Luigi Paganetto *Editor*

Stagnation Versus Growth in Europe

Capitalism in the 21st Century

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Making Progress in Economic and Monetary Union

Pier Carlo Padoan

Abstract The debate on the future of monetary union is a great opportunity to strengthen the resilience of the European economy and of the European project at large. How we move forward in this new challenge should be guided by a few key principles: the link between short term and long term issues should be strengthened and based on a common vision.

The distinction between measures that require Treaty changes and those that do not should not be an obstacle to ambitious policy goals. Much can be done with the current treaty. Economic union is a multidimensional project: strengthening monetary and financial integration should go hand in hand with measures to boost growth and jobs. Strengthening EMU should be an opportunity to strengthen the relationship between EMU and non EMU member states, with reciprocal benefits for all of us and Europe as a whole.

1 The State of the Economy in Europe

The recovery that has been developing over the past several quarters in Europe is encouraging but modest. To obtain stronger and more sustained growth and job creation, decisive policy action is needed beyond the current policy mix and the positive contribution by the ECB policy stance. Action must be accelerated on several fronts: structural reforms, investment, and deeper economic integration. If on the contrary, complacency were to slow down policy efforts, visible progress in growth and job creation would fail to materialise. In such a case, as EU citizens are still heavily affected by the legacy of the crisis, in terms of unemployment, poverty, and inequalities the disaffection towards the European project would become more widespread than what already seen, boosting consensus for populist perspectives.

The European Union, and the euro area in particular, stand at a crossroads between muddling through a hesitant recovery or tackling the challenges of restoring growth potential, fostering employment within a stable macroeconomic

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environment, and rebuilding trust between the European institutions and European citizens. The Greek crisis and the possibility that exiting the euro could become a serious option has increased the risk that monetary union could become revertible and eventually unfold. We need a stronger policy mix, more effective economic governance, a consistent institutional architecture for the euro area and a stronger effort towards integration in the EU as a whole. We must proceed, along, and beyond, the lines recommended by the Five Presidents' Report "Completing Europe's Economic and Monetary Union", keeping in mind that a first set of measures can be implemented within the existing EU Treaty, while more far-reaching measures might require changes to the Treaty.

2 The Policy Mix in the EU

The current policy mix in the EU is moving in the right direction. The ECB's QE is having a positive impact on interest rates and financial markets. The weakening of the euro should also be seen as an indirect consequence of QE. It is important to note that the move towards a more proactive monetary policy stance in the Eurozone has been facilitated by the implementation of responsible fiscal policies and national reform programs in the EU Member States. QE also helps create more favourable conditions for the implementation of structural reform in Member States as reforms deliver better results in an expanding economy. The Commission's Communication on flexibility, in January 2015, has provided incentives to Member States to introduce and implement structural reform measures, through the structural reform clause. Overall such a policy environment, boosted also by lower oil prices, provides a window of opportunity that must be exploited without hesitation.

Recovery of investment is crucial to put the EU back on a path of sustainable growth. Investments support demand in the short-term, and strengthen supply and potential output in the medium-term. Over the recent past, the fall in investment in the European countries has been dramatic and widespread. To help reverse this trend, the Commission has launched the Juncker Plan and created the European Fund for Strategic Investment (EFSI). The Plan is an important opportunity to boost private investment with public support, that would bear the additional risk private companies are not prepared to take on.

But more needs to be done to support growth. Further strengthening the internal market is a priority and an opportunity that needs to be fully exploited: there is ample scope for additional benefits, through deeper integration, and stronger competitiveness. The single market has been at the heart of the European growth strategy for more than two decades; however, national interests, institutional barriers and bottlenecks, both at national and at EU level, have prevented to reap the full benefits in terms of competitiveness and growth. The ongoing efforts to revitalise the single market, targeted at removing obstacles to the single capital market and creating a Capital Markets Union, overcoming the segmentation of the energy market, and promoting the digital economy and innovation go in the right

direction. Beyond this we should keep in mind that the ultimate source of growth in an ageing economy such as the EU is through innovation driven productivity. In this respect the goal should be to move towards a fully fledged Innovation Union, i.e., the EU should adopt an integrated set of initiatives, to stimulate knowledge creation through education and research, which are the main drivers of innovation.

Structural reforms must be coordinated more effectively with fiscal policy, as recognized in the EU Commission's Communication on flexibility. Strong structural action will boost medium term growth thus supporting consolidation of public finance that will, in turn, strengthen economic growth. Better and more targeted use of fiscal space, in both spending and taxing decisions, will reinforce the impact of structural measures. All EU countries need to implement structural reforms. The more so euro area members that need to compensate the loss of an independent monetary policy with more flexibility and resilience in labour and product markets (this is, after all, one of the pillars that underpin optimum currency areas). *More symmetry is needed in macroeconomic adjustment*. Countries with current account surplus should take measures to reduce them, preferably though more investment. And structural reforms would support such rebalancing as they open profit opportunities that stimulate investment. Accommodative monetary policy would enhance the impact of structural reforms by maintaining favourable financing conditions.

The implementation of the Juncker Plan must be swift and provide a genuine additionality effect of public resources. The Plan should activate projects which would not otherwise materialise, due to excessive risk, market failures, or financial and budgetary constraints. The identification of high quality projects is one of the crucial issues for the success of the Plan. Last but not least the success of the Plan depends also on the contributions from national development banks, some of which have committed to supporting projects and platforms in the framework of the Plan.

A Capital Markets Union is a welcome initiative. The capital market in the EU is relatively less developed compared with the U.S.A. In the EU business environment funding is dominated by the banking system, and it is largely organised along national lines. Deeper and more accessible capital markets could contribute to boost investment, growth and jobs. To become effective in a long-term perspective, the EU single capital market requires greater convergence in corporate and bankruptcy regulatory regimes, as well as in tax law systems within the EU.

Much remains to be done in energy and labor markets. With regard to energy, the integration of national markets would have a significant impact on the competitiveness of the European economy, Harmonisation of national regulations of the labor market would encourage labor mobility and would be enhanced by the pooling of resources to support adjustment and reallocation. A common unemployment insurance scheme would increase the resilience of the Union (and more importantly the euro area) and facilitate macroeconomic stabilisation (I will return to this point later). Furthermore, the portability of individual pensions would help pooling national pension funds at European level, that could boost long term investment projects at EU level.

3 Changing Governance

To boost the performance of monetary union changes in governance are also needed. A monetary union is ultimately unstable if structural differences persist among member countries. EMU cannot survive in the long term unless it continues to move forward in terms of integration and convergence, ultimately leading to a political union. We cannot stay still. If we do we risk a return to the vicious circle of "fragmentation—short-termism—further fragmentation" that we have seen at work in the years of crisis, 2011 and 2012; we must instead put in place a virtuous circle of "integration-long-term strategies—more integration." To obtain such a change in direction the current policy mix must be strengthened along the lines discussed above; however, we also need significant changes in the governance and functioning of the Union.

To make monetary union really irreversible a change of approach is required: we must manage our European common house, not only on the basis of national interests, but by adopting a systemic, common vision.

This approach can be applied to a variety of policy dimensions. Much has been done towards a more coordinated assessment of national fiscal policies within the European Semester and at the Eurogroup level with the dedicated session to discuss the Draft Budgetary Plans before the final national approval of budgets. Nevertheless, more progress remains to be achieved for the definition of a coherent policy strategy, which considers, in a more systemic and explicit way, the supranational dimension and the implications for each country. We need to establish a much closer link between the analysis and policy recommendations at the aggregate level and their implications for individual countries, taking into account the spillover effects of national economic policies on other countries.

A stronger monetary union needs strong common institutions. Here too we are making progress but more needs to be done, in the short term, within the existing treaties and in the long term contemplating treaty change.

Let me offer an example, presenting briefly a proposal advanced by the Italian government.

To complement the national efforts to reform labor markets, a European mechanism to mitigate the cyclical unemployment and its consequences would enhance labor market adjustments, reinforcing the effectiveness of national reforms. It could also create incentives to increase convergence in labor market regulation. It would help consolidate medium term growth by smoothing downturns and preventing or limiting hysteresis. It would be a further sign of the irreversibility of the Euro, with a positive impact on expectations. Such an instrument could be established without treaty changes.

The development of a stabilisation function to cope with asymmetric shocks implies an increasing degree of integration and fiscal transfers financed by a common fiscal capacity. Crucially, such a European insurance scheme should—and could—be designed in a way to avoid permanent or unidirectional transfers. These mechanisms, which are part of existing well functioning monetary unions,

would give countries a chance to smooth out the adjustment needed in presence of adverse shocks, avoiding, altogether, overly restrictive adjustment policies. More generally mechanisms that strengthen the real side of the economy, labor and product markets, would complement existing institutions that underpin the architecture of EMU starting with Banking Union.

Let me quickly and partially list the "to do" agenda. Banking Union, is a great achievement in the process of institutional innovation. However, two elements are still missing: a single deposit guarantee scheme, and the implementation of the agreement on the establishment of a common public support (the so-called common backstop) for the Single Resolution Fund. A fully fledged Banking Union requires that all the pillars are at work. They are key to definitely break the sovereign-bank nexus and increase resilience against future crises.

The completion of the Banking Union should go hand in hand with the establishment of a genuine single capital market, a Capital Markets Union. In addition to boosting investment and growth this would also introduce a further element of risk sharing through the development of financial markets and the related insurance mechanisms. Moreover, the ties between euro and non euro member states would be strengthened.

The institution of the European Stability Mechanism (ESM) has been a major advance for the management of sovereign crises, through the use of pooled resources. As the urgency of the crisis is waning, we should focus on how to fully exploit the benefits of this pool of resources while preserving its ultimate firewall function. An ambitious goal, would be transforming the ESM into a European Monetary Fund. In the shorter term, the ESM could become the backstop for the above mentioned resolution fund to testify the determination of the euro area countries to jointly and effectively safeguard financial stability in the Union.

Finally, monetary union needs to be complemented by a Fiscal union. I cannot dwell on this aspect but limit myself to noting, all in all, that the process of institution building along these lines would ultimately lead to political union.

This leads me to the issue of trust. One lesson arising from the crisis, is that the stability and progress of economic and monetary union requires more mutual trust, and a more forceful systemic approach, which implies more attention to the positive externalities of the integration process. Mutual trust can be accumulated by showing peers that one country abides by the rules. Rules must be designed so as to reward good individual behaviour and discourage uncooperative behaviour (i.e., prevent moral hazard). At the same time, rules must provide for risk sharing mechanisms which increase payoff for cooperative behavior. Risk sharing mechanisms are a key component of well functioning monetary and economic unions. In other words rules must allow for mutualization. The two elements are reciprocally reinforcing. Preventing moral hazard strengthens trust and supports mutualisation. Risk sharing and mutualisation offer a powerful incentive to abide by the rules and prevent opportunistic behaviour.

Crises are detrimental (also) because they destroy trust, i.e., the very fabric of a monetary union. This is especially true for prolonged crisis. To strengthen monetary union we need to replace the vicious circle "mistrust-fragmentation", which

dominated during the crisis, with the virtuous sequence "confidence-mutualization". EMU was conceived from the very beginning as a means to build confidence. Rebuilding trust among Member States, and defusing national prejudices are the principles that should guide the actions of European governments in our effort to learn from the crisis.

4 Conclusion

To conclude. The debate on the future of monetary union is a great opportunity to strengthen the resilience of the European economy and of the European project at large. How we move forward in this new challenge should be guided by a few key principles.

1. The link between short term and long term issues should be strengthened and based on a common vision. There should be no excuse for concentrating only on the short term.
2. The distinction between measures that require Treaty changes and those that do not should not be an obstacle to ambitious policy goals. Much can be done with the current treaty, and thus build support for treaty changes when needed.
3. Economic union is a multidimensional project. Strengthening monetary and financial integration should go hand in hand with measures to boost growth and jobs. This would show European citizens that Europe can be a part of the solution and not part of the problem.
4. Strengthening EMU should be an opportunity to strengthen the relationship between EMU and non EMU member states with reciprocal benefits for all of us and Europe as a whole.

Long-Term Tendencies in the Shares of Total Household Income Flowing to Upper and Lower Quantiles of European Households

Fred Campano, Alberto Costantiello, and Dominick Salvatore

Abstract Using national household income shares for deciles of household of countries belonging to the European Union, and their corresponding per capita GDP, projections of the share of the total household income flowing to the richest (top 20) quintile and the poorest (bottom 40) quintiles were projected based on the income distribution trends that were prevailing from 2003 to 2011. The decile data are the published estimates made by Eurostat from the EU-SILC survey and the per capita data are estimates made by the United Nations Statistical Office. The projections model is based upon the World Bank model developed by Ahluwalia, Carter and Chenery in 1979. That model was in turn based on the Kuznets' hypothesis (1955) which postulated that income equality and socio/economic development have a quadratic relationship. The purpose of the exercise was to ascertain whether the shares between the richest and the poorest quintiles are diverging or converging. Our results for the European Union indicate that they are slightly converging, but at least there is no indication that they are diverging.

1 Introduction

Income inequality has been an issue in development circles for decades. For most of the last half of the twentieth century, focus has been on the differences between the living standards in developing and developed economies. More recently, there has

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been an increasing concern that within the developed countries, household income equality may be deteriorating and that perhaps richer households may be gaining an increasing share of the total available household income at the expense of the poorer households. For example, in the United States the share of total household income for households with annual incomes above $200,000[1] steadily increased from 0.9 % in 1967 to 4.8 % in 2013, while for households with annual incomes below $15,000, the share decreased from 16.3 to 12.7 % over the same period (De Navas-Walt and Procter 2014). Now the statistics are not perfect, there are some differences in the methodology used in the earlier sample surveys that produced these statistics, but since about the year 2000 most of surveys have become relatively consistent.

In this paper we look at the available historical income distribution data for the 28 countries that comprise the European Union to discern any long-term tendencies in the household shares of different quantiles of households. We also estimated trend equations for the shares to see the long-term direction. In brief, the data do not show a widening of the difference in the shares, but instead a very gradual narrowing of the differences (Fig. 1) as income per capita rises. This result is in agreement with Kuznets' inverted U-hypothesis[2] (see Kuznets 1955, 1963) which he postulated some 60 years ago, namely that income distribution worsens until a certain level of development is reached and then becomes more equal as development continues to rise. In the 1970s researchers (Ahluwalia et al. 1976, 1979) at the World Bank used income distribution data in the form of shares of income flowing to deciles of population (Jain 1975) to repeat Kuznets' (1965) experiment, but this time on a much larger group of countries which included many developing countries. Their finding supported the notion that there is a connection between income inequality and development the way Kuznets postulated that it would happen. A flurry of research in the Kuznets hypothesis followed, some authors supporting it (i.e., Papanek and Kyn 1986) and other studies that cast doubt on the "U-" or

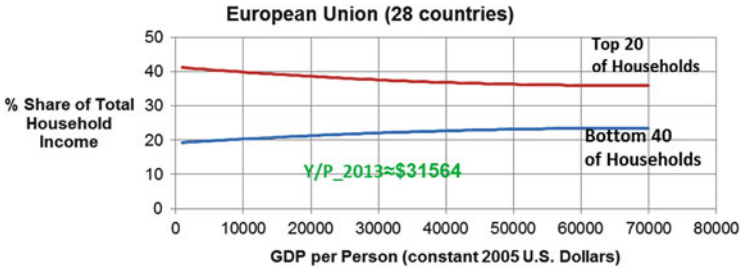

Fig. 1 EU income shares projected over increasing income per capita income

[1] Measure in constant 2013 U.S. dollars (CPI-U-RS). **Income and poverty in the United States: 2013, Current Population Reports P60-249. U.S. CENSUS BUREAU**.

[2] In the 100th Anniversary issue of *The American Economic Review (*Feb. 2011), Kuznets' 1955 publication was selected as one of the "Top 20" articles published in the journal over its 100 years of existence.

"inverted U-" hypothesis (Randolph and Lott 1983; Deininger and Squire 1998; Forbes 2000). However, in most of the studies that did not find a connection between growth and inequality the Gini coefficient was the statistic used to measure inequality, whereas in studies that supported the hypothesis (Campano and Salvatore 1988, 2007) the relative decile shares were the used for a measure of inequality.

We should point out that we are using per capita income as a proxy for economic development. This may not be the whole development story for many countries, especially those in the south. However, for the EU where there is a high awareness of social needs and where the corresponding governmental institutions to deal with them are in place, it is probably as good as a proxy as any other.

2 The Data

It is useful to look at the data input which produced our results before we discuss them. The income distribution data were taken from the United Nations University (UNU-Wider) **World Income Inequality Database**, WIID3A. These are presented in deciles and quintiles; we selected the deciles. The numbers originate from different sources; we selected the data that were contributed by Eurostat. These are as consistent as one can expect. They are based upon common concepts and definitions for the member countries and have a continuous series from 2003. The data originate in the EU-SILC, which is a survey of income and living conditions. The income concept that is used for *quantiles* (see EUROSTAT 2014) is *Equivalised disposable income after social transfers of quantile group*. For some of the years in WIID3A there are non-Eurostat estimates, usually done by scholars, but they are not necessarily consistent through time or across countries. The estimates of GDP per capita come from the United Nations Statistical Office National Accounts estimates of the expenditure table. The UN figures were expressed in United States Dollars, and we left them in those units for convenience, but they could easily be converted to Euros without loss of general conclusions.

3 Regression Models

All the estimation was done on a pooled time series across countries. We first pooled all 28 members of the European Union and estimated a set of equations and then pooled only the countries in the Eurozone. Altogether we had 206 observations for the 28 countries. The following functional forms were estimated for both the entire EU and the 18 countries in the Eurozone:

1. $$\text{Share} = a + b\, Y/P$$

2. $$\text{Share} = a + b\,Y/P + c[Y/P]^2$$

3. $$\text{Share} = a + b\ln(Y/P)$$

4. $$\text{Share} = a + b\ln(Y/P) + c[\ln(Y/P)]^2$$

For the 28 countries we obtained the following results:

Equations for the Top 20

$$\underset{(111.6)}{\text{Share} = 39.77563} \underset{(-5.8)}{- 5.9\text{E}-05\,Y/P},\ R^2 = 0.14$$

$$\underset{(80.1)}{\text{Share} = 41.36674} \underset{(-6.0)}{- 0.00016\,Y/P} + \underset{(4.1)}{1.18^{\text{E}}-09}\,[Y/P]^2,\ R^2 = 0.20$$

$$\underset{(13.9)}{\text{Share} = 56.99957} \underset{(-4.6)}{- 1.84798\ln(Y/P)},\ R^2 = 0.13$$

$$\underset{(2.9)}{\text{Share} = 103.4962} \underset{(-1.6)}{- 11.0979\ln(Y/P)} + \underset{(1.3)}{0.455028}\,[\ln(Y/P)]^2,\ R^2 = 0.21$$

Equations for the Bottom 40

$$\underset{(73.2)}{\text{Share} = 20.34508} + \underset{(6.1)}{4.76\text{E}-05\,Y/P},\ R^2 = 0.15$$

$$\underset{(47.4)}{\text{Share} = 19.12766} + \underset{(6.0)}{.000126\,Y/P} \underset{(-4.0)}{- 9\text{E}-10}\,[Y/P]^2,\ R^2 = 0.22$$

$$\underset{(2.4)}{\text{Share} = 5.277428} + \underset{(7.6)}{1.632521\ln(Y/P)},\ R^2 = 0.22$$

$$\underset{(-1.5)}{\text{Share} = -42.4494} + \underset{(2.0)}{11.21979\ln(Y/P)} \underset{(-1.7)}{- 0.47928}\,[\ln(Y/P)]^2,\ R^2 = 0.22$$

Upon inspection of the estimated coefficients we see that in practically all of the equations the t-tests (in parenthesis) are quite strong. More importantly, the signs are consistent. All equations for the Top 20 indicate a **declining** share of the total household income as per capita GDP increases, and all the equations for the Bottom 40 point to an **increasing** share of the total household income as per capita GDP increases. We also get the same direction for the Bottom 20 (in Appendix) as we do for the Bottom 40. The magnitude of the change is quite small from 1 year to the next, but that is to be expected. A doubling of the per capita GDP only raises the share of the Bottom 40 by 3 or 4 %. For a country whose per capita GDP is growing at 4 % annually, it would take about 17.7 years to double. This might be difficult for the more established countries in the European Union, but for many of the new members it seems quite possible.

In Fig. 2 we see that the "transition" countries have average growth rates of per capita GDP over 4.5 % (2000–2013), while the 15 members (who entered the EU before 2000) have rates under 4.5 % for the same period. This sheds some light on why the tendency is towards more equality rather than higher inequality. With the exception of Luxembourg, which is an outlier, and Malta which until recently was considered a developing country, the countries with the fastest growing per capita incomes are the more recent members of the EU and former "transition" countries. Most of these became members in 2004, but some joined later. We see in Fig. 3 that these are the countries with the lowest per capita incomes. In other words, the poorest countries in the EU are the ones whose per capita incomes are improving the fastest. The implication of this is a reduction of inequality. Perhaps, the EU policy of free labor mobility between member countries is one of the most important reasons for this. As low paid wage earners migrate out of the poorer countries to the richer countries their incomes increase. Often the member of the family who moves to a foreign country for employment sends back remittances to the family in the home country. The remittances add-up and by themselves can make a significant contribution to the standard of living in the home country. At the same time, less labor in the home country causes the labor supply curve to shift up, raising the home wage. Also, the lower wages in the poorer (lower per capita) countries attracts foreign direct investment from the higher-waged richer countries, contributing to higher growth.

However, we should not expect the transition countries to maintain a faster growing per capita income forever. A more likely scenario is that as the transition countries' per capita incomes approach levels of the non-transitional countries, the per capita growth rates will slow down.

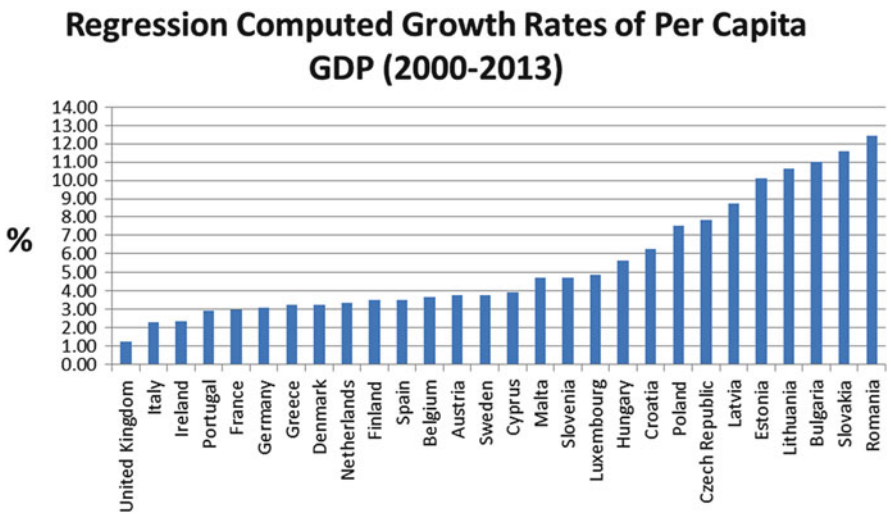

Fig. 2 Per capita GDP rates of growth (2000–2013) for European Union Countries

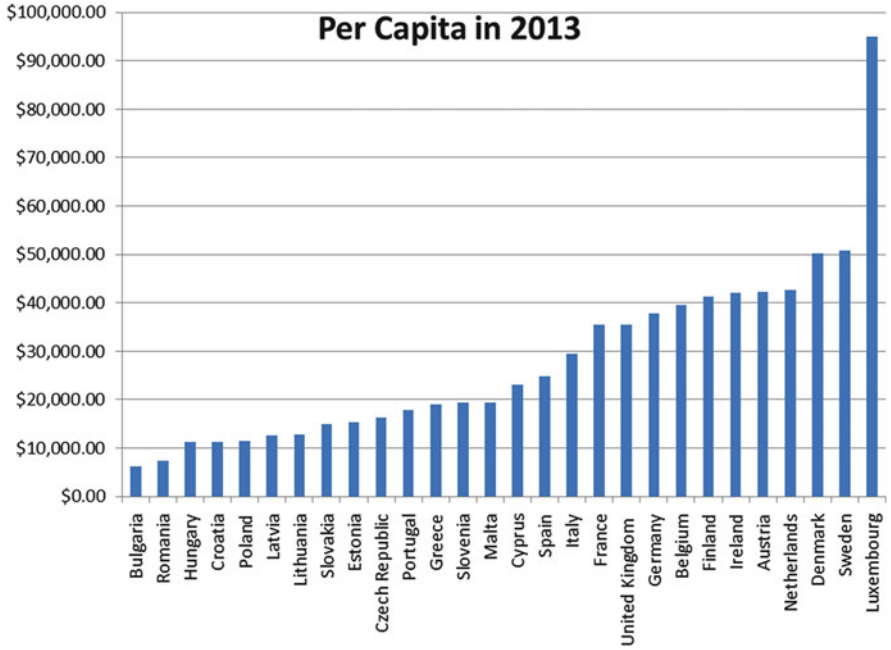

Fig. 3 The ranking of EU countries by per capita GDP in 2013

A contributing factor to the more even distribution of income found in the European Union is the effort that the EU makes to address the problems associated with human welfare. They are keenly aware of the human degradation that can result from *social exclusion*, a term which refers to several types of social disadvantage; including living below the poverty threshold, as well as the exclusion of minorities, people with disabilities, and those who suffer from other forms of discrimination. The European Council (June 2010) has set targets which include promoting educational levels and promoting social inclusion through the reduction of poverty. Such action automatically increases the share of total income flowing to the poorer populations.

4 Income Mobility

Generally speaking, the social agenda of the European Union promotes income equality for its member countries. When EU Gini coefficients are compared with the other developed countries (where they are published) such as the United States and Canada, the EU coefficients are lower. Most of the EU-SILC Gini coefficients are less than 0.35, while in the U.S. and Canada they are above 0.35. In the U.S. the most recent estimates are above 0.45. The U.S. estimates are based on *Equivalent-Adjusted Income (P-60, 149)*. Under this definition a single-person household

would have twice the income of a two-person household if each household had the same total income. However, in the U.S. there is income mobility. Approximately 31 % of the households in the poorest quintile in 2004 moved up to a higher quintile in 2007, and about 32 % of households that were in the richest quintile in 2004 moved to a lower quintile in 2007 (Current Population Report P60-149). Households with lower levels of education were more likely to remain or move to a lower quintile. Chronic poverty was relatively uncommon with about 3.5 % of the families remaining in poverty for the entire 36 months. So in the US, while there is overall higher inequality, there is also hope that with education a household can move to higher levels of relative income.

While we do not have any statistics on the percentage of households that have moved from lower income quintiles to higher income level quintiles in the EU, we can get sense of the income mobility there by looking at some of the studies done on *Intergenerational Transmission of Disadvantage Statistics* (Statistics in Focus 27/2013) by Eurostat. Authors Sigita Grundiza and Cristina Lopez present statistics on the correlation between the level of education of parents and their children. They concluded that:

In the EU the transmission of the level of education from parents to children is 34.2 % for a low level of education, 59.2 % for a medium level, and 63.4 % for a high level. Even though the persistence of a low level of education is the smallest among the three education levels, the share of respondents with a low level of education was much higher among those whose parents had a low level of education (34.2 %) than among those whose parents had a high level of education . . .54.2 % of current adults in the EU-28 had parents with low education, 29.5 % had parents with medium education and 16.3 % had parents with high education.

Judging by these transmission rates it seems as though there are opportunities for income mobility based on educational attainment in the EU. However, for those who remain in the bottom quintile, there is still a generous safety net which provides a cushion of basic needs.

5 The Eurozone Countries

Although the Eurozone countries are only 18 countries out of the 28 that comprise the whole European Union, the regression equations estimated for them produced coefficients that are not very different than the equations for the 28. These are shown below.

5.1 Eurozone (141 Observations)

Equations for the Top 20

$$\underset{(88.1)}{\text{Share} = 39.41876} \underset{(-3.6)}{- 4.2\text{E-}05\ \text{Y/P}},\ R^2 = 0.08$$

$$\underset{(53.4)}{\text{Share} = 41.34966} \underset{(-4.0)}{- 0.00015\ \text{Y/P}} \underset{(3.0)}{+ 1.05\text{E-}09\ [\text{Y/P}]^2},\ R^2 = 0.14$$

$$\underset{(13.9)}{\text{Share} = 56.99957} \underset{(-4.6)}{- 1.84798\ \ln(\text{Y/P})},\ R^2 = 0.13$$

$$\underset{(2.7)}{\text{Share} = 146.9392} \underset{(-1.9)}{- 19.4797 \ln(\text{Y/P})} \underset{(1.7)}{+ 0.861634\ [\ln(\text{Y/P})]^2},\ R^2 = 0.15$$

Equations for the Bottom 40

$$\underset{(60.1)}{\text{Share} = 20.58581} \underset{(4.1)}{+ 3.67\text{E} - 05\ \text{Y/P}},\ R^2 = 0.11$$

$$\underset{(32.2)}{\text{Share} = 19.07977} \underset{(4.2)}{+ .000118\ \text{Y/P}} \underset{(-3.07)}{- 8.2\text{E-}10\ [\text{Y/P}]^2},\ R^2 = 0.17$$

$$\underset{(1.9)}{\text{Share} = 5.843464} \underset{(5.1)}{+ 1.555345\ \ln(\text{Y/P})},\ R^2 = 0.16$$

$$\underset{(-1.1)}{\text{Share} = \text{-}45.8715} \underset{(1.5)}{+ 11.6935\ \ln(\text{Y/P})} \underset{(-1.3)}{- 0.49544\ [\ln(\text{Y/P})]^2},\ R^2 = 0.16$$

Figure 4 shows the semi-log equations for the Top 10 % and the Bottom 40 % projected for the 18 countries that are members of the Eurozone. These indicate the same tendency as the shares for the 28 as a whole, however, the convergence is much faster. This is because there are fewer "transition" countries as a proportion to

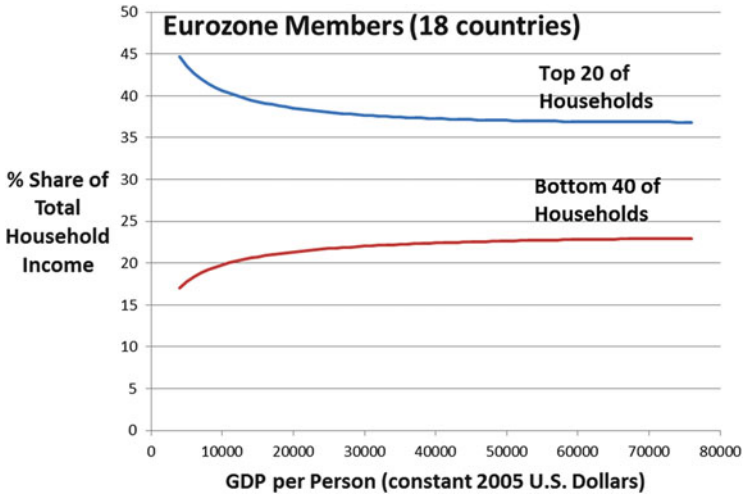

Fig. 4 Eurozone projected household income shares over increasing income per capita

the total (4/18 as compared to 11/28) and hence there is less "catching-up" to do. However, since all countries in the EU have free trade and income mobility with one-another, regardless of their currency, it makes more sense to analyze the long-term shares in terms of the whole group of 28.

6 Conclusions

The income distribution data from Eurostat provides an ideal research base of consistent data to extrapolate the income shares of members of the European Union. The linear and quadratic estimations of the shares of income flowing to the "Top 20 %", i.e., the richest 20 % and "Bottom 40 %" of households in the EU indicate a gradual reduction in the gap between these two groups. While the reduction is not more than a few percentage points over a wide range of per capita incomes, it is nevertheless a reduction and not an increase. Our estimation indicates that income inequality among households is not worsening in the European Union.

Intergenerational income stagnation also does not seem to be a problem in the EU. Access to high quality free education and nationalized health care make it possible for all individuals living in the EU to develop to their potential. There are no barriers preventing children from moving to higher levels of education than their parents have achieved. While some may argue that there is no scientific evidence that links education and income in the European Union, there is every reason to believe they are correlated there as they are in other parts of the developed world. Hence, upward income mobility is probably present in the EU, especially for those who obtain higher levels of education. Overall, the European Union offers its residents a high standard of living, especially as compared to the rest of the world.

Appendix: Regression Results T-Value in Parenthesis

Entire European Union (28 Countries, 206 Observations)

Equations for the Top 10

$$\underset{}{\text{Share}} \underset{(83.9)}{= 24.7752} \underset{(-5.3)}{- 4.4\text{E-}05\ \text{Y/P}},\ R^2 = 0.12$$

$$\underset{(59.9)}{\text{Share} = 25.91913} \underset{(-5.3)}{- 0.00012\ \text{Y/P}} \underset{(3.5)}{+ 8.46\text{E-}10\ [\text{Y/P}]^2},\ R^2 = 0.17$$

$$\underset{(16.4)}{\text{Share} = 38.45539} \underset{(-6.4)}{- 1.4834\ \ln(\text{Y/P})},\ R^2 = 0.17$$

$$\underset{(2.5)}{\text{Share}} = \underset{(-1.4)}{73.51805 - 8.52671\ \ln(Y/P)} + \underset{(1.2)}{0.352101\ [\ln(Y/P)]^2},\ R^2 = 0.17$$

Equations for the Bottom 40

$$\underset{(73.2)}{\text{Share} = 20.34508} + \underset{(6.1)}{4.76\text{E-}05\ Y/P},\ R^2 = 0.15$$

$$\underset{(47.4)}{\text{Share} = 19.12766} + \underset{(6.0)}{.000126\ Y/P} - \underset{(-4.0)}{9\text{E-}10[\ Y/P]^2},\ R^2 = 0.22$$

$$\underset{(2.4)}{\text{Share} = 5.277428} + \underset{(7.6)}{1.632521\ \ln(Y/P)},\ R^2 = 0.22$$

$$\underset{(-1.5)}{\text{Share} = -42.4494} + \underset{(2.0)}{11.21979\ \ln(Y/P)} - \underset{(1.7)}{0.47928\ [\ln(Y/P)]^2},\ R^2 = 0.22$$

Equations for the Bottom 20

$$\underset{(49.4)}{\text{Share} = 7.527777} + \underset{(6.0)}{2.58\text{E-}05\ Y/P},\ R^2 = 0.15$$

$$\underset{(31.0)}{\text{Share} = 6.925569} + \underset{(5.6)}{6.47\text{E-}05 Y/P} - \underset{(-3.6)}{4.5\text{E-}10\ [\ Y/P]^2},\ R^2 = 0.20$$

$$\underset{(-0.5)}{\text{Share} = -0.6351} + \underset{(7.5)}{0.884592\ \ln(Y/P)},\ R^2 = 0.22$$

$$\underset{(-1.96)}{\text{Share} = -29.4277} + \underset{(2.2)}{6.668384\ \ln(Y/P)} - \underset{(-1.92)}{0.28914\ [\ln(Y/P)]^2},\ R^2 = 0.23$$

Eurozone (18 Countries, 141 Observations)

Equations for the Top 10

$$\underset{(65.2)}{\text{Share} = 24.48076} - \underset{(-3.1)}{3\text{E} - 05\ Y/P},\ R^2 = 0.06$$

$$\underset{(39.2)}{\text{Share} = 25.801} - \underset{(-3.3)}{0.0001\ Y/P} + \underset{(2.4)}{7.156\text{E-}10[\ Y/P]^2},\ R^2 = 0.1$$

$$\underset{(10.8)}{\text{Share} = 37.27335} - \underset{(-4.0)}{1.34446\ \ln(Y/P)}, R^2 = 0.1$$

$$\underset{(2.4)}{\text{Share} = 109.4812} - \underset{(-1.8)}{15.5\ \ln(Y/P)} + \underset{(1.6)}{0.691761\ [\ln(Y/P)]^2},\ R^2 = 0.12$$

Equations for the Bottom 40

$$\underset{(60.1)}{\text{Share} = 20.58581} + \underset{(4.1)}{3.67\text{E-}05\ Y/P},\ R^2 = 0.11$$

$$\underset{(32.2)}{\text{Share} = 19.07977} + \underset{(4.2)}{.000118\ Y/P} - \underset{(-3.07)}{8.2\text{E-}10[\ Y/P]^2},\ R^2 = 0.17$$

$$\underset{(1.9)}{\text{Share} = 5.843464} + \underset{(5.1)}{1.555345 \ln(Y/P)},\ R^2 = 0.16$$

$$\underset{(-1.1)}{\text{Share} = -45.8715} + \underset{(1.5)}{11.6935 \ln(Y/P)} - \underset{(-1.3)}{0.49544 [\ln(Y/P)]^2},\ R^2 = 0.16$$

Equations for the Bottom 20

$$\underset{(41.1)}{\text{Share} = 7.652694} + \underset{(4.0)}{2.16\text{E-}05\ Y/P},\ R^2 = 0.12$$

$$\underset{(21.3)}{\text{Share} = 6.872603} + \underset{(4.2)}{6.38\text{E-}05 Y/P} - \underset{(-2.9)}{4.2\text{E-}10[\ Y/P]^2},\ R^2 = 0.17$$

$$\underset{(-0.5)}{\text{Share} = -0.66682} + \underset{(7.5)}{0.880538 \ln(Y/P)},\ R^2 = 0.17$$

$$\underset{(-0.9)}{\text{Share} = -19.5366} + \underset{(1.05)}{4.57976 \ln(Y/P)} - \underset{(-0.85)}{0.18078 [\ln(Y/P)]^2},\ R^2 = 0.17$$

Adding a Dummy Variable for the Transition Countries

Equation for the Top 10

$$\underset{(3.78)}{\text{Share} = 109.9372} - \underset{(-2.48)}{14.233 \ln(Y/P)} + \underset{(1.2)}{0.568013 [\ln(Y/P)]^2} - \underset{(-4.83)}{2.4875 \text{Dum}},\ R^2 = 0.30$$

Equations for the Bottom 40

$$\underset{(-3.27)}{\text{Share} = -84.9906} + \underset{(3.48)}{17.88526 \ln(Y/P)} - \underset{(-2.88)}{0.73148 [\ln(Y/P)]^2} + \underset{(6.31)}{2.825335 \text{Dum}},\ R^2 = 0.36$$

Equations for the Bottom 20

$$\underset{(-3.8)}{\text{Share} = -53.7121} + \underset{(3.75)}{10.47333 \ln(Y/P)} - \underset{(-3.13)}{0.43311 [\ln(Y/P)]^2} + \underset{(6.62)}{1.612826 \text{Dum}},\ R^2 = 0.37$$

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When "Secular Stagnation" Meets Piketty's Capitalism in the Twenty-First Century: Growth and Inequality Trends in Europe Reconsidered

Karl Pichelmann

> *. . .to ensure equilibrium conditions of prosperity over a period of years it will be essential, either that we alter our institutions and the distribution of wealth in a way which causes a smaller proportion of income to be saved, or that we reduce the rate of interest sufficiently to make profitable very large changes in technique or in the direction of consumption which involve a much larger use of capital in proportion to output. Or, of course, as would be wisest, we could pursue both policies to a certain extent.*
> *J.M. Keynes (1937), Some economic consequences of a declining population, Eugenics Review XXIX, No. 1*

Abstract The spectre of "secular stagnation" has been haunting both pundits and policymakers for some time. In weighing the question of whether slow growth in Europe and other advanced countries reflects some kind of ongoing stagnation problem, it's important to be clear on the concept. Moreover, in view of the hotly debated bi-causal interaction between lacklustre economic growth and growing inequalities in the distribution of income and wealth fuelled by Piketty's recent bestseller, it may be useful to recall some of the fundamental insights about capital accumulation, growth and distribution in order to take a look at the secular stagnation hypothesis from this angle as well. Against that background, the paper first reviews the secular stagnation hypothesis and variants thereof, discussing its plausibility and confronting it with the empirical evidence from a European

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perspective. It then looks into the nexus between growth patterns and the trends in the distribution of income and wealth. Finally, it offers some policy conclusions that can be derived from the analysis.

1 Introduction

Economic indicator readings for the first half of 2015 have brightened the near term outlook for economic activity in the euro area, alleviating concerns that the economy could again go into reverse. However, the expected pace of recovery remains weak, making little inroads into persistently high unemployment. Europe not only continues to struggle to leave the legacies of the crisis behind it; economic growth remains also weighed down by unfinished macroeconomic adjustment and sluggish implementation of reforms, as well as long-standing poor productivity growth trends. Against that background, the spectre of "secular stagnation" has been haunting both pundits and policymakers for some time, in particular in Europe. Indeed, there is still a serious risk that anaemic growth could become the new, dismal normal of the euro area. Over and above the implications for economic welfare and social cohesion, such an outcome would obviously also impose a major strain on the new and still largely untested EU policy co-ordination framework.

But while the term "secular stagnation" was widely repeated, it was not commonly understood. Barry Eichengreen, in his blog, pointed out that "secular stagnation, we have learned, is an economist's Rorschach test". It can mean different things to different people. In weighing the question of whether slow growth in Europe and other advanced countries reflects some kind of ongoing stagnation problem, it's important to be clear on the concept. Moreover, in view of the hotly debated bi-causal interaction between lacklustre economic growth and growing inequalities in the distribution of income and wealth fuelled by Piketty's recent bestseller, it may be useful to recall some of the fundamental insights about capital accumulation, growth and distribution in order to take a look at the secular stagnation hypothesis from this angle as well. In fact, inequality could well be seen the defining challenge of our time (Krugman 2013).

The plan of this paper is as follows. Section 2 reviews the secular stagnation hypothesis and variants thereof, discussing its plausibility and confronting it with the empirical evidence from a European perspective. Section 3 looks into the nexus between growth patterns and the trends in the distribution of income and wealth. Finally, Sect. 4 offers some policy conclusions that can be derived from the analysis.

2 Getting Out of (Secular) Stagnation

The revival of a debate about secular stagnation started in late 2013. Is it possible that the US and other major global economies might not return to full employment and strong growth without the help of unconventional policy support? That question—put in the frame of the old idea of "secular stagnation"—was raised by former U.S. treasury secretary and Harvard professor Lawrence Summers in a talk hosted by the IMF, and further explored and elaborated in a panel contribution at the AEA meeting 2014 in Philadelphia and in two subsequent comments in the FT. It should be noted that Summers was careful to depict secular stagnation as a contingency to be insured against—not a fate to which we ought to be resigned. His remarks clearly struck a chord and led to an intense debate among both pundits and policymakers (see the overview in Teulings and Baldwin 2014).

The basic tenet of the Keynesian-flavour secular stagnation hypothesis as illustrated in Fig. 1 is a chronic shortfall of aggregate demand due to an excess of private savings over private investments, which can only be eliminated by a significantly negative real interest rate—loosely speaking, households are not spending enough and firms are not investing enough even at near-zero interest rates (quote Summers: "With short-term interest rates constrained by the zero lower bound, real rates may not be able to fall enough to spur enough investment to lead to full employment").

Summers offers several explanations why the level of spending at any given set of interest rates is likely to have declined. Investment demand may have been reduced due to a slower growth of the labour force and perhaps slower productivity growth. Consumption may be lower due to a sharp increase in the share of income and wealth held by the very wealthy and the rising share of income accruing to capital. (Those with very high incomes have a relatively low propensity to consume, and virtually all the income gains in the United States have gone to those with very high incomes.) Risk aversion has gone up as a consequence of the crisis and saving—by both government and consumers—has risen. The crisis increased the cost of financial intermediation and left major debt overhangs. Declines in the cost

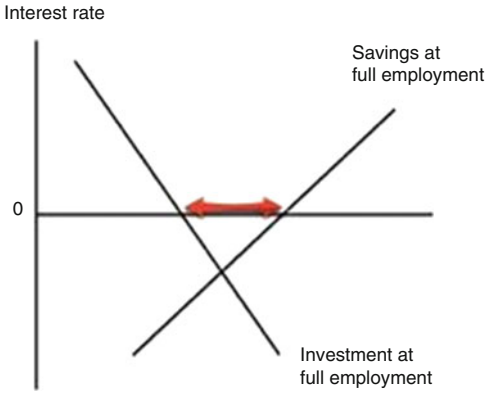


Fig. 1 Savings-investment schedule at full employment

of durable goods, especially those associated with information technology, meant that the same level of saving purchases more capital every year. And lower (expected) inflation is encouraging consumers and investors to delay spending, and to redistribute income and wealth from high-spending debtors to low-spending creditors. Overall, the result is a glut of savings that firms are unable to invest at any interest rate greater than zero. Thus, the advanced countries find themselves with extraordinarily low interest rates as this glut of savings floods the market, and yet with not enough investment to absorb it or to sustain a respectable rate of growth.

However, as Summers points out, a strategy that relies on interest rates significantly below growth rates for long periods of time virtually guarantees the emergence of substantial bubbles and dangerous build-ups in leverage. Note that standard economic theorising actually rules out the long-term possibility of the (real) interest rate staying below the rate of growth as this would violate the no-Ponzi game condition.

Empirical estimates for the "Wicksellian" natural interest rate for the Euro area indeed suggest that it may well have moved into negative terrain (see Fig. 2, OECD 2014). However, a setting where real equilibrium interest rates are negative for decades is fundamentally instable and incompatible with capitalism as we know it; in consequence, unsurprisingly, this case is basically ignored by card-carrying members of the economics profession. Note also, that savings rates tend to fall as growth declines, with the benchmark theory maintaining that at zero growth the net savings rate will be zero as well. Thus, a permanent savings glut hypothesis rests on shaky theoretical and empirical grounds.

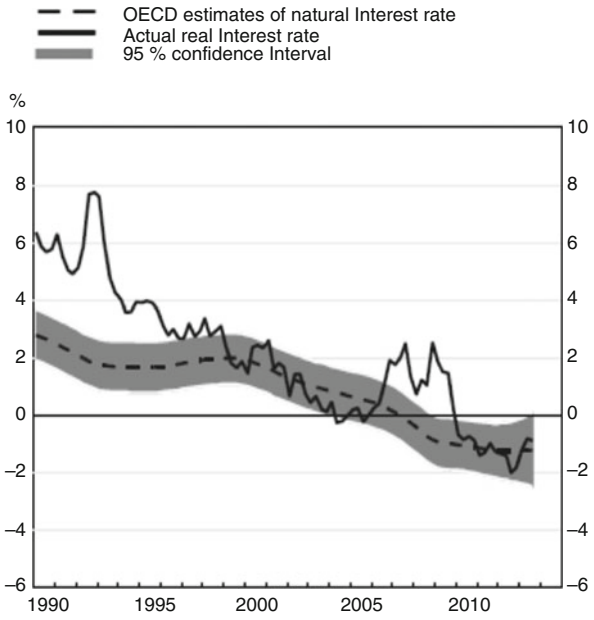


Fig. 2 Real interest rates 1990–2015

And obviously, the savings glut explanation needs to be put in a global perspective. As Barry Eichengreen has stressed, what matters for interest rates is not U.S. (or EU, my addition) saving but global saving, since funds can move across borders. In fact, global saving has held stable for the last 15 years at 23–24 % of global GDP. Looking ahead, with China rebalancing its economy toward consumption, there is some reason to think that the global saving rate will come down. Still, savings-investment imbalances across world regions will in all likelihood continue to characterise the global economy, making a fundamental case for trade integration, FDI and the free movement of capital.

Turning to persistent investment shortfalls (over and above the hysteresis-related fallout from the crisis), this is the issue where the demand-side explanations meet with supply-side fundamentals. Growing gaps in public investment in both tangible and intangible infrastructure investment, including education and training, are evident for many observers. Yet it is difficult to imagine that public spending could compensate for persistent weakness in private investment, not least given high levels of public debt. Thus, obviously, a sobering supply-side narrative can also be told; indeed, the specific term "secular stagnation" is one familiar to an earlier generation of economists. Many believed that the Great Depression had permanently changed the long-term trend rate of economic growth that was possible given the rate of growth of the population, technological progress and the decline of investment opportunities, among other things. The principal spokesman for this view was the Harvard economist Alvin Hansen (1938). The role of demographics has long been considered as crucial in that respect. Just recall that in Samuelson's consumption-loan model the natural rate of interest equals the rate of population growth; in slightly more general formulations, the crucial variable is the rate of population growth (set equal to the rate of labour force growth) plus the rate of technical progress (total factor productivity growth).

More recently, an attempt to formalise the idea of secular stagnation has been provided by Eggertson and Mehrotra (2014). In their paper they propose a simple overlapping-generations New-Keynesian model in which a permanent (or very persistent) slump is possible without any self-correcting force to full employment. The trigger for the slump is a deleveraging shock which can create an oversupply of savings. Other forces that work in the same direction and can both create or exacerbate the problem are a drop in population growth and an increase in income inequality. High savings, in turn, may require a permanently negative real interest rate. In contrast to earlier work on deleveraging, their model does not feature a strong self-correcting force back to full employment in the long-run, absent policy actions. Successful policy actions include, among others, a permanent increase in inflation and a permanent increase in government spending. The authors also establish conditions under which income redistribution can increase demand. Policies such as committing to keep nominal interest rates low or temporary government spending, however, are less powerful than in models with temporary slumps. They claim that their model sheds light on the long persistence of the Japanese crisis, the Great Depression, and the slow recovery out of the Great Recession.

While their model is certainly elegant and thought inspiring, the notion of the natural rate of interest being permanently negative is hard to swallow and relies on a specific formulation of savings behaviour in an OLG context; moreover, capital and investment are yet to be incorporated into the model. Still, their analysis sheds good light on the conditions for an economy to remain mired in a permanent recession or, put alternatively, for a liquidity trap of arbitrary duration.

The empirical evidence on secular stagnation having set in after the Great Recession differs considerably across countries and major world regions. While the overall hit on the level of real GDP has been almost universal, the post-crisis slowdown in growth rates of GDP has been particularly pronounced in Europe (see Fig. 3). In the euro area as a whole, economic growth has been mediocre at best, hysteresis effects have been significant, and monetary and fiscal policies may not have been sufficiently accommodative in view of strong deleveraging pressures on private and public agents and systemic constraints in the set-up of EMU. Obviously, these effects have been even more acute in the vulnerable countries (see Fig. 4).

But how plausible is it for stagnation to become really secular? Starting from a supply-side perspective, current medium term projections by ECFIN staff provide a scenario where the EA economy would eventually move partially back towards a pre-crisis growth rate, corrected for capital growth which appears to have been too high in the pre-crisis boom. This baseline scenario does not include any further growth impulses from structural reforms but is largely based on three assumptions: First, currently high levels of unemployment would not lead to long lasting hysteresis effects, second, about 2/3 s of the TFP growth decline could be recovered in the medium term and third, firms and households make use of investment opportunities offered by favourable reversals in supply side trends, but will not benefit from further reductions in capital cost. Under these conditions secular stagnation would

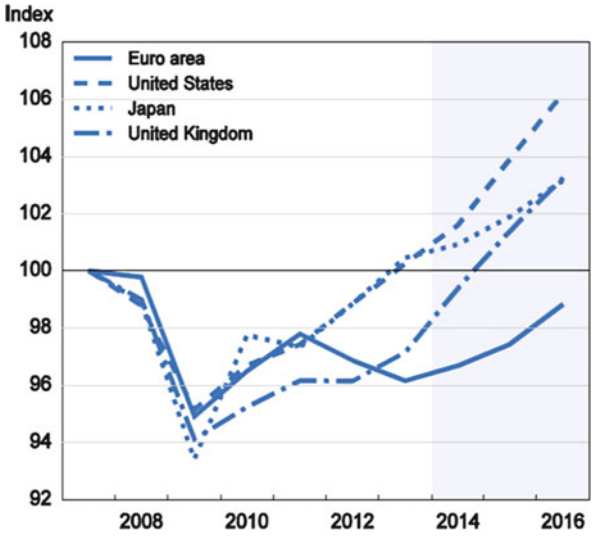


Fig. 3 Trajectories of real GDP

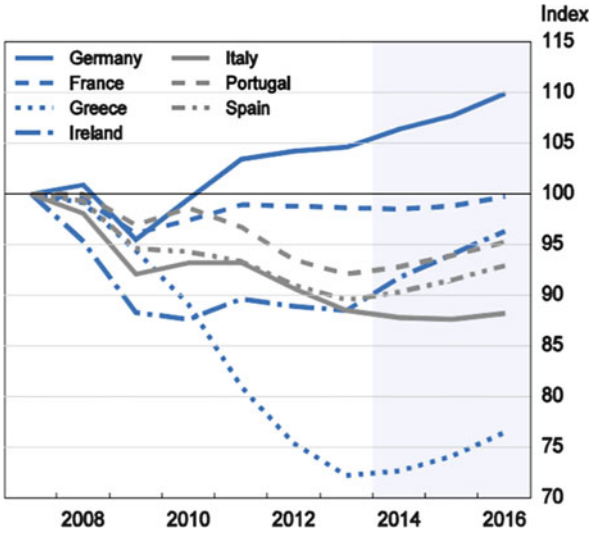


Fig. 4 Trajectories of real GDP

be avoided and average growth rates over the next 10 years could be at around 1.4 %; this also takes into account a closing of the output gap.

Looking at the supply side factors, there are two downside risks. First, hysteresis effects could be longer lasting than assumed in this projection. Apart from the standard arguments for hysteresis effects which are related to skill degradation of long term unemployed, an additional hysteresis risk appears in the current juncture, namely delayed wage adjustments in a low inflation environment. However, looking at the evidence on negative growth rates of both nominal and real unit labour costs in EA economies with high unemployment, this risk appears small. A stronger downside risk is associated with the assumed recovery of trend TFP growth to 0.6 % in the medium term. This implies a reversal of a long lasting downward TFP trend and can thus be seen as an optimistic assumption. If this trend reversal does not occur but TFP growth remains at 0.4 % (or even declines further to 0.3 % in case the downward trend persists), this could shave off 0.2–0.3 % from the average trend growth projection over 2014–2023.

A more fundamental challenge to this projection is probably coming from concerns about demand side factors which are related to debt overhang and deleveraging needs in many EA countries. ECFIN analysis of deleveraging scenarios indeed suggests that the deleveraging process leads to a prolonged slowdown of growth (over half a decade or so), but this process stabilises and the growth slowdown is not permanent. During this period private sector debt remains high and declines only slowly because of denominator effects. An important reason for debt remaining high initially is the fall of inflation which raises the real interest rate. This leads to a vicious circle of reductions in private consumption and investment aggravating the negative demand effect. However, as price and wage adjustment slows down, the real interest rate declines, domestic demand stabilises and the

deleveraging process gains momentum, eventually resulting in a return of employment and investment rates to baseline level over the medium term. In an open economy setting, additional stabilisation is provided by an improvement of external competiveness.

But obviously, these scenarios are subject to the criticism that current DSGE models may stress equilibrating mechanisms too much and neglect possibly insufficient price and wage adjustments (coordination failures), negative confidence effects and heightened risk aversion because of increased uncertainty. And, monetary policy may find itself overburdened with macro challenges given the current configuration of economic policy settings, including the SGP and, in particular, its debt rule.

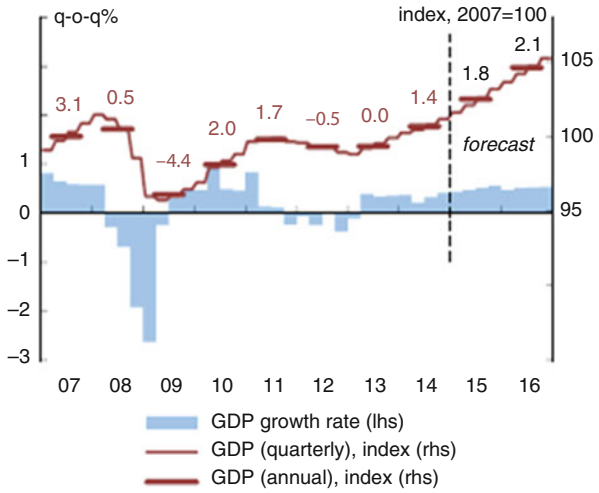
At the current juncture, however, some optimism may be justified that the Europe could break out from the low growth-low inflation "stagnation trap". Supported by further easing of monetary policy via the expanded asset purchase programme of the ECB and a more neutral stance of fiscal policy, the drop in oil prices and the weaker euro exchange rate, the momentum in economic activity is forecasted to accelerate over the horizon of the next 18 months (Fig. 5, European Commission, Spring Forecast 2015). However, while reaching a pace well above potential, it will still leave Europe with a significantly negative output gap at the end of 2016.

In conclusion, the strong Keynesian version of the secular stagnation hypothesis—in the reading of this paper the version based on a permanently negative natural rate of interest—appears to stand on shaky grounds, both theoretically and empirically, and fundamentally inconsistent with capitalism as we know it. However, this does not mean that chronic shortfalls of demand associated with prolonged periods of weak growth can be ruled out. On the contrary, it points to the need to address structural demand weaknesses and to augment the arsenal of the more traditional structural reform options. Failure to do so runs the risk "to be condemned to oscillating between inadequate growth and unsustainable finance" (Summers).

European policy makers have taken up this challenge. In its Annual Growth Survey for 2015, the Commission proposes that the EU pursue an integrated approach to economic policy built around three main pillars, all of which must act together—boosting investment, accelerating structural reforms and pursuing responsible growth-friendly fiscal consolidation. Indeed, standard pro-growth policies—labelled as structural reforms or supply-side policies—get a new focus when viewed from a demand side perspective.

First, as most saving behaviour is slow moving, boosting investment is the most suitable way of stimulating demand in the current environment. This is fairly undisputed and, in fact, efforts are ongoing at the European level to put an additional investment package—the so-called Juncker investment plan—on track.

Fig. 5 GDP growth



Figures above horizontal bars are annual growth rates.

Second, standard theory suggests that the steady-state capital stock grows at the sum of the growth rates of productivity and labour inputs. Thus, policies that stimulate innovation and increase efficiency and those that boost employment will raise the neutral "Wicksellian" interest rate and help to elude the zero-lower-bound problem, making evident the need to put together the major ingredients of a

renewed push to boost jobs, growth and investment along these lines. In fact, determined implementation of pro-growth structural policies appears all the more essential given the scepticism of some pundits regarding the evolution of fundamental growth drivers.

Indeed, starting from a traditional supply-side perspective, Bob Gordon (and others) has proclaimed the end of growth as faltering innovation confronts headwinds such as demography, education, inequality, globalization, energy/environment, and the overhang of consumer and government debt. Gordon offers an "exercise in subtraction" from the average US growth rate over the period 1987–2007 to arrive at a prediction that future growth in consumption per capita could fall below 0.5 for the bottom 99 %; see Fig. 6.

Specifically, Gordon has argued that electricity, the internal combustion engine and indoor plumbing were infinitely more important for boosting productivity and enhancing living standards than anything produced by the dot.com boom. Personal electronics may be great for playing games, but they are not so good for raising productivity. And there is no great invention equivalent to electricity or the internal combustion engine on the horizon.

However, as Eichengreen among others has argued, for economic historians this argument flies in the face of 200 years of experience. Pessimists have been predicting slowing rates of invention and innovation for two centuries, and they have been consistently wrong. (It should be recognised, though, that Gordon has significantly toned down his innovation pessimism in later contributions.) Many economists are much more optimistic, arguing that the effects of the IT revolution

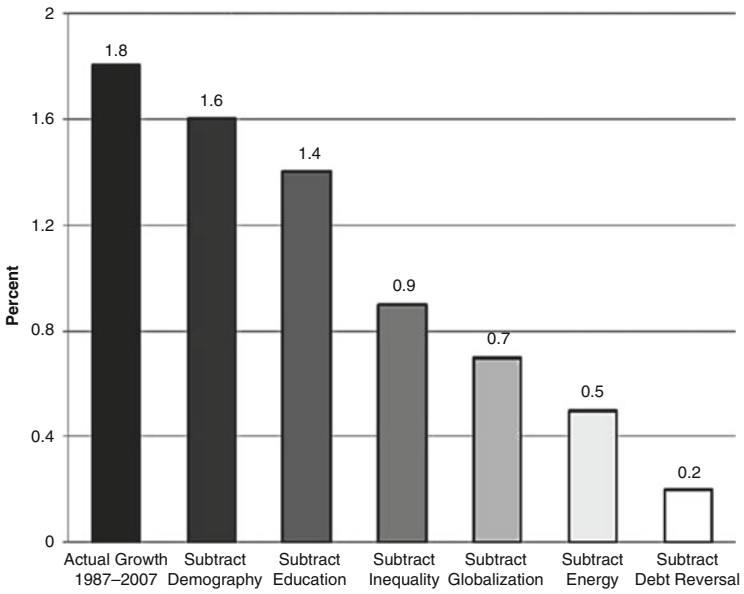


Fig. 6 Components of the exercise in Subtraction, from 1987 to 2007 Growth in Per-capita Real GDP, To Hypothetical Future Growth in Real consumption Per Captia for the Bottom 99 %

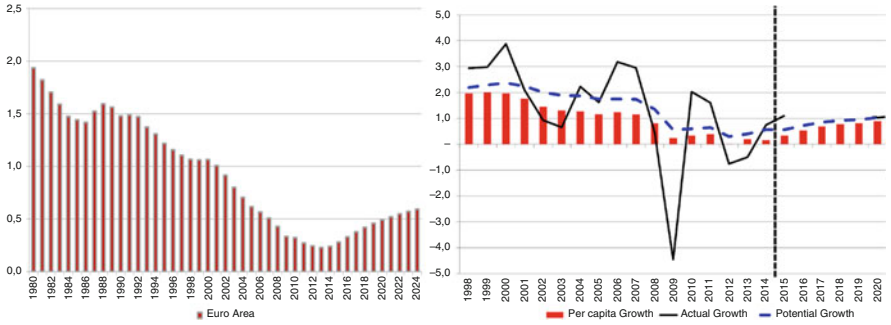


Fig. 7 Trend growth rates of TFP

will become cumulatively larger as they are applied in conjunction with robotic and biological advances. For example, Andrew McAfee and Erik Brynjolfsson's influential books on the march of the robots identify many reasons for believing that the "second machine age" is only just starting. Martin Wolf, among others, is taking this possibility and the risk of large-scale "technological unemployment" very seriously indeed. In fact, the evidence that we are learning how to use intelligent machines to replace first unskilled and eventually skilled labour suggests that we have an income distribution problem, not a growth problem stemming from lack of innovation.

Still, Europe's productivity growth problem is more than evident. Already before the crisis, trend growth rates of total factor productivity have continuously fallen over the past three decades. And the crisis years have dealt another blow to productivity growth, not least via the impact of pronounced investment shortfalls. In combination with the stagnant/declining working-age population this results in a dire medium-term projection for potential per-capita growth in the euro area, even under the assumption of a recovery towards pre-crisis productivity growth rates (see Fig. 7).

3 Secular Stagnation and the Distribution of Income and Wealth

Inequality has become a hot topic in the public debate. The width and the intensity of the debate following Piketty's book is a strong indicator for that. The financial crisis and its fall-out have fuelled a widely-held perception of unfair burden-sharing in society. However, already before the crisis growing inequalities in the distribution of income and wealth and of opportunities in life in general have prompted rising concerns. Inequality is now also firmly established on the radar screen of international organisations such as the IMF and the OECD, not least because the

growth and market integration process cannot enjoy sustained democratic support if benefits from growth accrue to just a small share of the population but fail to extend to society at large.

The interactions between patterns of economic growth and the trends in the distribution of income and wealth are complex and go both ways. It is now widely acknowledged that *excessive* inequality can have negative implications for long-term growth and macroeconomic stability. Inequality creates "*negative externalities*" for growth for a series of factors including higher social conflict, increased rent-seeking behaviour leading to misallocation of resources, lower social mobility leading to underinvestment in human capital, restricted access to education for low income groups and deviant behaviour. Empirical studies have corroborated the view that highly unequal societies experience shorter periods of high growth and that growth is less effective at lowering poverty. Moreover, from a purely demand side perspective, consumption may be structurally depressed due to a sharp increase of income held by the very wealthy and the rising share of income accruing to capital.

At the same time, recent work by Thomas Piketty (for a friendly review see for example Solow, more critical with some serious jibes embedded in praise see Summers 2014) suggested that absent redistributive policy action lower growth will inevitably lead to higher concentrations of wealth and a rising share of national income accruing to capital. But this conclusion has faced serious critique (Krusell and Smith 2014; Rognlie 2015). Recall that one of the basic relations in Piketty's book—derived from standard growth theory—is that the wealth income ratio (or, alternatively, the capital-output ratio) equals the ratio of the net savings rate relative to the growth rate (determined by the growth rate of the population and the rate of technical progress).

$$W/Y = s/g$$

Assuming a constant (and positive) net savings rate, Piketty argues that the wealth-income ratio will rapidly rise in the future as g is bound to fall significantly (broadly equivalent to an assumption of secular stagnation; but obviously, with g approaching zero, the wealth-income ratio will become infinitely large). If one further assumes that the rate of return to capital is largely insensitive to how much capital is accumulated, a cut in g by half (both considered as plausible by Piketty) would imply a doubling of capital's share in income and bring back levels of inequality similar to those in the nineteenth century since capital is so unevenly distributed today.

However, as argued above in the context of the discussion of the savings glut hypothesis, benchmark theory maintains that, at zero growth, capital is maintained at a constant level, i.e., the net saving rate is zero, in sharp contrast with Piketty's assumption. More generally, the prediction arising out of this literature is that savings rates tend to fall, not rise, as growth falls. Thus, neither the textbook Solow growth model nor a 'micro-founded' model of growth predicts anything

like the drama implied by Piketty's argumentation. In both cases, theory suggests that the wealth–income ratio would increase only modestly as growth falls.

But even if Piketty's projection of a rising wealth-income ratio (or capital-output ratio) was ultimately to come true, a key question is whether the rate of return on capital will not be bound to fall substantially under such circumstances; if so, the capital owners' claim on aggregate output may not be larger than before and the tendency for concentration of income arising via this channel will be fairly limited. In fact, recent work by Rognlie (2015) finds that although the net capital share has at times seen dramatic shifts both up and down, away from housing its long-term movement has been quite small, and there is not strong reason to suspect that this pattern will change going forward.

Thus, these authors argue that declining overall growth is simply not a powerful force for generating high inequality, and they would not want to make predictions based on it. What they put forward, instead, is that wealth dispersion in the Western world—which is very large and most definitely a compelling target of theoretical and empirical study—has primary determinants much different than those emphasised in Capital in the twenty-first century. These include, mentioning but a few, educational institutions, skill-biased technical change, globalisation, changes in the structure of capital markets, and the working of housing markets. It is to these forces that those who care about inequality should be devoting their attention, and to which policy reforms ought to be targeted. Similarly critical is Summers, who doubts that Piketty's theory emphasizes the right aspects even where capital accumulation is concerned. Looking to the future, his guess is "that the main story connecting capital accumulation and inequality will not be Piketty's tale of amassing fortunes. It will be the devastating consequences of robots, 3D printing, artificial intelligence, and the like for those who perform routine tasks... And the trends are all in the wrong direction, particularly for the less skilled, as the capacity of capital embodying artificial intelligence to replace white-collar as well as blue-collar work will increase rapidly in the years ahead."

Before now briefly sketching some main trends in the distribution of income, it may useful to recall three different (re-)distributional dimensions:

1. Broadening the pre-market distribution of endowments (including inheritances), education and skill formation, and in general enhance opportunities for all;
2. Improving the market distribution of gross wages and salaries, as well as of other types of revenues (such as income from capital);
3. Compressing the ex-post market distribution: lowering inequality of net disposable incomes (after tax and transfers, including transfers in-kind, and the provision of public goods and services).

General broad-based education and skill formation is the most important equalising driver of the pre-market distribution. However, endowment structures have changed to the disadvantage of (low-skilled) workers via trade integration and labour migration. Moreover, pre-market distributions have tended to grow more unequal due to the rising importance of fairly concentrated inheritances after a long period of capital accumulation uninterrupted by war time destruction. In some

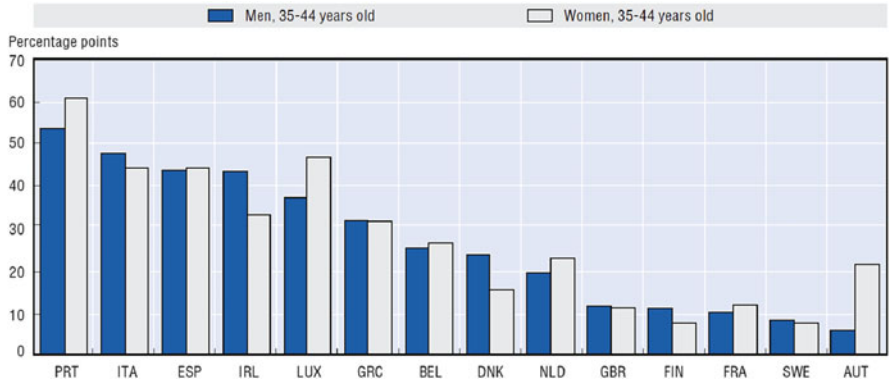


Fig. 8 Summary measure of intergenerational persistence in below upper secondary education

cases, limited social mobility has contributed to constrain access to good education perpetuating inequality in initial conditions. Indeed, work by the OECD found that in higher inequality countries, children born to poorly educated parents tended to do worse academically than those in lower inequality countries (Fig. 8). This suggested inequality hurts growth by leaving more people with inadequate skills.

Trends in market distribution are easier to assess empirically and show, almost unequivocally, that over the past 30 years inequality has been rising in high-income advanced economies (including some of the more egalitarian European countries) and falling in developing countries.

This is in line what one would expect in an era of globalisation. The particular supine S-shaped global growth incidence curve (see Lakner and Milanovic 2013, 2014) indicates that the largest gains were realised by the groups around the global median (with 9 out of 10 people in this group coming from 'resurgent Asia'). But after the global median, the gains rapidly decrease, becoming almost negligible around the 80th–90th global percentiles with the overwhelming majority in that group of 'losers' coming from the 'old, conventional' rich world. But not just anyone from the rich world. Rather, the 'losers' were predominantly the people who in their countries belong to the lower halves of national income distributions. Gains are then shooting up again for the global top 1 %. As a result, growth in the income of the top 5 % accounted for 44 % of the increase in global income between 1988 and 2008.

However, globalisation is certainly not the only—and probably not even the main—culprit for widening income disparities. Notably, indeed, the trend towards growing inequalities has set in already before the emergence of countries such as China and India as significant players on the global trading scene. Besides globalization, advances in technologies (in particular ICT) have been identified as a further push factor. New technologies have increased the demand for skills (skill-biased technological change), the return to education and, thus, the wage premium to skills affecting wage dispersion. Drastic advances in communication and transportation technologies in cheap labour countries provide firms located in the

developed countries the incentives to outsource most of the routine production (of both blue and white collar). Thus both the computerization of routine tasks and offshore outsourcing contribute to the rising trend in inequality More recently, the advancing of information technology has led to develop a richer version of the skill-biased technological change theory, whereby technology complements highly educated workers engaged in abstract tasks and substitutes for middle-skilled workers performing routine tasks, while it has less impact on low-skilled workers performing manual tasks—in particular in non-tradable services—requested by the high-skilled (the so-called labour market polarization hypothesis). This prediction was corroborated by data showing that wage growth polarised and relative employment of middle-skilled declined.

In many advanced economies, growing inequalities have been driven predominantly by a rising share of market income accruing to the very top of the distribution, probably reflecting increased possibilities for unfettered rent extraction. Institutional labour market developments, such as the erosion of trade union bargaining power, are likely to have been contributing factors as well. Last but not least, policy has shown a growing inclination to shy away from interfering directly with the market income distribution.

While several European countries exhibit a relatively high dispersion of the market income distribution—almost on par with the US-, the perception of "egalitarian Europe" is largely based on the fact that inequality of the post-market distribution is much smaller than elsewhere, reflecting the higher degree of redistribution via taxes and transfers; see Fig. 9. The value of the Gini coefficient of disposable income for the EU28 falls from 51.3 to 30.6 % once social transfers (including pensions) are included (EU SILC 2012 data). However, it is also true that weaker redistribution via the entire tax and benefit system was one of the culprits of higher income inequality prior to the crisis; in particular with respect to the bottom half of the distribution. Such changes in overall redistribution were mainly driven by benefits; taxes also played a role but to a lesser extent.

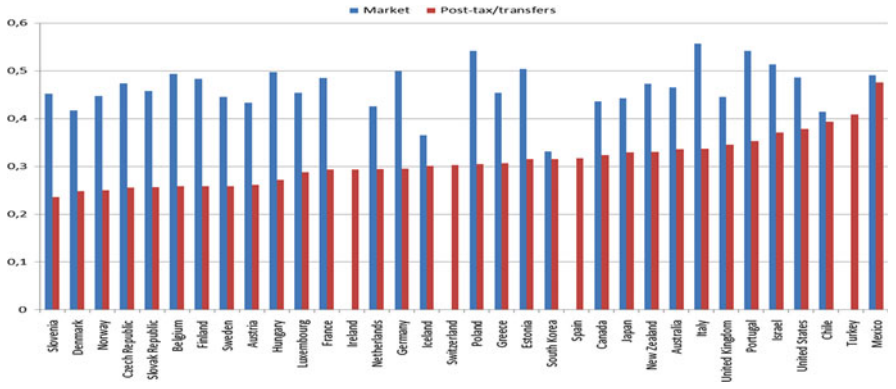


Fig. 9 Gini-coefficients (late 2000s)

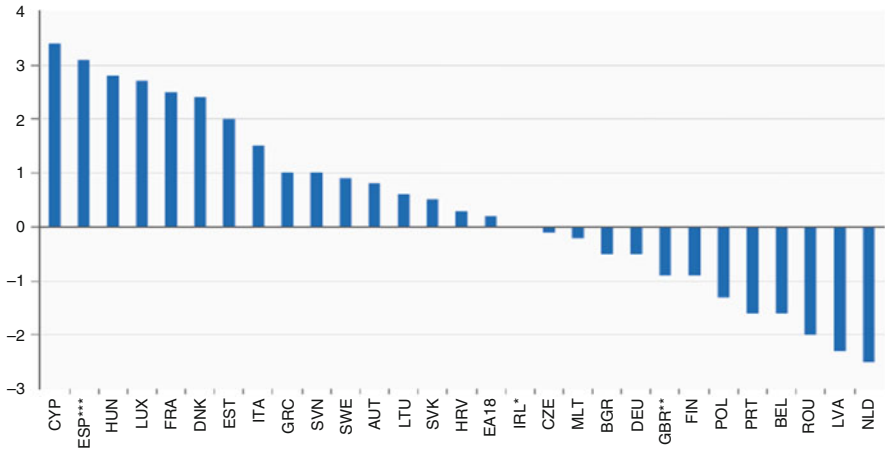


Fig. 10 Change in Gini-coefficient 2008–2013, equivalised disposable incomes

Still, the welfare state has prevented inequality going from bad to worse in the first years of the Great Recession. Moreover, as Fig. 10 shows, trends in the distribution of disposable incomes have varied widely across countries. Indeed, with the economic crisis, changes in inequality were determined by *falling* disposable incomes, in particular at the bottom of the income distribution. As the jobs crisis persists there is a growing risk of further rising inequality. These latter developments have important policy implications, as they are associated with a rise in poverty and social exclusion.

Poverty is a multidimensional concept which relates not only to the lack of income and wealth but also to the distribution of resources and the provision of public good and services. Trends in poverty indicators, as depicted in Fig. 11, are therefore influenced by different economic developments and by how the income distribution is affected. The apparently muted response of poverty at aggregate EU level during the crisis hides in fact marked differences between Member States: while most of the former EU15 Member States did not experience particularly strong changes in recent years, those countries most severely hit by the crisis recorded steep increases in severe material deprivation and low work intensity rates starting from 2010. Among New Member States, those less affected by the crisis continued along a downward path consistent with economic convergence (e.g., Poland, Slovakia, Czech Republic), while in countries such as Bulgaria, Romania, Hungary, Latvia and Lithuania such downward trend reversed dramatically.

Measures of inequality, such as the Gini index, and poverty indicators do not always evolve in close connection. In fact, in most countries measures of relative poverty (e.g., the at-risk of poverty rate) did not change or even decreased during the 2008–2009 recession, despite an increase in absolute poverty. This is because in some countries median incomes were also severely affected, provoking a shift in

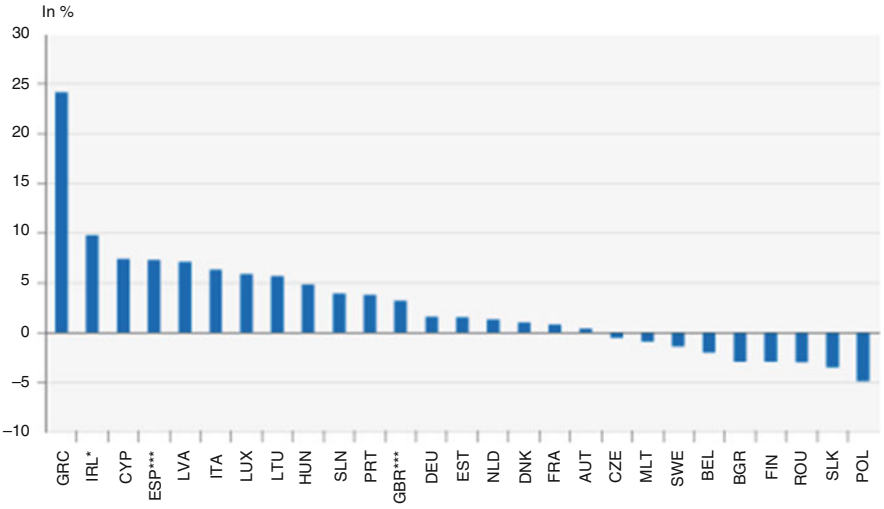


Fig. 11 Change in the risk of anchored poverty 2008–2013

the relative poverty threshold, while strong increases in material deprivation were the result of the strong deterioration of the labour market situation in many EU countries. *Absolute* poverty in particular appears strongly connected with the capacity of the economy to create jobs and to reduce the extent of long-term unemployment, as absolute poverty is explained by the loss of labour income, dissipation of financial wealth and loss of entitlements to government transfers, which occurs typically after long unemployment spells. A second crucial element is the existence of a safety net which effectively supports the most vulnerable groups which face the greatest difficulties to reintegrate in the labour market.

Expenditures on social protection as a percentage of GDP have risen in virtually all Member States, with a steep increase registered in the first phase of the crisis (2008–2010). This reflects the combined effect of a drop in the denominator (the GDP) but also the role of automatic stabiliser played by the social protection system. In most Member States, this effectively prevented or contained a rise in poverty. After the outburst of the financial crisis, despite a reduction of real social protection expenditure per head, social expenditure as a percentage of GDP did not fall or even increased in most vulnerable countries, since fiscal consolidation packages generally preserved this type of expenditures as compared to other spending.

Remarkably, over the past 30 years youth replaced the elderly as the group experiencing the greater risk of income poverty and the recent crisis has further accentuated this trend. Indeed, the high and rising share of young people who are Not in Employment or Education or Training (hence NEETs) in many countries is indicative of a growing challenge to education systems and to integrate young people into the labour market providing them with more and better job opportunities; see Fig. 12.

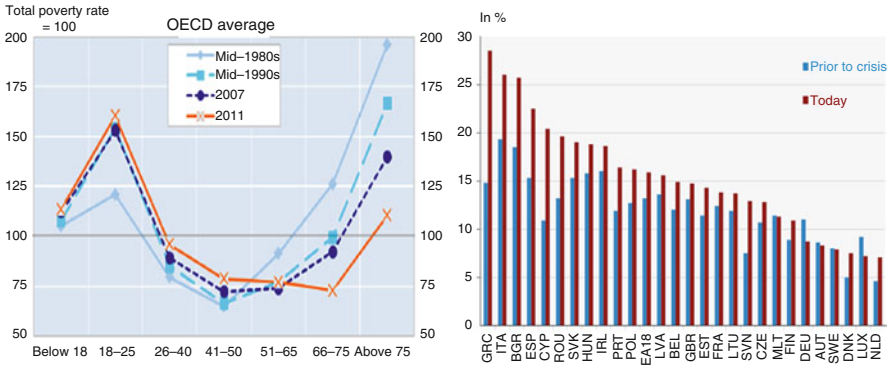


Fig. 12 Risk of income poverty across age groups; NEETs 15–29 years

4 Concluding Remarks

Tackling the challenge arising from secular stagnation tendencies and growing inequalities requires combining monetary, fiscal and structural policies in an integrated approach effectively, acting both on the demand and supply sides of our economies.

Even if the secular stagnation hypothesis may not hold in its strong form, chronic aggregate demand weaknesses may lead to ultra-loose monetary policies for some time to come. This requires careful management and international co-ordination, supported by micro-prudential supervision, macro-prudential oversight and policy action if necessary, to avoid financial instabilities and/or harmful protectionist action. Trade integration, FDI and free capital flows are essential to handle savings-investment imbalances across world regions.

In fact, with short-term policy rates at the zero lower bound, conventional monetary policy is approaching its limits. The European Central Bank will continue to play a key role in the overall policy setting of the euro area. The ECB has the exclusive responsibility for monetary policy in the Euro area. It has taken a number of important measures to ease the monetary policy stance and enhance its transmission to broader financial conditions, notably through its Asset Backed Securities purchase programme which started in October 2014. Combined with the covered bond programme and the Targeted Longer-Term Refinancing Operations programme, the overall impact of these three measures on the balance sheet of the ECB will be significant. It is expected that the size of the balance sheet will steer toward the size reached at the beginning of 2012. These measures should support economic activity as they work their way through the economy.

Member States, for their part, have the critical responsibility of delivering an appropriate fiscal stance. The examination of the draft budgetary plans submitted by Member States indicates a broadly neutral fiscal stance in the euro area in 2015, following a halt in consolidation in 2014. This appears to strike an appropriate

balance between fiscal sustainability requirements and cyclical stabilisation concerns.

Nevertheless, the assessment of budgetary plans also points to possible scope for improvements in the fiscal stance. First, several euro area countries still face a risk of non-compliance with the Stability and Growth Pact. Maintaining a neutral aggregate fiscal stance, while some Member States are called to increase their efforts in order to comply with the SGP, implies a degree of fiscal support coming from the exploitation of the fiscal space available in other Member States. Second, more efforts should be made to prioritise productive investment, raise the quality of public expenditure and make tax systems fairer and more efficient.

Moreover, determined structural reform action addressing both demand and supply side constraints is called for. Indeed, standard pro-growth policies—labelled as structural reforms or supply-side policies—get a new focus when viewed from a demand side perspective.

First, as most saving behaviour is slow moving, boosting investment is the most suitable way of stimulating demand in the current environment. This is why the European Commission has put forward an additional investment package—the so-called Juncker investment plan. It should be noted, however, that it is more than just about the additional money and the new European Fund for Strategic Investment. It is as much—or perhaps even more—about finance reaching the real economy and about an improved investment environment. Second, standard theory suggests that the steady-state capital stock grows at the sum of the growth rates of productivity and labour inputs. Thus, policies that stimulate innovation and increase efficiency and those that boost employment will make the investment push viable over the medium term. Third, structural reform efforts need to support rebalancing in the Euro area. This means for the vulnerable countries, and including France and Italy, to further strengthen reallocation processes from non-tradeables to tradeables sectors, addressing the inefficiencies in the sheltered sectors of the economy. But the creditor countries need to play their part as well by removing structural impediments to stronger domestic demand and, thus, allowing for more balanced growth across the area as a whole. Last but not least, migratory flows can to some extent alleviate the pressures from unfavourable demographic developments.

Still, however, over the medium-term a scenario might prevail by which the pace of productivity growth will be slower in the EU than in the emerging economies. Such a trend combined with demographic and climate change constraints in the EU would make agendas for structural reform, greater competition, trade opening, the transition to more knowledge-based economies, and deeper European integration and international cooperation even more necessary, while at the same time less socially acceptable if in this process too many people are left behind. The EU will have to develop a project integrating adequately fairness issues. While tackling excess inequality is primarily a domestic challenge, co-ordinated action at both the European and the global level could help generating synergies and avoiding negative spillovers. Policy efforts should concentrate on affecting the pre-market and the post-market distribution to tackle excessive inequality calling for a package

comprising the following main elements of redistribution and inclusive employment policies:

- Reforming tax and benefit systems and access to social protection: Government transfers (both cash and in-kind, including health) have an important role to play to safeguard low-income households, providing a social safety net for the weakest groups of society. Besides the overall level of social protection expenditure, its composition and effectiveness are crucial dimensions to be considered as in many instances, within a given envelope, important efficiency gains can be achieved by avoiding duplication and ensuring appropriate targeting.
- In terms of governance at the Community level, it may be considered to:
  - specifically monitor and benchmark national shock absorption and adjustment capacities with a view to further strengthening stabilisation properties and in this context identify good and practices in terms of reforms;
  - in particular, introduce systemic stress-testing of social security systems in monitoring and surveillance processes, with a view to establishing adequate floors and minimum efficiency standards of social safety nets including their financing;
  - still, mistakes and failures cannot be ruled out and "unknown unknowns" do occur; thus, appropriate emergency mechanisms should be put in place as well. This could include, for example, a European Emergency Social Facility as a conditional and temporary support instrument to bolster national social safety nets under well-defined exceptional circumstances.
- There is also scope for reviewing some tax provisions: on the one hand increased income shares point towards higher tax capacity among top-income households, on the other hand the international mobility of factors makes redistributive income taxation less effective; as a result, (reform of) wealth or inheritance taxes and better coordinated tax reforms could be contemplated. In general, efforts to tackle tax evasion and the erosion of tax bases should be supported both at the EU and the international level.
- Boosting employment and career prospects ("more and better jobs"): Facilitate and encourage access to employment, notably for groups facing difficulties with labour market integration, and address labour market segmentation.
- Investment in human capital: Safeguard access to general and high skilled education; promote up-skilling of the workforce, better training and education for the low-skilled. Strengthen inclusive pre-school programmes, in particular for children from disadvantaged households.
- Inclusive housing policies are in all likelihood an important element to counteract tendencies for a growing concentration of incomes and wealth arising from the unfettered working of housing markets in many countries.

Slow growth prospects and rising inequalities are a real threat to the social fabric in Europe at the current juncture and over the medium-term. This is a fact and denial is not a strategy. Perhaps belatedly, policy makers in Europe have taken up the challenge. And more determined action may still be needed.

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Long Term Patterns of European Accumulation and Growth: Europe at a Turning Point

Martino Lo Cascio and Mauro Aliano

Abstract The current transitional paths of the Euro Area countries can be seen as a turning point between two alternative scenarios: (i) a low decline path (although no secular stagnation), where markets saturation features and trends dynamically interact with a growing share of finance disentangled from the real economy; (ii) an evolution towards self -sustained growth trajectories bundles, where feasible economic and institutional improvements are set in place. In order to capture such a turning point, we adopt a new approach to understand the Saving-Investment Feldstein–Horioka puzzle, developing a model based on the investigation on the time-growth varying surfaces of the Average Propensity to Save (APS) and the Average Propensity to Invest (API). The related specification econometrics, a sort of Colander "Craftsmen's approach" that includes à la MIMIC estimates of the real rate of depreciation of social overhead capital stock, requires only the hypotheses of adaptive behaviour and stock-flow feedback loops. The results are consistent with the current instability of the Euro Area and show (and measure) to what extent small institutional changes and a limited set of operators can shift the overall trajectories of the EU system.

1 Objectives and Contents

The sequence of crises, both economic and financial, are often not fully explained by classical economic and financial theory. In the time-span in which this paper was written (May 2015) and discussed (June 2015) the third financial Greek crisis and the prolonged stagnation of the European Economy were shocking public opinion and policy makers, including Central Bankers and leaders of other international

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institutions. We develop, in this paper, further estimates and discussions starting from those contained in "Exploring Patterns of real Saving and Capital Growth in Eurozone: the Impact of Financial Crisis" (Lo Cascio and Aliano 2015, hereafter Loc-Ali.15). Focusing on the debate about the European Union economy, the introduction of Euro, the working of Euro's financial market, that paper aimed to provide some fresh insights in a bibliography frame where the "outcomes are not completely terse" and, often, contradictory. However, what was—and now is—uncontroversial is the role of capital formation and saving coupled with other institutional, international and financial factors (Hieronymi 2013). In a seminal work Feldstein and Horioka (1980) found that, in an open economy, in light of imperfect world capital mobility (due to home bias portfolio preferences and institutional rigidities that lessen the flow of long-term capital among countries), domestic Saving and domestic Investment correlation persists in time, even if with growing variability (and time lags) and reversing the traditional economic theory direction of the relationship. This evidence is singled out by Obstfel and Rogoff (2000) as one of the six major puzzles in international Macroeconomics. We think there is a new way to understand Saving-Investment puzzle going over the Obstfeld and Rogoff's extended transport costs to include foremost stock flow loops.

The Reati and Toporowski (2004), Caverzasi (2014) and Perez (2005) fifth or sixth long waves and their links with the cycle, i.e., the finance role as accommodating (easing saving towards investment and productive capital) or speculative (finance towards financial self-cumulating assets) represent the background of our work, coupled with the theoretical debate and the debate among the practitioners (the big players) before and after the introduction of the Euro. More specifically, the objectives of our previous paper were: (i) To describe the 1990s and 2010s vision of the Monetary Union by theorists and practitioners; (ii) To provide an understandings of the costs of the institutional delay and financial crisis (or crises).

In this work we employ a companion approach to see in depth the present instability, in reality and perception, exploring the current transitional path as a turning point between two alternative scenarios: (i) a low decline path (even though not a "secular stagnation", see Paganetto 2015), where markets saturation features and trends dynamically interact with a growing share of finance detached from the real economy; (ii) an evolution towards self-sustained growth trajectories bundles, where feasible economic and institutional improvements are set in place.

Some insights of the so called "complexity economy" (Colander 2009) seemed useful for the econometrics and results evaluation of the model we specify. The *complexity economy,* beyond the theoretical and semantic ambiguities, looks at an economic system as an open system (proper to the current world economy)[1], therefore suitable to better capture the globalization items, accepting only a partial

[1] As considered in physics, biology and other sciences even also mathematics (Arthur 2013).

overlapping between micro[2] and macro aspects.[3] Analysing the relation among variables-agents and trade arrangements where the dynamic, and interactive adapting behaviour of various economic and financial agents does not contradict first order approximation of the relationships among macro variables, in our average propensity to save (APS)–average propensity to invest (API) based model.

From an operational point of view, this approach allows to evaluate how small changes and a limited set of behaviours of operators can shift overall trajectories of the systems especially as in today transitional period.

In order to outline the macro-economic context in which the analysis is further developed, some relevant data and descriptive diagnostic are presented in the second section. The third section contains a "*survol teorique*" on common and controversial thinking about the Monetary Union before and after the Euro. Focal points of the quantitative methodology used are presented in the fourth section. In the fifth section, the resulting implications of how historical baseline captures the transitional pattern and suggests scenarios for the future are shown. A discussion on the turning point of European economy partially derived from complexity economy view is also proposed. This is followed by final remarks and conclusions.

2 Some Relevant Data and Descriptive Diagnostic

Unemployment, monetary instability and slow economic growth feature the current context for the economy of the Euro countries. The last 35 years' trends in the levels of stock market indices and of the consumer price indices of the major world economic areas (MEI-OECD data, Europe, U.S., U.K. and Japan) show two main points: (i) the growing divergences between consumer prices and asset prices; (ii) higher volatility of the indices of stock prices compared to the price indices of consumer goods. Assets prices of U.S. and U.K. had shown an increasing trend, and fluctuations over the trend, with peaks in 1999, 2004–2005, 2007 and, after 2011–2012, a persisting growing trajectory; Europe and Japan had growing patterns (though at a slower pace than U.S.), with peaks in 1999 and 2007.

After 2000, the rate of growth of consumer prices loses momentum in all areas, regardless of the economic zones. Stock prices are more unpredictable and do not follow inflation slowdown, providing a cue in the "controversy" between the financial instability hypothesis of Minsky and the theory of capital market inflation of Toporowski. Focusing on the Real Saving and Capital Formation (as share on GDP) of France, Germany, Italy and Spain (as representative countries of Euro zone, Eu Core) a long trend slowdown (some exception for France) emerges mainly

[2] Subatomic in physic, single agent in economy.

[3] Newtonian mechanics in physics and "meso economic" or macroeconomic aggregates. In this sense see Kenichi Ohamae (2005), "The next global stage: challenges and opportunities in our borderless word", Pearson Education, Inc. Upper Saddle River, New Jersey 07458.

for the years that following the Bretton-Woods breakdown and the two oil price crises. In this section as well as in the follow, we have made use of MEI-OECD data, that have been reworked to build a time-countries-area consistent database.[4]

Since the beginning of the 90s, for the four Euro core countries, there has been an excess of saving over investment, that drastically stopped in 2009, as well as negative net imports. With reference to the individual countries, in summaries:

- France shows an excess of Investment compared to Saving and a positive average rate of growth of GDP (as well as negative net import when the single currency was introduced);
- Germany shows an excess of Saving compared to Investment after the slowdown (during 2003–2004) and the financial crisis (2009); this trajectory started following the rate of GPD growth from 1994 onwards;
- Italy presents an excess of Saving compared to Investment with a low growth rate of GDP between the middle of 90s up to 2002; during the period 2002–2007, the gap between Saving and Investment seems to be approximately zero; after 2009 with a negative growth of GDP, a negative slowdown of Investment/GDP ratio with respect to Saving/GDP ratio can be appreciated. In the overall period 2008–2013 the growth rate of GDP is negative;
- Spain shows positive imbalances between Investment and Saving starting from 2002 and up to the crisis, coupled with a substantial positive net imports;
- from 2011 onwards, Italy and Spain return to an excess of Saving over Investment (and excess of exports over imports).

The bilateral net export for Euro core countries, since the introduction of the Euro, show a considerable increase in net exports for Germany, especially directed to France; while France, conversely, shows a negative net export against Germany and Italy. An observation seems to emerge somewhat controversial and important: imbalances inside the Euro Area seem to increase over time. The share on GDP of intra-Euro trade doesn't show substantial changes, remaining well below the intra state trade of U.S. (*the investment gap*).

Preliminary descriptive analysis ("soft theory" time series analysis) has been carried out on the above database. Results show autoregressive structural patterns between Real Saving to GDP ratio and Real Gross Investment to GDP ratio, for which lagged variables parameters, their statistics and the impulse/response to innovation figures, suggest the Obstfeld-Rogoff's interpretative line of explanation of Feldstein-Horioka's puzzle. However, to raise consistency with data, we consider as structural and exogenous the rate of growth and the year momentum of surplus/deficit account in capital, instead of using some more or less extended trade relative costs by sector and country. Last, but not least, the rate of Capitalization of Euro Zone economy decrease dramatically (with the exception of France) in the last 50 years, showing an increasing gap even in comparison with the U.S.A.[5]

[4] Data refers to France, Germany, Italy and Spain as a whole (Euro Core) and for individual countries.

[5] See Table 1 in Loc-Ali.15.

3 Bibliographic Overview About Monetary Union Before and After the Euro

The theoretical debate on the introduction and functioning of the Euro is rather complex, includes many fields of Macroeconomic, Political and Financial Economy, therefore exceeding the scope of this paper. A short bibliographic sketch about the introduction and functioning of the Euro is hereby proposed starting from what is contained in Baldassari and Mundell (1993). "Building the New Europe—The single market and monetary unification".

3.1 Thinking the Monetary Union Before the Euro

Starting from what might be called the "Mundell-Meade controversy", in the early 1990s, the thinking about a single European currency may have captured in the first volume "Building the New Europe". Mundell (1993) evaluates the options in terms of a single currency for the EMU, in particular: (i) the use of a basket of currencies, (ii) the use of the U.S. Dollar, (iii) the use of gold, (iv) the use of an existing European currency and regards, as the best solution for the adoption of a single currency, the use of the Dollar or of the Deutschmark, highlighting that "On economic grounds, but rejecting the Dollar, the Europe would be the ghost of the Mark". Meade (1993) has serious concerns regarding the possibility of a/the "hard ECU" or of a common currency instead of common currencies for different sets of countries. Furthermore Meade worries about extending European integration (and the common money) to the eastern European countries. In the cited volumes, the integration of Eastern Europe countries was on the periphery of the discussions about the European Union and the Euro. Triffin (1993) sees the Europe wide monetary unification as the second best option to re-build a 'true international monetary system' in a paper entitled: "IMS: the International Monetary System or ...Scandal?". From the institutional point of view Borner (1993) studies the trade-off between deepening and widening the European Union in view of the introduction of a single currency. The problems involved in widening the EU are accounted for in the paper of Kinderberger (1993). Market saturation as a long term structural problem and the impact of demographic transition in the richest countries are dealt with by Lo Cascio (1987, 1993).

"***The intellectual and policy effort of Jacques Delors' (1993)*** *envisioning an innovation-based Europe by channelling the common EU Real Saving towards Investments in Education and R&D,* ***seemed initially able to address****: (i)* ***the structural heritage*** *of the so called Baumol's disease affecting the growth process in advanced industrial economies at the beginning of the 1970s;(ii)* ***the challenge of a common currency*** *("Hard ECU"); (iii) the* ***political preference towards a widening EU process with respect to a deepening one****. However the Delors' approach was later criticized by mainstream economists, often closely tied to policy*

makers. The Lisbon strategy—launched in 2000—represents a healthy theoretical shift towards a dual emphasis on innovation and social cohesion both within and between countries. The approach is based on the "new economy" paradigm defined by the convergence of the main schools of contemporary economic thinking (Fontela 2005): (i) ***post Schumpeterian*** *(leading role of innovation and high priority to R/D policies); (ii)* ***Neoclassic*** *("perfect market" idea for the allocation of the dividends of innovation); (iii)* ***post Keynesian*** *(driving role of new demands and income multiplayers in an expansionary context). Learning from the experience of "white paper", observed Erik Reinert (2005), "the Lisbon process was carried through cautiously, avoiding the ministries of finance that had sunk the Delors' paper, and this saved it from falling into the same trap. A victory of this tactic, however, may have blaklashed, creating problems for the long run strategy". The SKS-NBIC (Sustainable Knowledge Society—Nano Bio Info Cogno) policies were envisaged, but substantially left to the responsibility (including expenses) of each Member State, while the Maastricht parameters were setting harder constraints to national fiscal policies. The integration of former Eastern Germany was considered as a huge success that should be uncritically copied on a larger European scale, in spite of (i) the destruction of Eastern Landers social overhead capital, (ii) the not replaced industrial base and (iii) the extremely expensive public transfers (Reinert 2005 and Giacchè 2013).*[6]

The EU enlargement went on, the geo-strategically policy towards trade surplus forcing, emerged and won (because of the alliance of policy makers, business leaders and influential intellectuals) up to 2008' big financial crisis originated in U.S." (Loc-Ali.15)

3.2 Thinking the Monetary Union After the Euro

Four issues at stake in the 1990s were expected to be solved after the introduction of the Euro: (i) convergence in prices and in productivity among EU countries; (ii) reversing the trend on public debt; (iii) Reduction of current account imbalances and related capital account imbalances; (iv) facing unemployment disease.

"*To some extent, after more or less 20 years, only convergence in prices has been got, while the other three issues remained still open. Many authors have dealt with the topic. Among them, De Cecco and Maronta (2013) wrote: "Money formally without State (but with Germany as the latent leading state, that does not create liquidity, but that absorbs liquidity) does not dim the anomaly of a "currency in multinational circulation" built around a country like Germany, which is structurally a net exporter. Furthermore the cost of the permanence of*

[6] Up to 2005 clustering European Regions by structural characterized of economy, eastern *länders* (out of Berlin) were not clearly distinguishable from South Italy, Greece and Portugal regions (Lo Cascio et al. 2012).

the current account surpluses by Germany and their induced deficit on the other euro countries enhance the likelihood of a growing gap between potential and real income.

The lack of a harmonised fiscal policy or at least of common rules against fiscal competition among 19 countries is an open issue that has not been properly addressed yet. In this context, the traditional monetary policies tools have been less effective (the "transmission" problems recalled by Mario Draghi) and the growing risks for the real economy connected with the emergence of the new technologies in finance couldn't be kept apart from their benefits.

Last but not least, the weight and role of increasing inequality in income distribution between and within large economic areas deeply emerged." (Loc-Ali.15)

4 Methodology

The patterns of API-APS time-growth varying surfaces are computed through the methodology presented in Loc-Ali.15. The core of such an approach is to estimate a Seemingly Unrelated Regression (SUR) of Real Saving function (through a consumption function S = Y-C) and of Real Capital Formation (an investment function), developed for the whole Euro Area and the for the individual Euro Area representative countries.

Since the Propensity to Save (PS) equals 1-PC (Propensity to Consume), the starting point is a consumption function of the following type:

$$C_t = \mu_o + \alpha_1 C_{t-1} + \beta_0 Y_t + \beta_1 Y_{t-1} + \varepsilon_t \tag{1}$$

Where:

C_t = Final Consumption Expenditure at time t in real terms;

Y_t = Gross Domestic Product at time t in real terms as a proxy of national income.

Equation (1) can be viewed as the estimable specification of the following relationship:

$$C^*_t = \mu_o + \beta Y^*_t + \varepsilon_t \tag{2}$$

Where C^*_t and Y^*_t are not observable variables representing expected consumption and income levels. Logging variables (under usual restriction $\alpha_1 + \beta_0 + \beta_1 = 1$, setting $\gamma = 1 - \alpha_1$) Eq. (1) can be written:

$$lnC_t = \mu_o + (1-\gamma) lnC_{t-1} + \beta_0 lnY_t + \beta_1 lnY_{t-1} + \varepsilon_t \tag{3}$$

Or the Error Correction Model (ECM):

$$lnC_t - lnC_{t-1} = \mu_o + \beta_0(lnY_t - lnY_{t-1}) - \gamma(lnC_{t-1} - lnY_{t-1}) + \varepsilon_t \quad (4)$$

In an open economy, we have to take into account deficit/surplus momentum in capital account or the corresponding surplus/deficit account in the capital account or the financial asset accounts. We define:

$$q = \frac{imp_t - exp_t}{Y_t} - \frac{imp_{t-1} - exp_{t-1}}{Y_{t-1}} \quad (5)$$

Where imp_t and exp_t are import and export at time t in real terms.
(5) can be rewritten:

$$lnC_t - lnC_{t-1} = \mu_o + \mu_1 q + \beta_0(lnY_t - lnY_{t-1}) - \gamma(lnC_{t-1} - lnY_{t-1}) + \varepsilon_t \quad (6)$$

In the long run APS can be defined as:

$$APS = 1 - e^{\left\{\frac{\mu_o + \mu_1 q - (1-\beta_0)\frac{dY}{Y}}{\gamma}\right\}} \quad (7)$$

If:
$q \neq 0$, (7) may be useful for simulation purposes or if Scandizzo (1991) type theoretical conditions are verified.
$q=0$, we can go back to (8):
In this case, APS reduces to:

$$APS = 1 - e^{\left\{\frac{\mu_o - (1-\beta_0)\frac{dY}{Y}}{\gamma}\right\}} \quad (8)$$

For Real Capital Formation, defining K_t, I_t respectively as capital stock, investment at time t and χ the rate of depreciation of capital, we can write the following algebraic accounting identities:

$$K_t = K_{t-1} + I_t - \chi K_{t-1} \quad (9)$$

$$K_t = I_t + (1 - \chi)K_{t-1} \quad (10)$$

If $\boldsymbol{K}_t^*$ represents the desirable or optimal stock of capital, irrespectively of the production function adopted,
m is the capital/income ratio and
λ $(0 < \lambda < 1)$ is a coefficient of partial adjustment of current capital to desirable capital, then we have:

$$K_t^* = mY_t \tag{11}$$

$$K_t - K_{t-1} = \lambda\left(K^* - K_{t-1}\right) \tag{12}$$

$$K_t = \lambda K^* + (1-\lambda)K_{t-1} \tag{13}$$

$$K_{t-1} = \lambda {K_{t-1}}^* + (1-\lambda)K_{t-2} \tag{14}$$

Few algebraic passages show that an estimable Investment function is the following:

$$I_t = \lambda m Y_t - (1-\chi)\lambda m Y_{t-1} + (1-\lambda)I_{t-1} + \varepsilon_t \tag{15}$$

As r is a random walk with drift type values of rate of the investment growth, we can write (15) as follows:

$$I_{t-1}(\lambda + r) = \lambda m Y_t - (1-\chi)\lambda m Y_{t-1} = \lambda m(Y_t - Y_{t-1}) + \chi\lambda m Y_{t-1} \tag{16}$$

API can be defined as:

$$API = \frac{I}{Y} = \left(\frac{\lambda}{r+\lambda}\right)\chi m + \left(\frac{\lambda}{r+\lambda}\right)m\frac{dY}{Y} \tag{17}$$

Where r is a stable rate of investment growth.

If $\boldsymbol{r} = 0$, i.e., strictly stationary API:

$$API = \frac{I}{Y} = \chi m + m\frac{dY}{Y} \tag{18}$$

If $r < \frac{dY}{Y}$, as it can be mainly observed over the past 20 years, a downward shift in GDP growth and/or in quality of Real Capital stock (in the limit Investment does not cover depreciation) is going to happen. If $r < \frac{dY}{Y}$ condition infeasible in the long term, in light of the historical experience, solution emerges of increasing net positive inflow from outside the Eurozone.

If $q>0$ export oriented policies will prevail; vice versa, if $q<0$.

The APS-API time varying surfaces will depend on the point of time we are referring to, and on the combination of r and q values. The following table shows the capital depreciation for each countries and EU under two examples hypotheses (Table 1).

5 Results

The above SUR model has been estimated for the Euro Core Area and for each country. The data that have been used, as already mentioned above, were obtained from the rearranged OECD yearly database for the period 1970–2013. All

Table 1 Capital depreciation share on GDP

	Zero growth	Accommodating fiscal policy (r=2 %)
Euro Area	0.1478	0.12213
France	0.12434	0.09671
Germany	0.1376	0.11593
Italy	0.16781	0.14417
Spain	0.2654	0.23493

Table 2 Estimation: expected investment and saving function parameters

	λ	χ	M	β_0	γ	μ_1
EU	0.095	0.033	4.48	0.491	−0.04	1.059
Fra	0.07	0.021	5.921	0.414	−0.06	0.461
Ger	0.107	0.032	4.3	0.699	−0.02	0.99
Ita	0.122	0.048	3.496	0.748	−0.02	1.075
Spa	0.154	0.056	4.74	0.696	−0.03	0.698

parameters are significant at 95 % of confidence with good fitting and all economic conditions always *satisfied*.[7] High variability in marginal efficiency of capital and financial needs for depreciation between countries may be cited, as well as higher marginal efficiency for Italy and higher needs for financing depreciation of capital stock for Spain and Italy (Table 2).

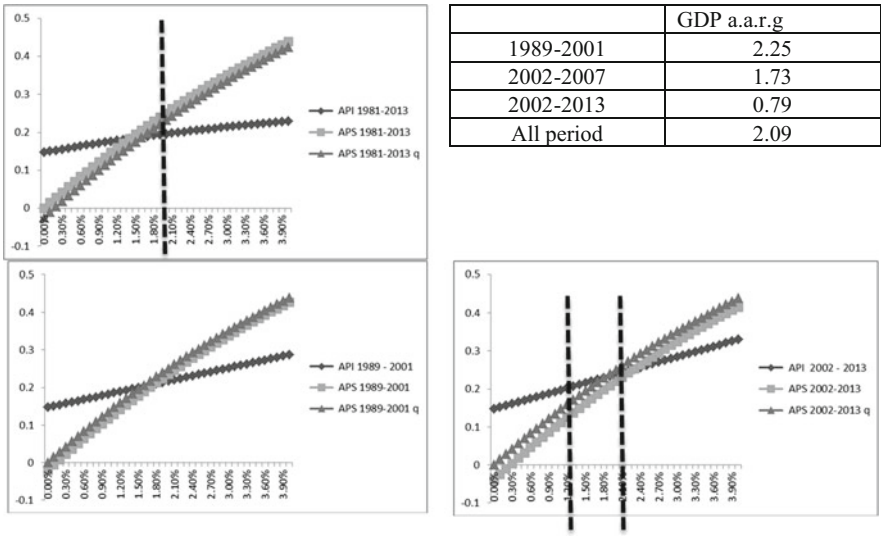
5.1 Looking at First Glance the API-APS Trajectories

The graphs below show the average propensity to save and invest for different hypothetical growth rates of the GDP. The first graph displays API and APS over the entire period, the second graph over the period before the introduction of the euro, while the last one is related to the period after the introduction of the euro. The vertical dotted lines represent the actual average growth rate of the Gross Domestic Product in the reference periods.

Each of the Figures below consist of three different graphs. In the first one (whole period), the vertical dotted line represents the average GDP rate growth in the period 1981–2013. In the second graph (1989–2001) the dotted line represents the average GDP growth rate in the period 1989–2001. While, in the third graph (2002–2013), the two dotted lines represent: (i) GDP growth during the financial crisis, (ii) the GDP growth after the financial crisis.

The original Feldstein-Horioka's puzzle does not seem to be a puzzle anymore, since, *coeteris paribus*, a borrower country for low or zero rate of growths becomes

[7] The details of the system estimates, together with structural characteristics of capita/output expected ratios, depreciation share on real saving and investment and or net financial position, are available upon request.



	GDP a.a.r.g
1989-2001	2.25
2002-2007	1.73
2002-2013	0.79
All period	2.09

Fig. 1 API-APS base trajectories for Germany

a lender country for high rate of growth. State stock and flow variables of a single country matter at any point of time, thus covering some pieces of the original puzzle.

While for Germany Fig. 1 represents solutions outcomes, for Euro Core (Fig. 2) and Euro core net Germany (Fig. 3) solutions outcomes are obtained, for the sake of simplicity, by aggregating the solution simulations of the individual countries.

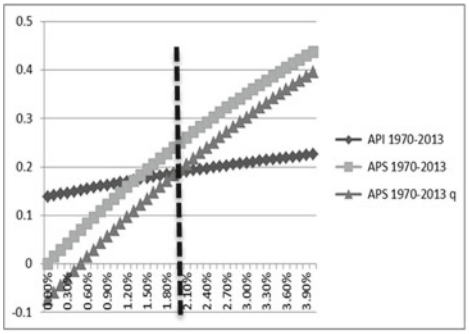
The unbearable conditions of excess of need of Investment over Saving emerges for the whole Euro Area, but, to some extent, surprisingly even for Germany.

For France and Spain, the long term need of financial flows from abroad is high for rates of GDP growth lower than 2.5 %.

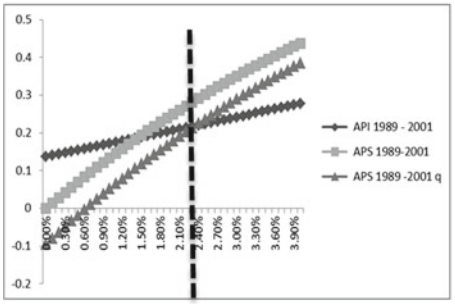
As for the introduction of the Euro and the Financial crisis (or crises), the above simulations were tested under two hypotheses: (i) breakdown hypothesis of previous trend and (ii) breakdown of the previous hypothesis (i), coupled with prolonged financial current crisis. Results show that, even under the breakdown hypothesis, all the four countries that have been considered present a negative net financial outflow. Especially under (ii) hypothesis, simulation highlights a drastic reduction both on Investment and on Saving and negative Financial outflows for individual countries and for the Euro core.

Only adopting the frame hypotheses of new medium term 2013 OECD optimistic scenario (deep structural reform), the model results show improvement in Saving and Capital Formation, together with a tendency to return in a long period growth trajectory.

Johansson et al. (2013) in a OECD working paper showed a new model to project the growth of OECD and Non-OECD countries (it replaces the previous



	GDP a.a.r.g
1989-2001	2.32
2002-2007	1.41
2002-2013	1.07
All period	2.01



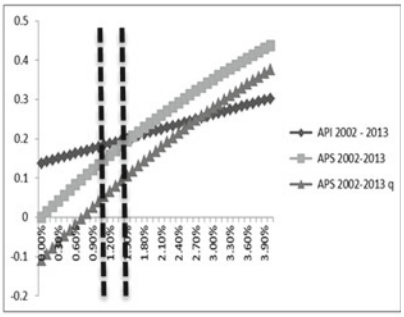
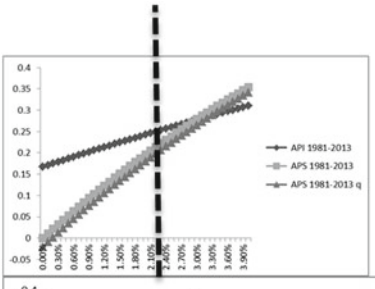
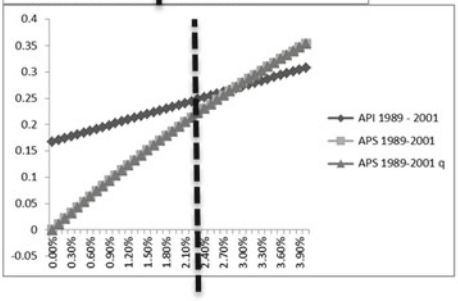


Fig. 2 API-APS base trajectories for Euro Core





	GDP a.a.r.g
1989-2001	2.23
2002-2007	1.89
2002-2013	0.63
All period	2.13

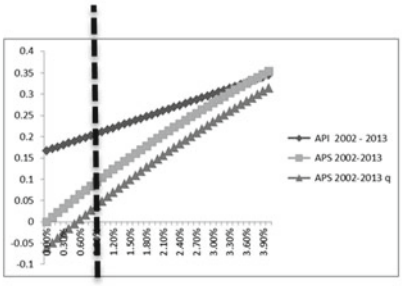


Fig. 3 API-APS base trajectories for others Euro Core countries

version of the MTB model) and it is consistent with the framework used for short-term projections in the Economic Outlook (OECD).[8]

However, in short-medium term, for France and Spain, strong deficit emerged, even if lowered or counterbalanced in the long run by the great vitality of Spanish economy and by the French demographic transition.

6 Discussion: Europe at the Edge of Chaos

Methodology and results previously discussed may be also viewed as those produced by a Colander type "craftsman approach" (Colander 2009).[9] Beyond the above (paragraph 3 and 4) merged soft theoretical bases, we had gone towards an "empirical based macroeconomic estimates" (Arthur 2013), as a way to escape the shortcomings of now questioned mainstream "Representative Agent Macro economy": Standard Textbook Economics (STE) assumptions, classical Real Business Cycle (RBC) and Dynamic Stochastic General Equilibrium (DSGE).

Adopting, at least for discussion purpose and a widening scope, some useful insight of "complexity economics", seems suitable both on (i) the interpretative side, (ii) the foresight side.

[8] The baseline OECD scenario assumptions, synthetically, are:

- Reduction gap between potential and actual output
- Increase in real oil prices by about 5 % per annum is assumed from 2013 to 2020, 2 % per annum from 2020 to 2030 and 1 % per annum thereafter
- Unchanged, in real terms, of bilateral exchange rates between OECD countries
- Private credit to GDP ratio about 200 %
- Inflation 2 % and neutral interest rate in short term gradual increase in the underlying fiscal primary balance of ½ percentage point of GDP per year from 2013 onwards

The share of active life in life expectancy is assumed to remain constant.
Based on the baseline scenario, the assumption in "deep reforms" scenario are:

- rapid liberalization in product markets
- deeper labour market reform scenario (differences in active life expectancy are progressively eliminated)
- Improve fiscal balance by up to 1 % point of GDP each year
- reductions in the tax wedge
- welfare and financial reforms in non-OECD countries are assumed to occur more quickly than in the baseline: whereas public spending on social protection increases by 4 percentage points of GDP by 2040 in the baseline, the increase is assumed to take place by 2025; similarly, the availability of credit (expressed as a share of GDP) is assumed to reach the same level in as was previously achieved in the baseline by 2060.

[9] See also Holt et al. (2010).

6.1 Interpretative Side

The APS, API time-growth varying surfaces as—they had been carried out—do not need standard neoclassical equilibrium micro-foundation, thus bypassing the related Knightian uncertainties and the B. Arthur problems in specified models with an excess filtering of the real economy. The model we hereby propose needs only the hypothesis of adaptive behaviour and feedback loops to macro variables. Furthermore, time is an important variable (i.e., introduction of the euro, financial crisis I and II, etc.), as the succession of facts interacts with higher and lower degrees of innovation in institutional and technological framework. Feedback loops may be captured by q (that is influenced and influences Saving and Investment patterns and may be linked to export forcing policy), and by r (as a result of combination of hysteresis and more or less structural reforms policies). Finally, the trajectories of the rate of depreciation of capital on GPD and/or the capital stock quality are captured by a sort of MIMIC (Multiple Indicators and Multiple Causes) approach.

6.2 Foresight Side

In this context, current transitional paths for Euro core and countries may be viewed as a turning point to two alternative "strange attractors structures": the first one is a low decline way trajectory, where market saturation hypotheses are dynamically interdependent with the one of the possible realization of the so called "casino-finance"; the second one is represented by the feasible self-sustained growth trajectories bundles.

In order to sum up the results hitherto discussed, we think that it is useful to have a look at the figure below, which presents two solutions: the first one, putting $r=0$, $q=$ *last historical trend*; the second one, putting $r=dy/y$, *and* $q=0$ *and*, averaging the results of France, Italy and Spain for the Euro core area net of Germany.

The current instability emerges for low shifts of r *and* q, so envisaging the Euro zone turning point consistency with the data. In Fig. 4, the central dotted line point implies a Myopic based foreside Current Policy (*M.C.P.*): we may call this the turning point. The first dotted line on the left implies Incoming High Risk (I.H.R.) out a Hieronymi stage[10] IV (2013), while the first dotted line on the right indicates an Opportunity Recovery (O.R).

As suggested in the figure below, given a rate of growth of GDP near 2.5 %, the excess of Saving over the Investment for Euro Core is equal to the excess of Saving for Germany, i.e., the excess of Saving for the economic area is given by the excess of saving for Germany (*O.R.*). For a rate of growth of GDP between 1.8 and 2 % (***M.C.P.***) the imbalance of Euro Core without German is equal to the excess of

[10] Especially under the hypothesis of rise in U.S. interest rate.

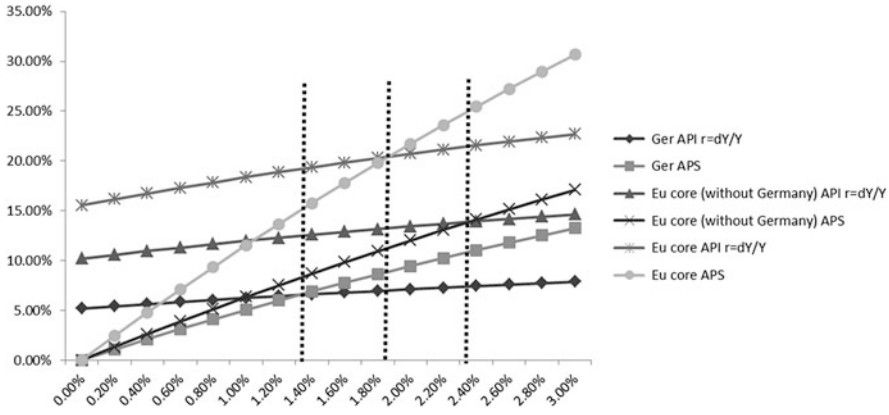


Fig. 4 Investment and Saving: the role of Germany in EU core countries (APS and API as a share of EU core GDP, GDP growth annual)

saving of Germany. Furthermore, an excess of Investment over Saving is presented for a rate of growth of GDP lower than 1.4 % (*H.I.R.*), both for Euro core and both for Germany. This last observation makes the European scenario extremely unstable and, under the actual occurrence of the above conditions, unpredictable in the results.

6.3 How to Envisage Europe at a Turning Point

Commenting the Paul Krugman critics to the mathematical pyrotechnics that has produced what he called "Greek economics" in the last decade ("elegant but lacking of empirical validation"), Beinhocker (1997) introduces the term "*strategy at the edge of chaos*" for business theorists and practitioners, since prevailing national and international markets are *complex adaptive systems*.

Realms and strategies at the edge of chaos may be and have been extended from micro to meso and macroeconomic aggregates, coupled with corresponding political and societal entities. Starting from Beinhocker's approach, five critical aspects may be single out:

1. **Short-termism vs. robust strategies:** in a complex adaptive system, points of strength are necessary for day-to-day survival, but they are not sufficient in long term**;**
2. **Competitive advantage vs. continuous adaptation**
3. **Conservative policies vs. radical strategies:** in a complex adaptive system, a country or an area that is resistant to change (Diamond and Lodge 2013) will have, in the long run, low benefits, and the same will happen to countries or areas that are oversensitive to shifts in its environment. But between the extremes of

stasis and *chaos* a region—*the edge of chaos*—lies where economic and social benefits are maximized

4. **Routinized vs. diverse strategies:** to catch the opportunities in evolutionary system, a rich pool of possible strategies is needed. The diversity by region, country, area represents a source of innovations to develop responses when the environment changes. But a certain level of standardization (e.g., evolving but **common** rules for Eu fiscal policy) in light of the cost of diversity (e.g., **opportunistic** fiscal behavior) appears to be desirable;
5. **Scale vs. flexibility:** the Brian Arthur convincing argument to explain increasing (as opposed traditional decreasing) returns to scale, may be translated in an EU strategy simultaneously conservative and radical between *deepening* and *widening policies*.

Europe at the edge of the chaos is another way to understand the above Opportunity Recovery (O.R.) scenario.

7 Final Remarks

Two sets of crucial questions had been highlighted by Hieronymi (2013):

I. How and when will the main OECD economies return two "*real interest rates*" and, first of all, what will be the consequences of "*soft-lending*" for savers borrowers and economic activity?
II. What happens nowadays after the "*40-year crisis*" a period of recurring international debt crisis and after the corresponding 40 years interwoven long wave cycle stages of world economic areas? Will the loss of momentum in the "*real economy*" aggravate the financial and monetary crisis? How EU will survive to the structural shortcomings of the Eurozone system and the political divergences through the Union?

To the first question, that exceeds our competence and therefore our aim, being, however, the shadow frame in which our "craftsman" approach moves, a starting but interesting reply may be found in Morais et al. (2015), that identifies the final impacts of U.S. Q.E. on real economies of newly industrializing countries with a multiple three or four times higher than U.S. Q.E. induced the financial inflow (rate of investment disproportionate to ex post returns) and a final reduction of their rate of growth. This paper is a follow up of Loc-Ali.15 published study. Some of the conclusions and warnings raised in the previous paper seem to be confirmed:

- The cost of institutional delay in the European landscape
- The impact of the 2008 subprime and of the 2011 sovereign debt crisis in terms of deflation, growing gap between the individual countries, the so called "wake ones" and "strong ones", with counterintuitive long term effects, mainly for the case of South, but unexpectedly also for Germany

- The break-up of Monetary Union prevented up to now (ECB Q.E.) does not appear to overcome the main last year' heritage, the "short-termism" view, prevailing in the most part of the private and public players.

As for question this paper addresses: is the Eurozone at a turning point? The descriptive diagnostic and the statistical model carried out do not prevent us to reply: yes.

The **Myopic Currently Policy** (**M.C.P.**) in Euro zone, where the export oriented policy of Germany, the algebraic control of fiscal policy and related weakness of public Investments prevail, may be viewed as determining a sort of bifurcation to two alternative "*strange attractors structure*".

The first one refers to the so-called stage IV of Hieronymi, and defined a **High Risk scenario** with particular concern for the rise in interest rates in U.S. and the Euro Zone **(I.H.E).**

The **Opportunity of Recovery (O.R.)**, whose underlying assumptions are, in part, those of 2013 OECD deep structural reform scenario, that imply more than 2 % growth rate of GDP.

Starting from the turning point, it is more than an opinion that small institutional changes and a limited set of operators can shift the overall trajectories of the EU system from one to another options.

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Those Things You Might Not See, Which Are Still Beneficial

Francesco Paolo Mongelli and Giuseppe Mongelli

Abstract The euro area is slowly exiting a deep and prolonged economic, financial, institutional and confidence crisis. Several reforms and adjustment processes are underway. An aspect that is often neglected in this difficult period is that European integration has an "engine" which has withstood the crisis: over the last 60 years there has been a continuing deepening of trade in goods and services, foreign direct investment and financial links across EU countries. Such EU Internal Market is a diffused process advancing slowly but steadily, while generating a stream of benefits (with a caveat during the crisis). Four new components of the internal market are under way and are briefly introduced in this chapter. They are: the EU's Digital Agenda, the Capital Market Union (CMU), the Payment System Directive (PSD), and Target-to-Securities (T2S). These elements are quite ambitious in their respective domains and need to be completed, understood, and widely adopted to exert their benefits, and boost the benefits from the euro. This is a big change in culture that is also supporting the change in EMU governance and political economy under way.

1 Introduction

The euro area is enduring a seemingly unending financial crisis, which has unravelled through various phases punctuated by short-lived recoveries. The crisis has exposed and exacerbated several flaws and gaps in the architecture of Europe's Economic and Monetary Union (EMU). EMU's governance could not impede the

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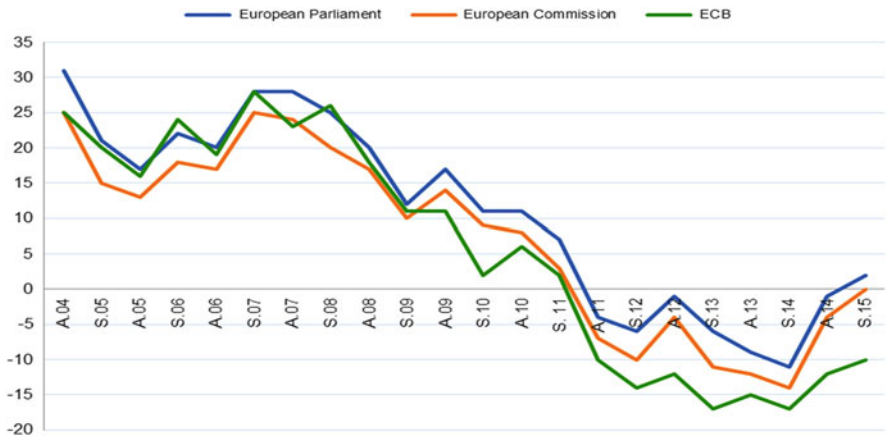

Fig. 1 Net Trust in EU Institutions—EU 28 (in percent)

accumulation of substantial private and public debt in several euro area countries.[1] Nor could it prevent significant losses in competitiveness and overleveraging by banks. Moreover, when the sovereign crisis erupted in 2010, there were no financial backstops for stressed sovereigns or strained banks to counter sudden stops in financial flows.[2]

Several financial market segments collapsed or fragmented (see Durre et al. 2014). Adverse feedback loops built up between weak sovereigns, weak banks and weak economies (Schoenmaker 2011; 2012). Strong trade and financial links among euro area countries became a vehicle of contagion. Greece, Ireland and others experiencing a sudden stop and bank runs, and needed adjustment programmes.[3] Break-up risks rose in 2011 and 2012. Growth plunged, unemployment soared, and inflation tumbled. Confidence in European institutions has fallen dramatically, while remaining above that in national institutions: both started recovering only recently (see Figs. 1 and 2).

To address the crisis, exceptional fiscal and monetary policy responses, various financial adjustments programs, and selected structural reform were deployed. Moreover, the crisis has also spurred a rethinking of institutional integration in Europe. Since 2010 some of the most important reforms in over 60 years of EU integration have emerged, including: enhanced fiscal governance, procedures to address macroeconomic imbalances, a crisis management and resolution framework, and financial backstops for sovereigns and banks [see Dorrucci et al. (2015), De Grauwe (2013) and Ioannou and Stracca (2014)].

[1] See Fernandez-Villaverde et al. (2013) and de Grauwe (2013). For a "*fiscal narrative*" of the crisis see Schuknecht et al. (2011), for the "*banking narrative*" see Constancio (2013), and for the "*competitiveness narrative*" see Sinn and Valentinyi (2013).

[2] See Dorrucci et al. (2015) and Mongelli (2013) for an analysis of the crisis.

[3] See Mongelli et al. (2015) for a list of responses to the euro area crisis.

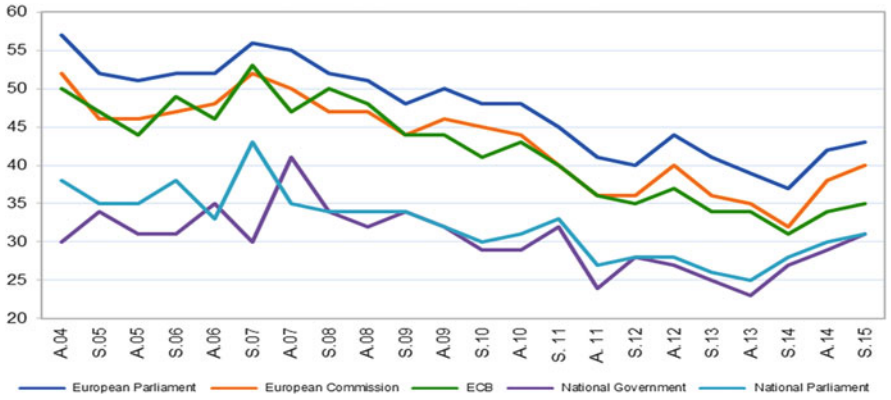

Fig. 2 Trust in EU and National Institutions—EU 28 (in percent)

To some extent, the institutional progress made in recent years is receiving modest recognition. A framework to kick-start anew the process of integration was outlined in the *Four Presidents' Report* delivered in December 2012, while a more advanced ***Five President Report*** was delivered in June 2015. These reports embed the elements of a *genuine union* characterised by: a "capital market union" which includes the "banking union," a "fiscal union," an "economic union," and a "political union". The advice of these reports is to progress with these four unions in parallel, although they are advancing at different speeds and are defined to different degrees. Still they provide an anchor for the reform efforts.

An aspect that is often neglected is that ***European integration has an "engine"*** which has withstood the crisis: economic integration that spans over trade in goods and services, foreign direct investment and finance. The fundamental laws governing economic activity—whether banking, industrial production or consumer protection—are largely harmonised in the EU Internal Market.[4] Thus, over the last six decades there has been a continuing deepening of economic integration: it has proven to be a diffuse process advancing slowly but steadily, while generating a stream of benefits for everyone in Europe. It has been the engine of Europe's integration, transforming it into the world's most open economic area.

The EU's Internal Market was strengthened with the Single Act in 1993. However, it's main elements were already sketched in the 1957 Treaty of Rome: they entail the free movement of goods, services, capital and persons (4-freedoms). Today European citizens and firms, are largely free to: reside, work, operate, study, and do business where they prefer. Admittedly the migrant crisis and recent geopolitical events and terrorist threats have led to a revocation of some internal

[4] There are some notable exceptions like pension systems. Moreover, banks operated differently across countries, various types of barriers & discrimination remain, and financial integration is uneven (see also Giovannini Report). The forthcoming Capital Market Union will address these shorthcomings.

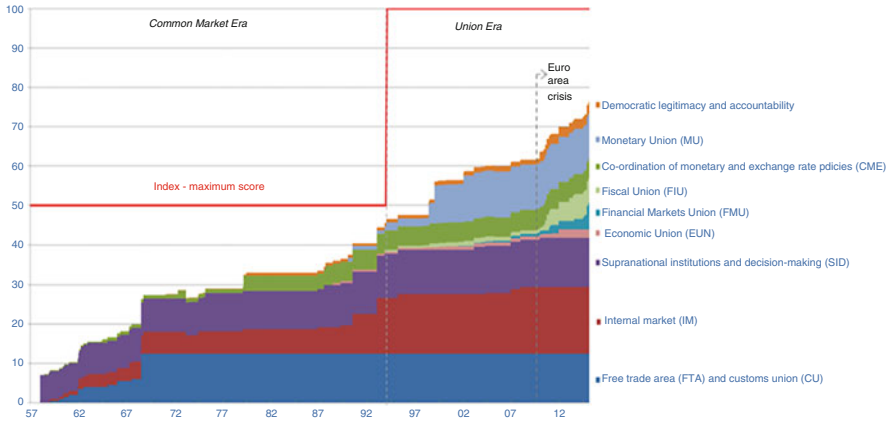

Fig. 3 Components of European integration

movements. European citizens also benefit from a wide choice of goods and financial and non-financial services from companies competing with each other. Hence, the building of the Internal Market is a diffused process that advances slowly but steadily [see Dorrucci et al. (2015)]. Figure 3 allows to recognise the various components of European integration—which are also known as the Balassa (1961) stages of integration (Sapir (2011)—namely: free trade area (FTA) and custom union (CU); the building of supranational institutions and sharing of decision making (SID); the financial market union (FMU); the coordination of monetary and exchange rate policies (CME); democratic legitimacy and accountability; the provisions to strengthen the economic union (EUN); the fiscal union (FIU); and the monetary union (MU).[5]

What allows the EU's Internal Market to function? The market is supported by: a wide range of infrastructures and platforms—example given for efficient payments, or financial clearings; diverse networks—such as for communication and transportation; and a harmonised body of laws, rules, and regulations. These underpinnings of the EU Internal Market were resilient during the crisis, even when stress soared and break-up risks peaked—like a building's plumbing and electrical network resisting the worst storm or earthquake.

Despite their resilience, these infrastructures, networks, and body of law are still progressing [see Monti (2010), Cœuré (2014) and Niemann and Ioannou (2015)]. The forward looking proposals to reform the governance are in the Four President Report [see Van Rompuy (2012) and European Council (2012)]. Important additional elements are already underway.

The rest of this chapter reviews additional elements of the EU Internal Market. It is organised as follows. Section 2, presents some elements of the EU's Digital Agenda. Section 3 introduces the Capital Market Union (CMU). Section 4 presents

[5] See http://www.voxeu.org/article/economic-integration-europe-insights-new-index

the Payment System Directive (PSD), and Sect. 5 presents Target-to-Securities (T2S). Section 6 presents some final remarks.

2 The EU's Digital Agenda

What is it? It is a Europe 2020 initiative to establish a Digital Single Market (DSM) for Europe. The Juncker Commission considers it as one of its ten key political priorities. The objective is to open up digital opportunities for people and business, and enhance Europe's position as a global leader in the digital economy. It has also been debated for a long period, see amongst others, Becchetti et al. (2003), Misuraca et al. (2011), Mansell (2014), and Reggi and Scicchitano (2014).

The aim of the EU's Digital Agenda is to support the free movement of persons, services and capital, whereby individuals and businesses can seamlessly access and exercise online activities under conditions of fair competition, and a high level of consumer and personal data protection, irrespective of their nationality or place of residence.

Why does the EU's Digital Agenda matter so much? Today's digital market is made up mainly by US-based online services (54 %) and by national online services (42 %). EU cross-border online services only amount to 4 %. The EU's Digital Single Market Strategy was adopted by the EU Commission in May 2015, with 16 initiatives to be delivered by end 2016. They are based on three pillars:

1. **Access**: better access for consumers and businesses to online goods and services across Europe;
2. **Environment**: Creating the right conditions for digital networks and services to flourish; and
3. **Economy and society**: Maximising the growth potential of the Digital Economy (Fig. 4).

At present the discussion is advancing concerning: concrete legislative proposals, to address issues ranging from consumer rights in online retail, to copyright and data protection to network expansion and the use of modern techniques for industries. The benefits expected from the Digital Single Market are substantial: it is hoped to contribute up to 415 billion euros per year to the EU economy; create new sources of employment and opportunities for start-ups; and expand markets and offer better services at better prices.

3 The EU's Capital Market Union

Capital Markets in Europe are still less developed, diversified and integrated than markets in other area. In financial terms, the euro area is like a plane flying principally on one engine: the banking system. But what is the Capital Market

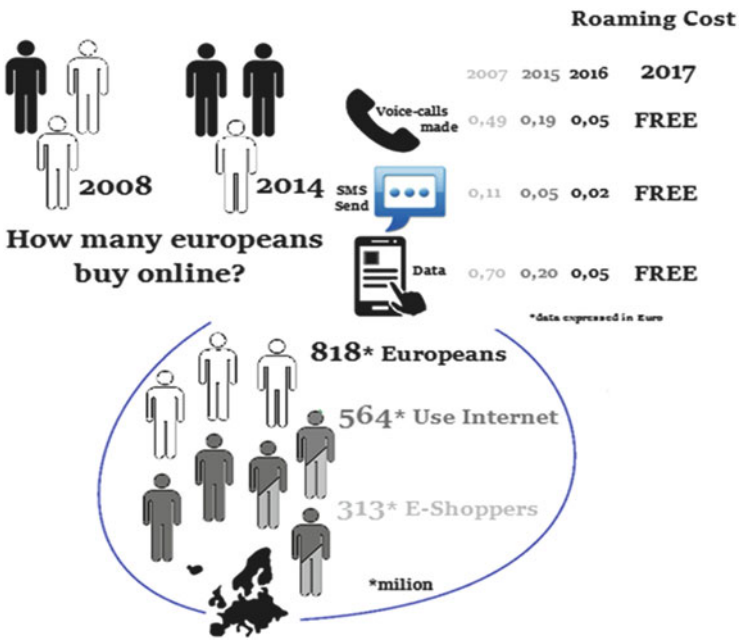

Fig. 4 EU's e-commerce and roaming cost. *Source*: Own elaboration based on Global b2c e-commerce report 2015

Union (CMU)? It is an agenda for the EU28—thus euro area and no-euro area EU countries. Its aim is to complete the Single Market for financial services, and its main features are laid out in a Green Book presently under consultation. Pursuing the CMU agenda, integration of the financial markets needs to go beyond financial convergence (Fig. 5).

Definitions and targets matter greatly. When debating convergence vs. integration: the objective should be to support qualitative rather than quantitative integration. In Fig. 6, increases in the FINTEC signal higher financial integration. The price-based FINTEC aggregates ten indicators covering the period Q3 1998—Q3 2014, and the quantity-based FINTEC aggregates five indicators available from the first quarter of 1999 to the first quarter of 2014. The FINTEC is bounded between zero (full fragmentation) and one (full integration) (Fig. 7).[6]

What is the Goal of the Capital Markets Union? The aim is to raise capital markets:

- Effectiveness: matching supply and demand (diversification);
- Efficiency: increasing competition and lowering costs; and
- Size: lowering barriers between Member States.

[6] See ECB (2015) Financial Integration in Europe, Adelino et al. (2012), Campbell (2013), and Shi et al. (2014).

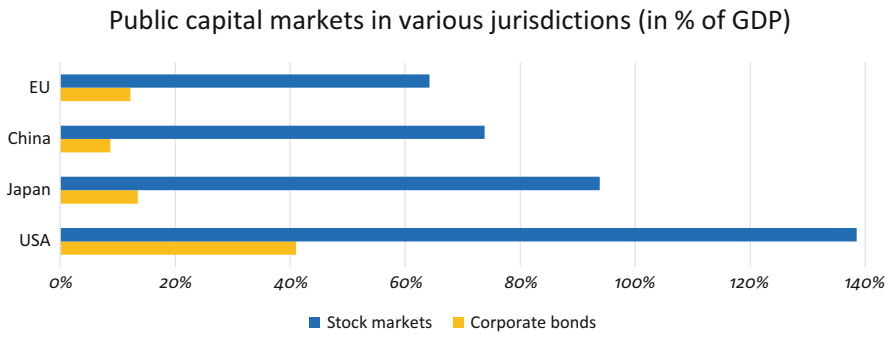

Fig. 5 Differences in the financial structure in Europe and in the US

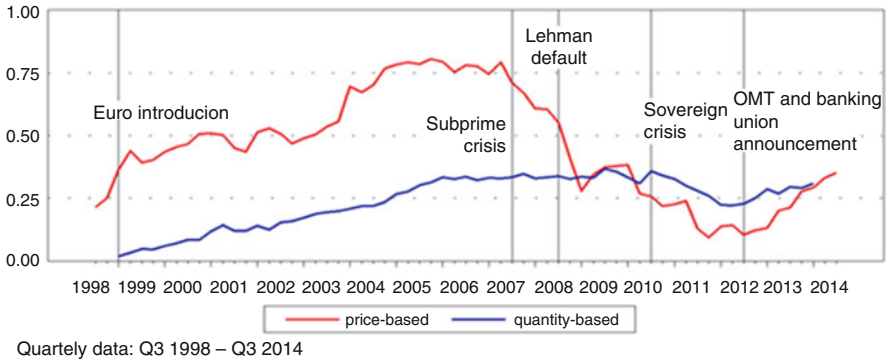

Fig. 6 Price-based and quantity-based Financial Integration Composites (FINTECs). *Source*: ECB and ECB calculations. Monthly data (January 1995—December 2014)

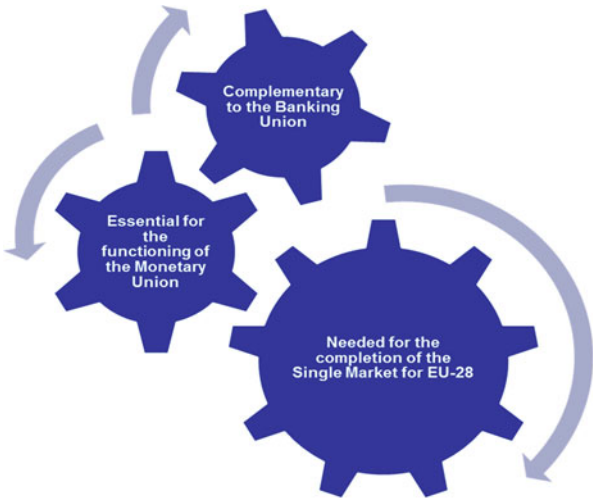

Fig. 7 The EU's Capital Market Union-CMU

4 Making Payments in the EU

The EU's Internal market needs appropriate and safe ways to pay. Perhaps one of the less known tasks of the Eurosystem—the system formed by all national central banks of the euro area + the ECB—is to promote the smooth operation of payment systems" (Art. 3.1 of ESCB Statute). For accomplishing this, the ECB and NCBs "may provide facilities, and the ECB may make regulations, to ensure efficient and sound clearing and payment systems within the Union and with other countries" (Art. 22 of ESCB Statute) (Fig. 8).

The Eurosystem has three main "neutral roles" pertaining the payment system. The first role is the **Operator role**: actually building, connecting and servicing the necessary platforms. It's a Hub and Spoke approach. The second is the **Oversight role**, and the third is the **Catalyst role** promoting: Safety and Security, Efficiency and Market Integration.

How large is the Single Euro Payment Area (SEPA)? Presently SEPA connects 34 countries (of which 19 euro area countries); 516 million people (euro area 332 million); 26 million companies (euro area 17 million), public authorities and NGOs; together making 87 billion payments p.a. (euro area 57 billion). Sources are Eurostat, ECB, BIS 2012 data.

The path has been quite long and the following are among the milestones of the payment systems integration:

- 1999—Introduction of the euro
- 1999—ECB report: Improving cross-border payment services in the euro area
- 2001—Regulation on Cross-border Payments in Euro (2560/2001)
- 2002—Introduction of euro coins and notes
- 2002—Establishment European Payments Council (EPC) by banking industry

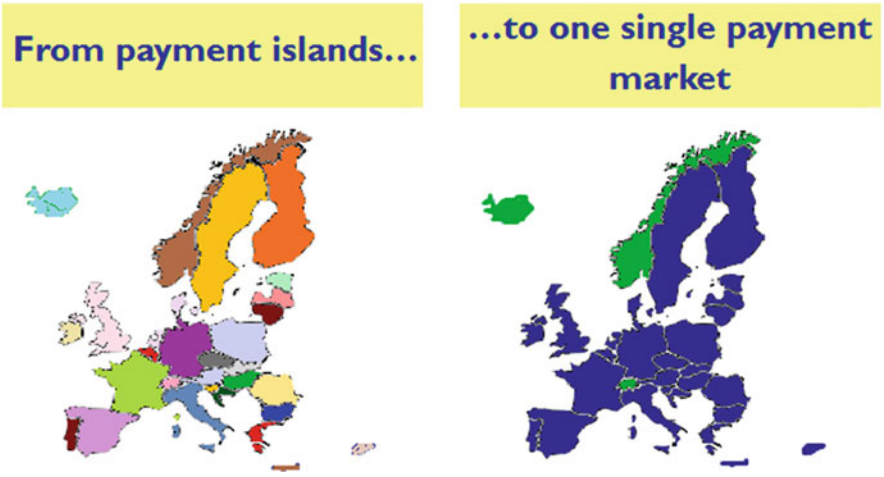

Fig. 8 Payment integration in the EU

- 2007—Payment Services Directive (2007/64) as legal basis
- 2008—Launch of SEPA Credit Transfer (SCT) scheme by EPC
- 2009—Launch of SEPA Direct Debit (SDD) scheme by EPC
- 2012—SEPA Migration End Date Regulation (260/2012)
- 2014—Launch of the Euro Retail Payments Board (ERPB)
- 2014—SEPA migration end date in the euro area for SCT and SDD
- 2014—Payment account directive (2014/92)
- 2015—Interchange Fee Regulation on payment cards (2015/751), soon: revised Payment Services Directive (PSD2)

The benefits from SEPA have so far been substantial, even during crisis when financial stress and break-up risks soared. For example:

- Fees for cross-border credit transfers have dropped by around 90 %;
- Transaction time has decreased from 3 days and more to maximum one business day in 2012;
- Cross-border direct debits possible since 2009;
- All credit transfers and direct debits in euro area according to SEPA since 1 August 2014; and
- 78 % of card Point-of-Sale-transactions done with EMV-chip in June 2014

What's next on the payments agenda? SEPA for cards, e-commerce and mobile payments; 'instant' payments for SEPA; and the "One account, One Card, One Terminal" plan.

5 Target to Securities (T2S)

It's a single IT platform connecting national Central Securities Depositories (CSD). It's an entirely new concept that solves the issue of fragmentation in this segment and lowers costs and risks [see also Gray and Pongsaparn (2015) and Jobst et al. (2012)]. As an example of its aims: suppose a small-medium enterprise (SME) intends to expand its business oversee. It might need to find investors. Its bank may offer to issue Debt Certificates on behalf of the SME and place them on the market. With T2S it can immediately reach investors across Europe and globally. These transactions will be treated the same as national flows. T2S is a secure platform to transfer these securities against cash. After receiving the proceeds on its account, the SME can then invest expanding its business. The ECB oversees the whole infrastructures: in a neutral manner (Fig. 9).

T2S has the potential to bring several benefits. It makes it easier to reach investors all over Europe and even globally. T2S gathers the main financial instruments in a centralized pool of securities. It delivers an integrated model for liquidity management. T2S creates a single collateral pool.

Benefits for Central Securities Depositories (CSDs) include: a technologically advanced, state-of-the-art, and robust settlement engine; economies of scale by

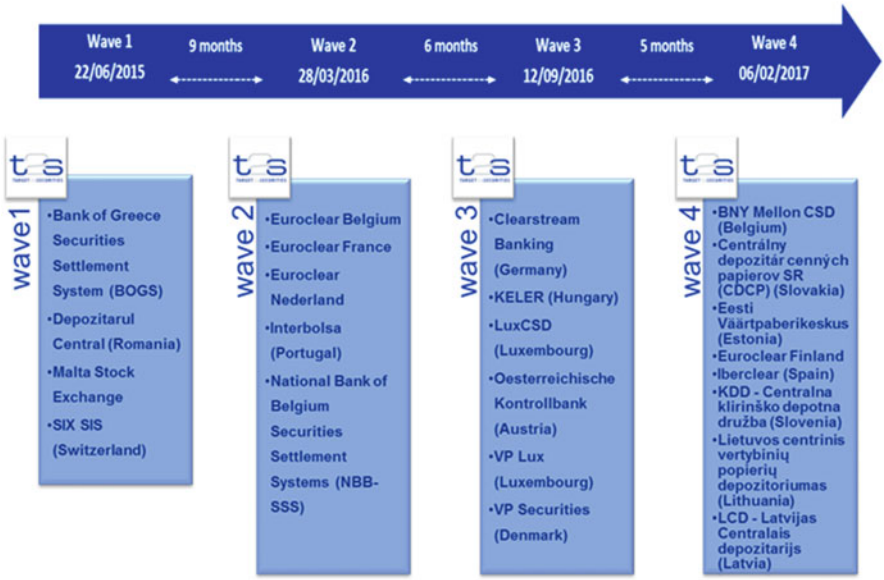

Fig. 9 T2S migration waves

pooling together settlement volumes across Europe; new business opportunities through access to new markets; and long-term savings from efficient re-shaping to T2S.

Benefits for Users include: acquiring the possibility to access all securities from one account in one CSD; potential to optimise collateral and liquidity requirements (single collateral pool in T2S); same processing and reduced settlement fees for domestic and cross-border transactions; reduced back-office costs by centralising settlement and thus streamlining interfaces; and new business opportunities through access to new markets.

Benefits for Markets include: higher level of competition in post-trade industry; a Single Market for financial services in Europe through harmonised settlement; reduced settlement risks on cross-border transactions, positively affecting financial stability; investors can more easily diversify their portfolios; issuers can more easily reach European investors; reduced costs of capital for firms lead to economic growth; and easier access to European securities by foreign investors.

6 Some Final Observations

The EU Internal Market is a shared asset which has been the engine of Europe's integration, transforming it into the world's most open economic area and with "*No Fortress Europe*": i.e., not at the expense of links with other countries. Over the last

60 years, its impact on trade, foreign direct investment and finance has been vastly beneficial (excluding during the crisis). Sadly this argument is playing a modest role in the current policy debate concerning the future of the EU and euro area.

An important feature of European integration is that the EU Internal Market has advanced slowly step by step while reshaping all countries. New components and elements are under way and we have reviewed four of them in this chapter: the EU's Digital Agenda, the Capital Market Union (CMU), the Payment System Directive (PSD), and Target-to-Securities (T2S). These elements are quite ambitious in their respective domains and need to be completed, understood, and widely adopted to exert their benefits, and boost the benefits from the euro. This is a big change in culture that is supporting the change in EMU governance and political economy under way.

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Demographic Changes and Economic Growth

Marias H. Gestsson and Gylfi Zoega

Abstract We derive an overlapping-generations model where the creativity of individuals is age dependent. The model implies that lower population growth and the ageing of the population may bring lower productivity growth and investment levels. Using a panel of OECD countries from 1950 to 2011 we find evidence for the negative effect of lower population growth on investment and the effect of the ageing of the population on both investment and productivity growth. However, we find no evidence on the effect of population growth on productivity growth. We conclude that Europe should welcome immigrants and promote higher birth rates among its population.

1 Introduction

Innovations and productivity growth occur where people interact while solving problems, view the world in different ways and have distinct insights and intuition about its working. Phelps (1968) describes how the birth of a new individual confers an externality on the rest of society through his future discoveries and inventions. It follows that the economy benefits from a greater supply of ideas when the population grows, which improves the productivity of both current as well as future generations.

In this paper we address the potential importance of the age distribution of the population in the generation of new knowledge. As new generations are born and then die to be succeeded by their children and their children's children the size of

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each generation affects the age distribution of the population at any given point in time. In this paper we present an overlapping-generations model where the creativity of each individual depends on his or her age. We show how changes in the age distribution affect the aggregate creativity of the population, hence the generation of ideas and the growth of productivity. We then analyze steady state growth when both capital and productivity are growing endogenously in equilibrium, driven by population growth and changes in the age distribution of the population. The empirical predictions of the model are tested using panel data for 20 OECD countries.

Our analysis has obvious implications for the future economic growth of Europe and Japan where population ageing has set in. It is especially pronounced in Japan but also quite significant in France, Germany and Italy.[1] In contrast, the ratio of old to young has not increased by nearly as much in the U.S., the U.K. and in Scandinavia.[2] The different paths of population growth and the age distribution of the population may explain the better recent performance of the latter group. It follows that if our thesis is right, the continent of Europe should welcome young and prime-aged immigrants who will increase investment and productivity growth in economies suffering from low birth rates.

2 Age and Creativity

While every young individual entering the labor market may bring externalities in the form of useful and good ideas over the course of his or her lifetime, the level of creativity differs between individuals. Moreover, the nature of these ideas may be affected by institutions as described by Baumol (1990). Thus the most creative individuals may resort to rent seeking, even criminality and warfare, when property rights are not well protected and the government is corrupt. But when an efficient government enforces well-defined property rights and the rule of law, the best and the brightest generate ideas that are useful for society. Here we turn attention to the age of people's greatest accomplishments to show that even in a well-organized society were the incentives for productive innovations are in place, the rate of innovation may fall as the population ages.

There is some evidence that people's creativity may start to fall once a certain age is reached. There is, for example, statistical evidence showing that research productivity is declining in age. Lehman (1953) finds that creativity in science and

[1] The old age dependency ratio, defined as the ratio of over 65 years of age to the 20–64 years age group, has risen from 23.3% in 1980 to 33.9% in 2012 in Italy; from 21.2% in 1980 in Germany to 34.4% in 2012; from 25.0% in France in 1980 to 30.2% in 2012; from 15.1% in Japan in 1980 to 41.5% in 2012.

[2] It was 25.3% in Denmark in 1980 and became 30.1% in 2012; 28.4% in Sweden in 1980 and became 32.6%; 26.8% in the UK in 1980 and became 28.7% in 2012; and finally 19.8% in the US in 1980 and became 22.9% in 2012.

invention is highest in the 30–40 years age category. Oster and Hamermesh (1998) find that economists' productivity measured by publications in leading journals declines with age, although the probability of acceptance once an article has been submitted to a leading journal is independent of age. They find that the median age of authors of articles in leading economics journals was 36 in the 1980s and the 1990s and that a very small minority of authors are over 50 in spite of a substantial percentage of AEA members being over the age of 50. Jones (2010) analyses the age of individuals at the time of their greatest achievements in science using data on research that leads to the Nobel Prize in physics, chemistry, medicine and economics and also data on research that leads to great technological achievements as shown in the almanacs of the history of technology. He finds that the greatest concentration of innovations in the life of a scientist comes in his 30s but a substantial amount also comes in the 40s, while scientists in their 50s, and even more so in the 60, generate far fewer discoveries. Moreover, he finds that the age of great innovations is 6 years higher at the end of the twentieth century than at the beginning of the century. Weinberg and Galenson (2005) study the age of accomplishment among Nobel-prize economists and find that it is concentrated between the ages of 40 and 50. However, there is a difference between economists doing conceptual work, peaking at 32.5 years of age, and those doing empirical work, peaking at 53.2 years. Jones (2010) calculates the average age of inventors granted patents in the NBER patent database and finds it to be 48. Jones et al. (2014) find that great scientific output typically peaks in middle age and Diamond (1986) finds, using longitudinal data set for scientists and mathematicians, that the quantity and quality of research output declines continuously with age.

Changing demographics, i.e., an increased number of older individuals relative to younger ones due to declining birth rates and increased longevity, have been shown to be associated with current account deficits[3] and challenging budgetary problems for central governments. Aksoy et al. (2015) find that the age profile of the population has both economically and statistically significant impacts on growth, savings, investment, hours worked, real interest rates and inflation. In addition, the number of patent applications per capita is positively related to the number of young and middle aged in the population.

We now move on to derive an overlapping-generations model where the creativity of the older generations is lower than that of the middle aged. We explore the equilibrium properties of the model and analyze the effects of changes in population growth, the age structure and saving rates on investment and the growth of productivity and output.

[3] See Higgins (1998), Taylor and Williamson (1997), Gudmundsson and Zoega (2014) and Katsimi and Zoega (2014).

3 An Overlapping-Generations Model of Productivity Growth

Our model starts from the insights of Phelps (1968) that population growth does not have to be immiserising as in the Solow and Ramsey growth models because it increases the number of creative individuals who may have useful ideas in the future.[4] We envisage a world where waves of new individuals, or cohorts, are born, each bringing a unique set of insights and intuition waiting to become ripe. While population growth has the effect of lowering the steady state level of capital per capita in the Solow model, as well as output and consumption per capita when the impact of new ideas is ignored, the creativity of new generations may more than offset this effect as shown in our model.

3.1 Model Setup

Output is produced with capital and labor where the technology is labor augmenting. The production function is the following:

$$Y(t) = K(t)^{\alpha}[A(t)L(t)]^{1-\alpha} \tag{1}$$

where $Y(t)$ is output at time t, $K(t)$ is the capital stock at time t, $A(t)$ is labor-augmented technology at time t, $L(t)$ is the labor force at time t and $0 < \alpha < 1$. The labor force at time t consists of an infinite number of generations that vary in age from the youngest one, who has just entered the labor force, to the oldest one who is about to retire. The labor force can then be written by the following integral:

$$L(t) = \int_{a=G}^{R} L(a,t)da \tag{2}$$

where $L(a,t)$ is the number of individuals in the labor force aged a at time t, G is the age at which individuals enter the labor force and R is the retirement age. We assume that the productivity of workers remains unchanged when it comes to producing output throughout their working lives [see Börsch-Supan and Weiss (2008)].[5]

[4] Phelps (1968, page 512) makes the point that "If I could re-do the history of the world, halving population size each year from the beginning of time on some random basis, I would not do it for fear of losing Mozart in the process."

[5] They studied productivity in a German car manufacturing and found that experience prevents the productivity of older workers from falling by reducing the probability of serious mistakes.

Labor-augmented technology is assumed to develop over time in the following way:

$$\dot{A}(t) = K(t)^{\beta} N(t)^{\gamma} A(t)^{\theta} \tag{3}$$

where $\dot{A}(t) = \frac{\partial A(t)}{\partial t}$ and $\beta > 0$, $\gamma > 0$, $1 > \theta \geq 0$ and

$$N(t) = \int_{a=G}^{R} \omega(a) L(a,t) da \tag{4}$$

is the aggregate creativity of all individuals alive at time t in the economy, where $\omega(a) > 0$ gives the creativity of an individual aged a. In Eq. (3) capital and the creativity of workers are used together to produce innovations where $\beta + \gamma$ measures the returns to scale. If $\beta + \gamma > 1$ we have increasing returns to scale in K and N in the production of innovations, which could be due to increased interactions among a growing number of researchers. In contrast, if $\beta + \gamma < 1$ we have diminishing returns to K and N in the generation of innovations, which could be due to congestion effects where doubling the amount of K and N may only cause the same set of innovations to be accomplished twice within the same research unit. The parameter θ measures the returns to knowledge in the generation of further innovations. When $\theta = 1$ a constant level of aggregate creativity N could generate a constant rate of growth of A and an increasing rate of growth when $\theta > 1$. In contrast, a constant rate of growth of A requires a rising level of aggregate creativity N when $\theta < 1$.

Finally, we assume a closed economy with no public sector, a constant savings rate and zero depreciation of capital;

$$Y(t) = C(t) + I(t) \tag{5}$$

$$I(t) = S(t) \tag{6}$$

$$S(t) = sY(t) \tag{7}$$

$$\dot{K}(t) = I(t) \tag{8}$$

where $C(t)$ is consumption at time t, $I(t)$ is investment at time t, $S(t)$ are savings at time t, s is the saving rate such that $1 > s > 0$.

3.2 Equilibrium

Equations (1), (6), (7) and (8) give the growth rate of the capital stock

$$g_K(t) \equiv \frac{\dot{K}(t)}{K(t)} = sK(t)^{\alpha-1}A(t)^{1-\alpha}L(t)^{1-\alpha} \tag{9}$$

and Eq. (3) gives the growth rate of labor-augmenting technology

$$g_A(t) \equiv \frac{\dot{A}(t)}{A(t)} = K(t)^{\beta}N(t)^{\gamma}A(t)^{\theta-1} \tag{10}$$

Taking logs and differentiating (9) and (10) gives a set of two differential equations in the rate of growth of the capital stock g_K and the rate of growth of technology g_A

$$\frac{\dot{g}_K(t)}{g_K(t)} = (1-\alpha)(g_A(t) + g_L(t) - g_K(t)) \tag{11}$$

$$\frac{\dot{g}_A(t)}{g_A(t)} = \beta g_K(t) + \gamma g_N(t) - (1-\theta)g_A(t) \tag{12}$$

where $g_L(t) = \frac{\dot{L}(t)}{L(t)}$ is the rate of growth of the labor force and

$$g_N(t) \equiv \frac{\dot{N}(t)}{N(t)} = \frac{\int_{a=G}^{R} \omega(a)\frac{\partial L(a,t)}{\partial t}da}{\int_{a=G}^{R} \omega(a)L(a,t)da}$$

Using

$$\frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} = \frac{\frac{\partial L(a,t)}{\partial t}}{L(t)} - \frac{L(a,t)}{L(t)}g_L(t)$$

gives:

$$g_N(t) = \frac{\int_{a=G}^{R} \omega(a)\frac{\partial \frac{L(a,t)}{L(t)}}{\partial t}da}{\int_{a=G}^{R} \omega(a)\frac{L(a,t)}{L(t)}da} + g_L(t) \tag{13}$$

where $\frac{L(a,t)}{L(t)}$ is the share of the labor force aged a at time t, which gives the age distribution of the labor force. Combining (13) and (12) gives

$$\frac{\dot{g}_A(t)}{g_A(t)} = \beta g_K(t) + \gamma g_M(t) + \gamma g_L(t) - (1-\theta) g_A(t) \tag{14}$$

where

$$g_M(t) \equiv \frac{\dot{M}(t)}{M(t)} = \frac{\int_{a=G}^{R} \omega(a) \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da}{\int_{a=G}^{R} \omega(a) \frac{L(a,t)}{L(t)} da} \tag{15}$$

Note that the denominator in (15) gives the number of inventions produced on average per individual in the economy at time t and the numerator gives its changes with respect to time, which depend on changes in the age distribution over time $\frac{\partial \frac{L(a,t)}{L(t)}}{\partial t}$. Hence, $g_M(t)$ gives the growth rate of the average number of new ideas and inventions per individual in the economy. The first-order differential equations in (11) and (14) give equilibrium in the system where $g_K(t)$ and $g_A(t)$ are endogenous variables while $g_L(t)$ and $g_M(t)$ are exogenous.

3.3 Steady-State Growth

Using (11) and (14), steady state growth rate of the capital stock ($\overline{g}_K(t)$) and labor augmented technology ($\overline{g}_A(t)$) is the following ($\dot{g}_K(t) = \dot{g_A}(t) = 0$):

$$\overline{g}_K(t) = \frac{1+\gamma-\theta}{1-\beta-\theta} g_L(t) + \frac{\gamma}{1-\beta-\theta} g_M(t) \tag{16}$$

$$\overline{g}_A(t) = \frac{\beta+\gamma}{1-\beta-\theta} g_L(t) + \frac{\gamma}{1-\beta-\theta} g_M(t) \tag{17}$$

which is stable when $1 > \theta + \beta$ as can be seen from the following phase diagram (Fig. 1).

Using (16) and (17) in (1), economic growth in steady state is

$$\overline{g}_Y(t) = \frac{1+\gamma-\theta}{1-\beta-\theta} g_L(t) + \frac{\gamma}{1-\beta-\theta} g_M(t) \tag{18}$$

Note that since $1 > \theta \geq 0$ and $\gamma > 0$ it follows that $1 + \gamma - \theta > 0$. Hence, the steady state growth rates of capital, labor augmented technology and output are increasing in the growth rate of the labor forces and the average number of new ideas and inventions produced by an individual in the economy.

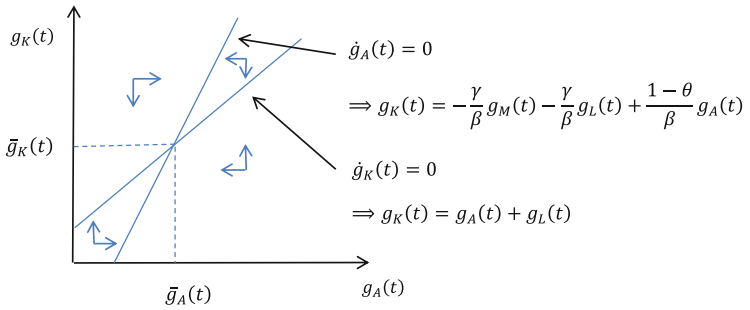

Fig. 1 Dynamics of growth rates of K and A when $\theta + \beta < 1$

3.4 Constant Age Distribution

As a benchmark case, let us consider the steady state growth rate of labor-augmented technology when the age distribution of the labor force is not changing over time $\frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} = 0$. According to (15) this gives $g_M(t) = 0$ and, hence, that the steady state growth rate of capital, labor augmented technology and output is the following according to (16), (17) and (18):

$$\overline{g}_K(t) = \frac{1+\gamma-\theta}{1-\beta-\theta} g_L(t) \tag{19}$$

$$\overline{g}_A(t) = \frac{\beta+\gamma}{1-\beta-\theta} g_L(t) \tag{20}$$

$$\overline{g}_Y(t) = \frac{1+\gamma-\theta}{1-\beta-\theta} g_L(t) \tag{21}$$

All three growth rates are increasing in g_L and the effect of g_L is increasing in β, θ and γ. In the absence of technological progress, when $\beta = \theta = \gamma = 0$, a higher rate of population growth has the effect of raising the steady-state rate of growth of capital and hence also output. With technological progress, there is the further effect that both an increasing capital stock as well as a growing population has the effect of increasing the rate of innovation so that A grows at a more rapid rate, which makes output grow faster than the labor force.

3.5 Increasing Number of Older Individuals Relative to Younger Ones

Let us now consider the case when the number of older individuals is increasing relative to the number of younger ones. The question is if it is possible that this results in lower steady state growth rates than when the age distribution is constant over time?

According to (16)–(18) and (19)–(21), this is the case only if $g_M(t) < 0$. According to (15), that only occurs if the average number of new ideas and inventions produced per individual in the economy is decreasing

$$\dot{M}(t) = \int_{a=G}^{R} \omega(a) \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da < 0 \tag{22}$$

It is not straight forward to show that (22) holds. Equation (2) gives

$$\int_{a=G}^{R} \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da = 0 \tag{23}$$

Hence, if $\omega(a)$ is constant $\omega(a) = \omega$ we have

$$\int_{a=G}^{R} \omega(a) \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da = \omega \int_{a=G}^{R} \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da = 0$$

and a necessary condition for (22) to hold is that $\omega(a)$ is dependent on age. Hence, whether or not an increased number of older individuals relative to younger ones results in lower steady state growth rates depends on the structure of the $\omega(a)$ function. We show two cases for the function $\omega(a)$ below (Fig. 2).

In case (i), the number of ideas and inventions produced by an individual are constant up to a certain age a^* at which it drops and is constant until he retires. In case (ii), it is constant up to a certain age a^* after which it decreases until he retires.

Case (i): A Discrete Decrease in $\omega(a)$ **at** $a = a^*$

Let us assume that $\omega(a)$ is greater for younger than for older individuals such that

$$\omega(a) = \begin{matrix} \omega_Y \\ \omega_O \end{matrix} \text{ if } a \begin{matrix} \leq \\ > \end{matrix} a^*$$

where $\omega_Y > \omega_O$ and $G < a^* < R$. From (23) we have that

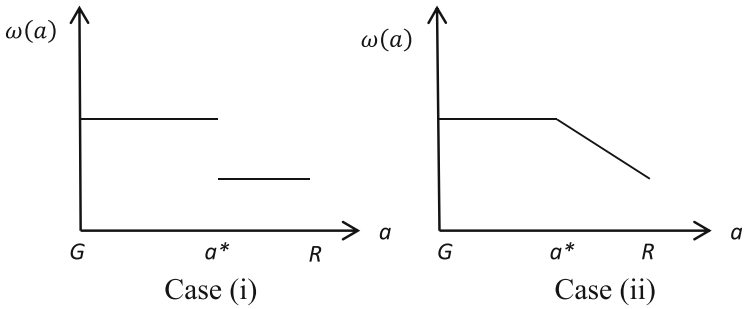

Fig. 2 Two cases of age-dependent creativity

$$\int_{a=G}^{a^*} \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da + \int_{a=a^*}^{R} \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da = 0$$

and if the number of older individuals is increasing relative to the number of younger ones

$$\int_{a=a^*}^{R} \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da = -\int_{a=G}^{a^*} \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da > 0 \tag{24}$$

Using this gives

$$\dot{M}(t) = \int_{a=G}^{R} \omega(a) \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da$$

$$= \int_{a=G}^{a^*} \omega(a) \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da + \int_{a=a^*}^{R} \omega(a) \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da$$

$$= (\omega_Y - \omega_O) \int_{a=G}^{a^*} \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da < 0$$

which fulfills the necessary condition in (22). Hence, an increase in the number of older individuals relative to younger ones results in lower steady state growth rates assuming that younger individuals are more productive in producing new ideas and inventions than older ones.

Case (ii): Non-Increasing ω(a)
Let us now assume $\omega(a)$ is constant in a for younger individuals and degreasing for individuals aged a^* or more

$$\omega'(a) \begin{matrix} = 0 \\ < 0 \end{matrix} \text{ if } a \begin{matrix} \leq \\ > \end{matrix} a^*$$

$$\lim_{a \to a^{*+}} \omega(a) = \omega(a^*)$$

where $G < a^* < R$. Hence, we have that

$$\omega(a) \begin{matrix} = \omega_Y \\ = \omega_Y - \rho(a) \end{matrix} \text{ if } a \begin{matrix} \leq \\ > \end{matrix} a^*$$

where:

$$\rho(a) > 0$$
$$\lim_{a \to a^{*}_{+}} \rho(a) = 0$$
$$\rho^{'}(a) > 0$$

Using this and (24) gives:

$$\dot{M}(t) = \int_{a=G}^{R} \omega(a) \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da$$
$$= \int_{a=G}^{a^{*}} \omega(a) \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da + \int_{a=a^{*}}^{R} \omega(a) \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da$$
$$= -\int_{a=a^{*}}^{R} \rho(a) \frac{\partial \frac{L(a,t)}{L(t)}}{\partial t} da < 0$$

which fulfills the necessary condition in (22). Hence, assuming that the productivity of older ones decreases with age makes an increase in the number of older individuals relative to the younger ones lower steady-state growth rates.

4 Shocks

In this section we use the model to analyze three types of shocks. The choice of shocks is intended to highlight the economic history of Europe since WWII. The first decades, the so-called Golden age, was characterized by high savings and investment, rapid population growth and a demographic shift to the younger generations. The period since the mid1970s, in contrast, is characterized by lower saving rates, lower investment levels, low and falling population growth rates and recently the ageing of the population. Falling labor force growth rates ($g_L(t) \downarrow$) and an increase in the number of older individuals relative to younger ones in the labor force imply a fall in the growth rates of average creativity ($g_M(t) \downarrow$). Furthermore, savings ratios ($s \downarrow$) are likely to fall following such demographic changes. It is therefore of interest to apply the model to analyze such exogenous changes.

Consider first a drop in the labor force growth rate ($g_L(t) \downarrow$). This causes a shift in the $\dot{g}_K(t) = 0$ and $\dot{g}_A(t) = 0$ paths in Fig. 3 and results in a movement to a new steady state (A to B) resulting in lower growth rates of capital and labor augmented technology during the transition period as well as in the new steady state. Here a fall in the rate of growth of the population has the effect of reducing the rate of growth of technology by reducing the rate of growth of workers engaged in research, i.e.,

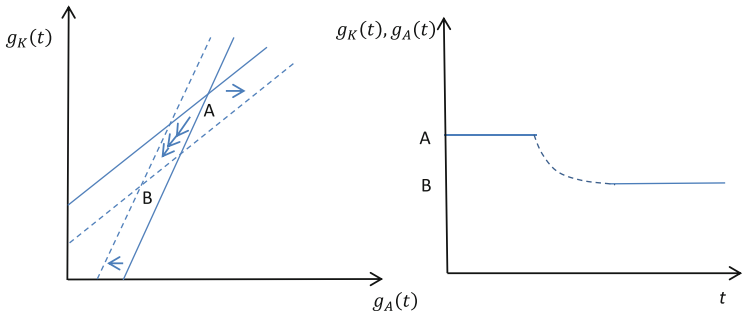

Fig. 3 Effect of a drop in the growth of the labor force

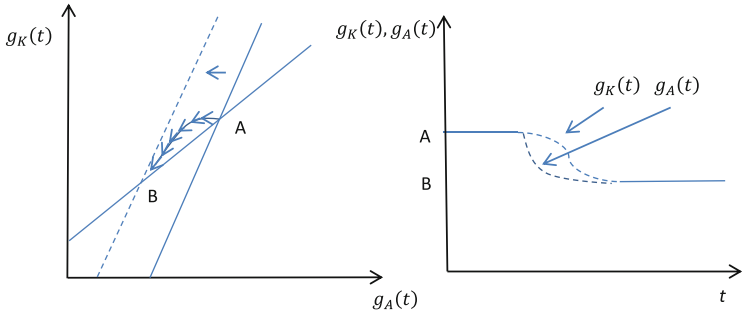

Fig. 4 Effect of a drop in the rate of growth of creativity

creativity, and development in Eq. (3). There is also an indirect effect in that a lower rate of growth of the labor force reduces capital accumulation so that the volume of capital used in research increases at a slower pace, which further reduces the rate of innovation.

Second, consider a drop in the growth rate of average creativity ($g_M(t) \downarrow$) due to demographic changes. The effect is shown in Fig. 4 below. The fall of g_M causes a shift in the $\dot{g}_A(t) = 0$ path and results in a movement to a new steady state (A to B) resulting in lower growth rates of capital and labor augmented technology during the transition period as well as in steady state. Intuitively, the lower rate of growth of aggregate creativity in the economy reduces the rate of growth of innovations, which then causes the rate of growth of capital to fall which reduces the rate of innovations further by reducing the rate of growth of capital used in the research department described in Eq. (3).

Third, consider a drop in the savings rate ($s \downarrow$). Using Eq. (9), this causes an immediate drop in the growth rate of capital, which then recovers to the initial steady state level leaving the level of capital lower than it would have been with an

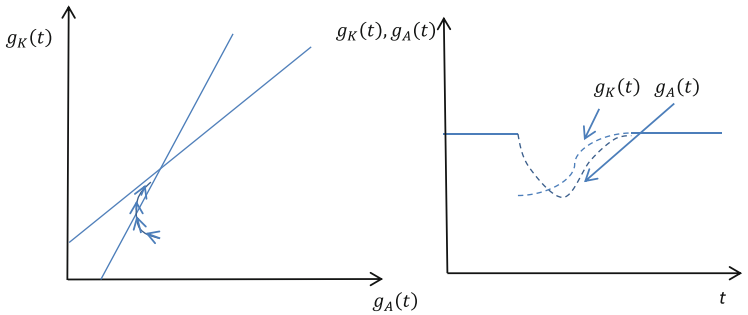

Fig. 5 Effect of a drop in the savings rates

unchanged saving rate. Following the drop in capital, the growth rate of labor augmented technology decreases first and then increases to the initial steady-state. During the period of low capital growth, the rate of growth of technology is lower, which results in a lower level of technology, in addition to a lower level of capital, in the new steady state (Fig. 5).

5 Empirical Evidence

In this section we explore the relationship between total factor productivity growth g_A and investment, as a proxy for g_K, as a function of the age distribution of the population for a group of 20 countries.[6] We use data from 1950 to 2011 to estimate the two steady-state relationships, which are Eqs. (16) and (17), for productivity growth and capital accumulation as a function of the growth of the labor force g_L and changes in the age distribution g_M. The labor force is divided into six age groups; 20–29, 30–39, 40–49, 50–59 and 60–69 and each is measured relative to the working age population; 20–69. The two dependent variables are written in percent as well as all right-hand side variables. The age variable is written as changes between half-decades.[7]

The estimated coefficients are shown in Table 1 below. We find that the higher the share of workers over 50 the lower is investment as a share of GDP and also the higher the share of over 60s the lower is the rate of TFP growth. Also, the higher the share of the 30–39 group the higher is the rate of productivity growth. Population growth is positively associated with investment but has an insignificant coefficient in the productivity growth equation.

[6] The countries are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, Norway, New Zealand, Portugal, Spain, Sweden, U.K. and the U.S.

[7] The TFP data are taken from Penn World Tables and the labour force data from the OECD (stats.OECD.org).

Table 1 Productivity growth, investment and the age structure

	Investment (% of GDP)	TFP growth
Constant	22.88[a] (52.35)	0.39[a] (2.40)
20–29 (change)	0.94[a] (3.26)	−0.15 (1.23)
30–39 (change)	−0.56[b] (1.73)	0.27[a] (2.01)
40–49 (change)	−0.62 (1.14)	−0.05 (0.25)
50–59 (change)	−1.44[a] (2.42)	−0.07 (0.29)
60–69 (change)	−1.55[a] (4.18)	−0.40[b] (1.88)
g_L	1.01[a] (3.23)	−0.05 (0.38)
Observations	191	237
Cross sections	20	20
R-squared	0.61	0.08

Method: Panel least squares, balanced panel. Fixed country effects. White period standard errors & covariance (d.f. corrected). [a]denotes significance at 5% level and [b]at the 10% level. Time period Half-decadal averages from 1950 to 2011, the first average is 1950–1954 and the second 1955–1959 and the same for the remaining decades except for the last one where the average of 2010 and 2011 is taken as the half-decadal values since more recent observations are not available

6 Conclusions

The creativity of people in business and science tends to fall when they reach their 50s and 60s. We use this observation to derive an overlapping-generations model where the ageing of society has the effect of reducing the rate of growth of aggregate creativity in the economy, reducing the rate of growth of productivity. In essence the total population is less creative because of more people belonging to the oldest categories. Using productivity data from the Penn World Tables and labor force data from the OECD for 20 countries from 1950 to 2011 we find, using a fixed-effect estimator, that a higher share of the labor force in the age groups from 20 to 50 is correlated with a higher ratio of investment to GDP and higher share of labor force in the age groups from 20 to 60 is correlated with a higher rate of growth of total factor productivity.

Population ageing has set in on the continent of Europe and in Japan. It is especially pronounced in Japan but also quite significant in France, Germany and Italy. If our thesis that the rate of productivity growth depends on the age distribution of the population, as well as on its size, is correct the analyses would lead us to predict that the aging societies of Europe and Japan would benefit from higher birth

rates and immigration. An influx of immigrants may to some extent offset the effect of declining birth rates and increased longevity. The current migration crisis in Europe may thus turn out to be a blessing in disguise. Social policies aimed at increased birth rates—such as subsidized childcare—may also be justified. A rising number of productive prime-age workers, be they natives or immigrants, would generate higher rates of productivity growth and rising living standards for all in the long term.

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Industrial Policy, Investment and Green Growth

Luigi Paganetto and Pasquale L. Scandizzo

Abstract The Juncker Plan, along with other measures of economic policy, is an attempt to rectify the fall in demand of European investment, raising investment and innovation capacity of enterprises, in a framework of perceived excess of austerity policies and some progress towards a new European industrial (and fiscal) policy. The Plan indicates the need to reconstitute investment profitability and the importance of environmental policies. Green growth policies have become particularly popular in the last decade, but their effects could be much greater because of the growing importance of intangible investment and the industrial changes, such as those expected from the EU program "Industry 4.0", the growing e change as market failure "global", and because the green technologies seem to offer the prospect of a new technological, industrial, and research-driven paradigm. The UN Report "Better Growth", "Better Climate" main thesis is that climate mitigation policies may not have a negative impact, but can even represent a stimulus for economic growth. The idea is that it is possible to combine growth and climate objectives by increasing resource efficiency, by investing in infrastructure and promoting innovation in urban policies, land use and energy sources.

The concept of sustainable development appears to be one of the drivers of green financing, with a growing influence on public awareness of a broad accountability set of criteria to judge governments and corporations on ethical grounds. In many cases, green projects lack an articulated financial structure that allows them to be competitive in attracting financial resources: they may be too small, too specialized, dependent on very specific and risky sources of income, or, due to their public or quasi public nature, not capable to generate appropriable cash flows that may permit risk sharing through concessions or similar private public partnerships. The role of the government in improving this situation is thus expandable on a number of fronts and may prove to be decisive.

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1 The Empirical and Theoretical Conditions

Economists are generally skeptical or hostile to industrial policy. Hostility probably can be traced back to the debate on import substitution and the free trade and, more recently, to the theories of rent seeking. These identify the industrial policies as one of the main culprits of faults created by the contiguity between policy makers and economic and financial lobbies. A more benevolent interpretation includes under the name of industrial policy measures that, taken together, are designed to improve the ability of a country to cope with its economic environment by improving the structure of its businesses. The word "industrial" indicates that these policies seek to generate changes in the economic structure of the country and, therefore, should be directed to the institutions and mechanisms of the market, rather than to specific groups of economic operators. The policies typically included under this denomination therefore belong to three broad categories: (a) the introduction of incentives or disincentives to improve the efficient operation of markets, to avoid or reduce the so-called "market failures", (b) the amendment of legislation and of state controls, to prevent or reduce the so-called "government failures" and, (c) the restructuring of the parastatal sector and in general of public intervention in the economy.

Green growth policies belonging to all three of these categories have become particularly popular in the last decade, and the growing importance of climate change as a form of "global" market failure, and because the green technologies seem to offer the prospect of a new technological, industrial, and research-driven paradigm. This paradigm has a vision not only of short term improved welfare, but also of a virtuous balance between long-term economic development and environmental protection. The policies range across these three types of interventions and are the most varied: in a recent article, Rodrik (2014) lists 50 types of such policies in three important countries (the US, Germany and China).

The empirical reason for the simultaneous application of such a plurality of measures appears to be primarily the recognition of a broad social consensus on the need to improve the environmental consequences of economic activity. More technically, the many types of policies put in place testify to the conviction of the existence of significant areas of economic inefficiency. These inefficiencies are induced by the imperfection or absence of markets for natural resources and, in particular from under-pricing of carbon. They also stem from the inability of the legislative and regulatory actions to intervene effectively in the mechanisms of formation of incentives to move the frontier of innovation to protect the environment, from environmental externalities, and climate change.

The existence of institutional rigidity and the reluctance of governments to take bold political and radical actions, such as, for example, the carbon tax, leads also often to prefer a policy of gradual reforms on several fronts, rather than an incisive public policy.

From the theoretical point of view, it is difficult to see a rational basis in the policy of multiple reforms, if not in the fact that it embraces the principle of moving towards a "green economy", working in all possible directions. A similar policy, as

we are taught by the theory of the "second best", certainly does not guarantee that the situation "after" is better than the situation "before" the interventions considered. It the multiplicity of specific interventions increases the likelihood that they will lead the economy in the direction of greater efficiency, it can it be said that there is a reasonable presumption that the simultaneous and gradual increase of the incentives to reduce emissions triggers a slow process of structural improvement, but it is doubtful that this process is at least "asymptotically" efficient.

Two additional theoretical arguments that can be invoked in support of opportunity 'to carry out on more' fronts, are also provided: (a) by the Tinbergen theorem about the matching of instruments and targets, (b) by a similar theorem of the theory of "second best" on how best to counter the most 'distortions' through an equivalent number of countermeasures.

According to theorem (a), the achievement of a given number of targets are 'conditional to the availability' of an equivalent number of tools. If the diagnosis of the inefficiencies of the market for environmental goods and related externalities has therefore led us to identify distinct objectives of public intervention (the reduction of more polluting industrial plants, carbon taxation and the removal of other price distortions), to ensure the achievement we will need to identify at least as many measures of economic policy. Although the operations of structural changes tend to be accredited more 'goals, one can claim that a maximum of correspondence exists between objectives and instruments in terms of large aggregates. This means that taxation and incentives are addressed mainly to the removal of market distortions and the regulation's aim is to reduce free riding behavior. The present calls for an active industrial policy, finally, aim to the redevelopment of part of the productive sector, in order to seize the opportunities offered by "green growth", i.e., a new paradigm of economic development based on the enhancement of the environment.

According to the theorem (b), on the other hand, the optimal way to reduce the social costs of distortion is 'to apply a set of counter-distortions of the same type'. This theorem is reminiscent of Tinbergen and strengthens it with the specification of the quality of the instruments: in a non optimal situation not only the amount, but also the quality of the instruments should be consistent with the objectives of reducing the effects of market failures. This involves a search of a plurality of instruments capable of opposing the distortions in place. In this way it can be invoked a theoretical basis for the reduction of price distortions through taxation of externalities (first of all CO_2 emissions) and the introduction of incentives for the development of clean technologies. This to the extent that government interventions are not limited to directly reduce the distortions in place, but introduce factors to offset the causes of distortion that cannot be eliminated.

This logic includes, for example, measures of market liberalization or deregulation activated in the presence of monopolies of public type that have not been privatized. Other measures may be extended to forms of management, such as leasing or granting concessions, which allow to offset the lack of competition in the property rights of companies with the activation of the competition in the production of services. Other examples of liberalization "offset" are: (a) the partial

elimination of the exemptions monopoly in the sectors of telecommunications, energy, marketing of certain products, etc. (b) the de-regulation in sectors where the market power of the companies was partly dependent on the authorities that they are given (in law or in fact) to "manage" the sectoral legislation, (c) the creation of channels distribution of subsidies to production or consumption alternative to the public sector, (d) the increase of the share capital in private companies with state participation.

Despite these arguments, however, the theoretical basis of industrial policies greens are much less explicit and, to some extent, rely on more complex models than those used to propose the reduction of public intervention in the economy of a country. In other words, although it may appear otherwise, it is much easier to give a theoretical justification to the policies of liberalization in the regulation or taxation. The process of reducing the role of the state, which began after the oil crisis of the 70s, but is still in place, tends to contradict the "green" policies, because it is above all the result of the comparison between the predictions of the intervention theories and the actual performance of public institutions. In this context, the reversal of the trends of nationalization and public involvement in the market economy stems from the belief that the theories of "market failure", of "natural monopolies", of "strategic sectors", of "central planning" led to an over-sized and even aberrant public sector from the point of view of the same theories that had inspired its formation and growth.

On the other hand, the policies of "green growth" seem to offer an opportunity to develop an international public action on global externalities. They can then be consistent with an "internationalist" paradigm of the role of the state, consistent with a reduction in its "local" industrial policies. Given this setting, redesigning the public sector is first and foremost a macro-economic choice: a choice, that is, that aims to dramatically increase the efficiency of the whole system. It follows naturally the need to proceed in different directions by operating at the same time on the "physical" dimensions of the public sector (privatization), on its sphere of influence (liberalization and deregulation) and on the territorial perspective of its policies. These policies should be less and less of the "beggar thy neighbor" variety and more and more integrated into a global effort. However, to proceed in so many different directions also means not having clear priorities and to advance, at least initially, a bit 'blindly'.

2 The Prospect of Industrial "Green" Policies

Scientists have set a goal of 450 ppm of CO_2 in the atmosphere (or less) as an input which could create a global temperature rise of 2 °C, with a probability of 50 % of exceeding it 3°. This objective has been generally accepted as a "doable" reduction of CO_2 in the atmosphere—an increase of approximately 65 ppm from current levels.

Even the possibility of reaching the target of 450 ppm is far from obvious. To get a peak at this level of CO_2 in the atmosphere requires emission reductions of 50–80 % from current levels. To get an idea of the enormity of the task, take the United States as an example. Current emissions are around 20 t of CO_2 per capita. In a business as usual scenario, emissions are expected to increase to 40 t per capita in about 40 years. To achieve the goal of a 80 % reduction in emissions, this amount would need to drop to about 4 t per capita against a neutral projection of about 10 times that amount. In comparison, India's emissions are currently about 1.2 t per capita and China about 6 t per capita. But as for the United States, these emissions are projected to grow, in a business as usual scenario, to a level of more than twice the current one.

Another way to look at this challenge is to quantify some decisive actions that would be required to get a billion tons of emission reductions from existing stocks of energy production. Currently, US emissions are about seven billion tons per year out of a total of 14 billion tons. To obtain a reduction of 50 % (below the target of 80 %) of current emissions seven billion tons should be cut in a business as usual scenario. Pacala and Socolow (2004) have suggested seven actions of one billion tons each:

1. Build 700 gW of nuclear power to replace the installed capacity in coal-fired (twice the current world nuclear capacity);
2. Decrease the move for two billion cars from 10,000 to 5000 miles per year;
3. Capture and store emissions of greenhouse gases of 800 coal power plants of large dimensions;
4. Improve the energy efficiency of a quarter of the existing buildings and appliances;
5. Producing a quantity equal to 100 times the current production of ethanol in the USA;
6. Produce two billion cars traveling at 60 miles rather than 30 miles per gallon of gasoline;
7. Create two million megawatts of wind turbines to replace coal.

These quantifications are extreme, but they give an idea of the technological challenge that climate change offers. Without a break-through multiple technology, and innovation spread, in fact, we cannot take effective action on the basis of the current scenario. The world needs technological solutions, but innovations must also be tested quickly. They depend not only on the experimentation of the great solutions, but also from specific solutions and their likely spread, for example in the field of biotechnology, energy efficiency, technology of sequestration and storage of CO_2. But to achieve these innovations we do not need grand schemes: we must instead move the frontier of business innovation and direct it in the right direction, through a better functioning of the economic and financial sector and the construction of a framework of appropriate incentives.

3 The European Business, Innovation and the Plan Juncker

What is the current state of innovation in European companies? Conflicts of interest involving the credit and the choice of investment projects is a crucial element in the relationship between banks and enterprises in the "bank-centered" system prevailing today in Europe and, under the current circumstances, take on a particular relevance. These conflicts, which have been widely analyzed by economic theory, arise because of the simultaneous presence of debt and limited liability. These two conditions, in fact, induce entrepreneur—shareholders to act in a strategic way: if an investment achieves larger earnings than interests on debt, they are the only ones to benefit. Conversely, the creditors are the only ones to suffer the possible failure of the investment.

The market tends to react to this situation, trying to mitigate the incentives that shareholders would otherwise have to adopt riskier investments. Banks ration credit, increase their natural caution and impose higher interest rates. As a result, shareholders may be tempted to leave out the projects with positive net present value. The chain of incentives and disincentives in response to shareholders' moral hazard determines therefore a solution in which everyone loses: the entrepreneurs, because money is more expensive, credit is harder to get and not all projects that are economically viable are financially attractive. Creditors lose too, because their behavior, while having the effect of lowering the overall risk of the credit, also has the effect of depressing the economy and discouraging innovation.

This phenomenon, known as "asset substitution" (i.e., "replacement activity") is the result of the interaction of two economic entities: a principal and an agent, responding to different aims. The principal is the shareholder who uses the agent "bank" to pursue her business objectives, while the bank has its different business objectives to be pursued. The "agency costs" consist mainly in a level of investment lower than optimal, caused by the conflict of interests between agent and principal.

The intensity of the conflict of interests and the relative magnitude of the costs, however, are not the same for all sectors and/or types of business. The most innovative firms with the highest growth rates are more penalized, because the stronger would be for their shareholders the incentives to undertake riskier projects. From theory we can then deduce the prediction that firms in mature industries, with production more stable and with fewer opportunities to innovate will be preferred by creditors. They will then obtain credit on better terms and will have higher debt.

But in a recession, companies operating in mature industries are those subject to the effects of the strongest demand reduction. Not only the opportunities for growth for them are lower, but typically they also produce goods with greater pro-cyclical components. Construction companies, for example, are the first to suffer in times of slowdown or reversal of growth, because they operate in mature industries where the dynamics of supply and demand is slow even in the best years, while 'the vulnerability' is high with respect to reductions in strategic purchases by consumers.

The Juncker Plan, along with other measures of economic policy, is an attempt to rectify this situation, raising investment and innovation capacity of enterprises, in a framework of a substantial excess of austerity policies and seeking progress towards a new European industrial (and fiscal) policy. As an investment program, the Juncker Plan may seem still vague and not big enough for a significant impact, but its most important features are already defined, although the Plan is still, largely, "in progress".

The first notable feature of the Plan is that it identifies for the first time a supranational European mechanism for the identification and financing of projects of public and private investment backed by European institutions as well as national states. This can be a first step to building a policy-making capability to put in place fiscal policy measures (infrastructure, environmental and industrial) in the European area and to raise funds on the basis of the creditworthiness of the European Union. In other words, a first step towards a European fiscal union.

The second important feature is the size of the Plan: 21 billion of European resources (Commission and EIB) for 3 years, which should serve as a basis to collect contributions of the member states (exempt from the restrictions of the Stability Pact) and financing on international and domestic markets. 21 billion euros of liquid resources for 3 years are a substantial amount, even though they may seem inadequate when compared with the so-called investment gap, which for Europe amounts to approximately 600 billion. To give orders of magnitude, consider that the World Bank has a paid-up capital of only $ 14 billion (compared with a subscribed capital of 236 billion) and provided loans and grants for about 40 billion dollars in 2014. Similarly, the European Investment Bank (EIB), after the last capital increase of 10 billion, has a paid-up capital of about 21 billion euros and has financed projects for 72 billion euros more in 2014. The Bank of Infrastructure of BRICS, launched recently with great ambitions by China and India, will have an initial paid-up capital of only $ 10 billion.

This first supply of 21 billion Euros to fund investment therefore is not to be despised, for its absolute size, as well as considering that it finances the first (cautious) testing phase of a funding mechanism that can be repeated in the future, with progressive increases in size (as in the case of the capital increases of the development banks). The 21 billions are also the budget that allows setting up a special EIB sponsored institution called European Fund for Strategic Investments (EFSI) aimed to finance and promote investments that have a potential value much greater than the initial financial funding. From a strictly financial point of view, EFSI may use the initial funding to create, through effective leverage, debt capital by issuing bonds. Given the sovereign nature of the guarantee, it is expected that EFSI may issue bonds for about 60 billion euros. These funds can be added to the contributions of member states, which may be granted in derogation of the Stability and Growth Pact. Commitments from the member states so far amount to about 26 billion Euros, although it remains unclear whether they will be used for direct funding or also as part of a guarantee fund. Even limiting the resources to the original 21 billion Euros, the loans obtained through bond issues in Europe (60 billion euro) can in turn be used as collateral for private funding at a ratio of 1–5.

This means that private investors participated in the financing of projects guaranteed by the Fund would be protected from a sixth of the potential losses related to these projects. This procedure includes pure financial leverage, of the same type used, for example, by the International Finance Corporation, an institution of the World Bank Group, which works with the private sector. In addition to pure leverage, however, a smart financial commitment on the part of one or more institutions that receive international market confidence can mobilize a greater amount of private investment through indirect leverage mechanisms, such as syndicated loans, co-financing, risk management products, technical support and other tools that facilitate the creation, aggregation and management of financial investments and public-private partnerships.

A guarantee amounting to one-sixth of the value of the investment can contribute significantly to the reduction of credit risk, but in the current situation this may not be enough to change the European business climate. Resources must also be mobilized quickly, to make quantitative easing a counterpart of a credible fiscal expansion that can jump-start economic growth. For this reason, many expect that the ECB will come into play, providing in turn guarantees that can further reduce the price of risk. How could this involvement happen? A simple and direct way could consist in the purchase by the ECB of asset backed securities or other forms of securitized assets that arise from the program funded by EFSI. These assets would be attractive because they possess the sovereign guarantees (from EFSI and the EU or from member states). To be acceptable to the ECB, they should also correspond to the projects selected according to the highest standards of quality and evaluated according to international best practices.

The possible intervention of the ECB is linked to the long-term consequences of the Juncker plan. If the Juncker bonds (the word looks too much like junk bonds, but is pronounced in a very different way ...) are securities backed, in fact by the European Union, and if they were purchased by the ECB, directly or indirectly, this would provide a link between fiscal policy and quantitative easing that is not there yet. This would make the Juncker Plan not only an attempt to foster structural intervention, but also to start a drive towards fiscal union in the Eurozone.

Credible estimates place the investment gap in Europe in the interval of 400–600 billion Euros. The gap corresponds to a reduction of its historical level with respect to total economic activity, which in aggregate has returned to pre-crisis levels. The reduction is mainly due to lack of ability to take risks by companies and financial institutions in Europe and the conflict of interest that the crisis creates between banks and innovative businesses. It depends on the high bad debts (about 900 billion Euros according to the latest estimates of the International Monetary Fund), the uncertainty about the prospects for long-term growth and the reluctance of investors to commit funds in the presence of institutional barriers and high volatility. On the other hand, Europe has opportunities for highly profitable projects in the areas of strategic infrastructure, including projects of preservation and enhancement of the environment, digitization, transport and energy (in particular interconnections and energy efficiency), and research and innovation in all these areas. Other significant investments to capture opportunities in green growth relate to the frontier of

knowledge of SMEs: education, research and innovation and sustainable projects. To invest in these areas, it is necessary to design the projects, using modern tools such as, in particular, "bundling", i.e., creating projects of sufficient size to attract funding of institutional investors (investment funds, pension funds and companies insurance together administer around 83 trillion dollars), through diversification, in order to reduce risks, and combine components with social benefits, but unprofitable in terms of private business, with investments that can generate cash flows and are thus attractive to private investors.

The project design problem is not trivial, and cannot be addressed in an amateurish way. The procedures concerning it, its regulation and its operations, in a sense, are more important of the same project. Both from the point of view of physical and economic project design, and of its financing, it needs systematicity and competence. The evaluation of the project must be made from the point of view of all stakeholders involved : the promoters, those who issue project bonds, banks that underwrite them, investors, governments and affected communities. It must use the most modern tools of economic and financial evaluation, and be thorough, reliable, controllable and certifiable, to become an essential tool for both the selection of projects, and for the reduction of risks associated with them (Fig. 1).

Although the Juncker Plan intends to remedy the fall in demand of European investment (measurable, according to the Commission's findings, in a gap of 300–400 billion Euros), or to the investment gap measured with respect to longer term growth (400–600 billion Euros), more ambitious, structural effects may also be involved.

The Plan indicates the need to reconstitute investment profitability and reduce risks, but its effects could be much greater because of the growing importance of intangible investment and the industrial changes, such as those expected from the EU program "Industry 4.0".

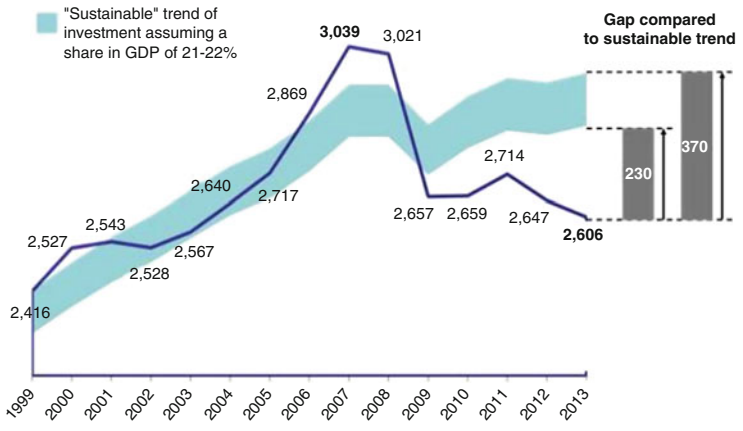

Fig. 1 The "Investment Gap" in Europe (Real gross fixed capital formation, EU-28, 2013 prices, EUR billion). *Source*: EC/EIB, 2014

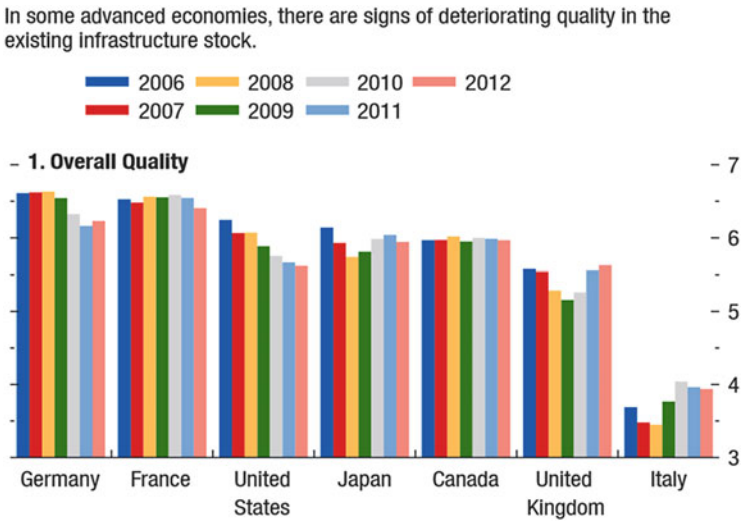

Fig. 2 Quality of Infrastructure in G7 Economies (Scale, 1–7; higher score indicates better infrastructure). *Sources*: World Economic Forum, Global Competitiveness Report survey; and IMF staff calculations. *Note*: The G7 comprises Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States

Because the quality of infrastructure matters to development (Fig. 2), it is important to look beyond the mere aspects of short term efficiency, since most of the effects of higher quality may be the consequence of spill overs and synergy with industrial change. Because these spill overs are not easily internalized by the private sector, this may be the time for a renewed commitment of the public sector.

For industry and services, if we assume a scenario of massive change as the one expected and pursued in Industry 4.0, the goal of ensuring competitiveness for European industry may require more resources, 90 billion (according to R. Berger) with respect to the Juncker Plan to be mostly directed to new technologies.

4 The Industry 4.0 Program and Green Growth

The Program of the EU Industry 4.0 assumes a new industrial cycle in which innovation and digital technologies are combined with new skills and human capital through the Internet of Things (IoT). It is a model in part similar to the model described by Ge and McKinsey as “Industrial Internet”. Innovation, digital technology and knowledge are constitutive elements with dramatic changes following in skills, tasks and in the establishment of a new centrality of work increasingly linked to skills.

Within this framework of renewed expectations for growth fueled by human capital development, Europe is committed to start what the Commission has called

at the beginning of 2014 an "industrial renaissance" and, at the same time, to live up to its environmental objectives that will find a redefinition in Paris in 2015. This raises the question of green growth, and its relationship to innovation and human capital, in a context of the insufficient dynamism demonstrated in the past 40 years by the European economy.

Policies to mitigate climate change, according to Khaneman and Spence (two authors of the recent UN report on climate change), are crucial to innovation and growth in the coming decades. This is consistent with the 150 billion dollar plan, which, according to President Obama, will create five million jobs in the green economy in the US in the next 10 years. The SET-Plan, adopted by the European Union in 2008, is a first step to establish an energy technology policy for Europe aimed, among its main objectives, to select and encourage energy technologies that reconcile investment and a low carbon economy.

The United Nations summit on climate change in New York, in September 2014, took as a reference the report of the Global Commission on the Economy and Climate entitled "Better Growth, Better Climate: The New Climate Economy Report". The thesis of the report is that climate mitigation policies may not have a negative impact on economic growth, but can represent a stimulus. The idea is that it is possible to combine growth and climate objectives by increasing resource efficiency, by investing in infrastructure and promoting innovation in urban policies, land use and energy sources.

Innovation plays a key role not only in combating and adapting to climate change, but also in its interaction and spillover effects on and from green infrastructure, clean energy sources and low carbon technologies. An example is the development of technologies of computing for geospatial analysis. The low-carbon innovation has important spillover effects in the field of materials for the turbines for wind systems, robotics and nanotechnology. Energy efficiency also plays a very important role in the relationship innovation—climate-growth.

For example, according to the UN report, cloud computing is one of the most promising innovations capable of linking technology, and reduction of CO_2 emissions and production costs. Google estimates that for an office of 50 employees the energy used per employee with cloud computing is only 2.2 kWh per employee per year, compared with 175 kWh without innovation of the cloud. According to the E. MacArthur Foundation, another sector where innovation, employment and reduction of CO_2 is combined is "remanufacturing". This is based on the concept of the so called "Circular economy", which seeks to rebuild capital, whether this is financial, manufactured, human, social or natural, to ensure enhanced flows of goods and services.

5 Green Financing

While the whole sector of green financing is undergoing a progressive change toward a greater degree of both self-regulation and outside scrutiny (Perez 2007), the normative needs of an effective capacity for sovereign financing in the green area requires an altogether novel approach. In order to be able to benefit from sizable amounts of green financing, national governments, in fact, will have to convince subscribers and market investors that their creditworthiness is enhanced by the greening program in terms of commitments and delivery capacity. For this, they will need a more rigorous and more general type of assessment of their greening policies and programs, with the provision of credible guarantees at aggregate and project level on the use of the proceeds and the impact of the projects.

While not immediately effective from the operational point of view, the concept of sustainable development appears to be one of the drivers of green financing, with a growing influence on public awareness of a broad accountability set of criteria to judge governments and corporations on ethical grounds. The Dow Jones Sustainability World Index ('DJSI World') is a good example of the increasing attention that investors pay to the ethics of the corporate sector. The index covers the top 10 % of the biggest 2500 companies in the Dow Jones World Index in terms of economic, environmental and social criteria and was first published on 8 September, 1999. It is constructed by following an analytical multi-criterion methodology, based on the so called "Corporate Sustainability Assessment", with the criteria divided into three dimensions: Economic, Environment, and Social, each including a list of criteria, sub-criteria and weighting. For the environmental dimension the criteria are specified as follows in Table 1.

Table 1 Dow Jones sustainability world index

Dimension	Criteria	Weighting (%)	Sub-criteria
Environment	Environmental performance (Eco-efficiency)	7	• Key performance indicators (KPI)—Energy • KPI- GHG • KPI- Waste • KPI-Water Coverage
	Environmental reporting	3	Content—Environmental reporting coverage
	Industry specific criteria	Depends on industry	• Environmental management systems, • Climate strategy, biodiversity impacts, product stewardship, etc. • Media and stakeholder analysis (MSA): selected industry specific criteria

The reporting guidelines issued by the Global Reporting Initiative ('GRI')[1] is the major example of the emergence of social and environmental standards at global level. The latest (2015) GRI Sustainability Reporting Guidelines are said "to offer Reporting Principles, Standard Disclosures and an Implementation Manual for the preparation of sustainability reports by organizations, regardless of their size, sector or location. The Guidelines also offer an international reference for all those interested in the disclosure of governance approach and of the environmental, social and economic performance and impacts of organizations. The Guidelines are useful in the preparation of any type of document which requires such disclosure."

The concept of sustainable development, in spite of some of its ambiguities, appears a good venue to a new ethos of socially responsible financing. The Guidelines provide detailed prescriptions for reporting on three main aspects of the activities of organizations: economic, environmental, and social, with the view that 'achieving sustainability requires balancing the complex relationships between current economic, environmental, and social needs in a manner that does not compromise future needs'. As Table 2 shows, while the Environmental dimensions loom large in the aspects identified by the Guidelines, the economic and social aspects appear equally important, and, for many variables, highly interdependent within a nexus including the environmental variables.

At national policy level, governments[2] appear increasingly involved on extending and refining environmental regulation along the financing front. Securities regulation, in particular, is evolving towards wider disclosure requirements of environmental data. While for the time being the rationale for this disclosure appears to be the concern about the impact of environmental changes on the

[1] The GRI was founded in 1997 by the Coalition for Environmentally Responsible Economies in partnership with the United Nations Environment Programme, https://www.globalreporting.org/reporting/g4/Pages/default.aspx

[2] In addition to direct issuance, and following the example of the international Development Banks, governments are also engaging or contemplating actions to develop the market for green bonds by supporting deal flow and aggregation, and creating the enabling policy and risk environment. Some of these actions are the operations of Credit Enhancement/Guarantees/De-Risking, whereby the credit rating of the bond is improved by a partial or total guarantee provided by the government (E.g., US Department of Energy Loan Guarantee program). Public entities can insure Power Purchase Agreements (PPAs) on renewable energy generation projects as well as provide credit enhancement wraps for Collateralized Debt Obligations (CDOs) of project loans to address political and other market risks and first-loss (default) risk. Backstopping operations are also being used, whereby governments purchase sub-tranches of subordinated debt from early bond issuances to improve the risk profile of bonds by temporarily taking some first-loss layers from early issuances which would serve to lower their price and help the market gain familiarity. The government could also insure the credit or debt of the bond issuer. (E.g., European Investment Bank offers credit enhancement product targeted for clean energy). Governments also can, as demonstrated in the case of the state of Pennsylvania, purchase and securitize energy efficiency loans to recycle capital for further lending. As already experimented in the US, tax preferencing, in the form of total or partial tax exemption, can also be an effective way of developing a green bond market.

Table 2 Categories and aspects in the guidelines of the global reporting initiative

Category	Social		Category	
Aspects III	• Economic performance • Market presence • Indirect economic impacts • Procurement practices		• Materials • Energy • Water • Biodiversity • Emissions • Effluents and waste • Products and services • Compliance • Transport • Overall • Supplier environmental assessment • Environmental grievance mechanisms	
Category			Social	
Sub-categories	Labor practices and decent work	Human rights	Society	Product responsibility
Aspects III	• Employment • Labor/Management Relations • Occupational health and safety • Training and education • Diversity and equal opportunity • Equal remuneration for women and men • Supplier assessment for labor practices • Labor practices grievance mechanisms	• Investment • Non-discrimination • Freedom of association and collective bargaining • Child labor • Forced or compulsory labor • Security practices • Indigenous rights • Assessment • Supplier human rights assessment • Human rights grievance mechanisms	• Local communities • Anti-corruption • Public policy • Anti-competitive behavior • Compliance • Supplier assessment for impacts on society • Grievance mechanisms for impacts on society	• Customer health and safety • Product and service labeling • Marketing communications • Customer privacy • Compliance

firm's future revenues, expanding reports and analysis of this issue would certainly serve also the need to monitor individual and collective impact of financing on the environment. A broader interest for transparency on environmental impact seems to be at the basis of the steps taken by the U.S. Environmental Protection Agency ('EPA') in cooperation with the U.S. Securities and Exchange Commission ('SEC'), to improve compliance with SEC disclosure requirements. Government regulators are also developing mandatory reporting schemes for companies which may impact the environment within a broad area of public concern. Examples of these schemes are those required by the U.S. Toxic Release Inventory program ('TRI'), the European Pollution Emissions Register ('EPER') and the Canadian National Pollutant Release Inventory Scheme ('NPRI').

Even though transparency and full information on security issuance has been one the prime concerns of governments regulating financial markets, so far no special attention has been given to the quality and extent of security issuers as to their sustainability conditions and the environmental impacts of the investment financed. This is not only true for general corporate financing, but also for the case of "green" financing, where the governments so far have stayed away from trying to regulate issuance documentation, reporting and monitoring of the use of proceeds and the impact of the projects financed. The legal landscape for these types of securities is rapidly changing, going from self-labeling to self-regulation to various types of verification and ratings. For example, for the so called "green bonds" or bonds issued to finance green investment, standards have been established in a set of "green bonds principles" by a plurality of diverse stakeholders.

The experience developed for green bonds is an especially important component of the new type of financing for several reasons. First, as private debt financing instruments, bonds are a favorite form of fund allocation for institutional investors and have traditionally been used by the public sector to finance major infrastructure projects. Second, projects financed with bonds issued by central or regional governments and municipalities were often revolving around environmentally impacting projects such as railways, roads, sewage systems, energy grids and hospitals, toll roads, bridges and water ways, electric and gas systems and utilities. Third, most of these bonds were targeted in the sense that their proceeds were earmarked to the financing of one particular project or sets of projects. Finally, these bonds were typically attractive for investors because they were exempt from federal income taxes and often also from local taxes. They had also a much lower default rate than corporate bonds (0.04 % against 9.83 %, between 1970 and 2002), even though they had lower yields than corporate bonds.

The green bond principles (GBP) were put together by a group of interested parties including NGOs, investors, and banks in February 2004.[3] They suggest disclosure and reporting procedures aimed at achieving transparency for the process of issuing the bonds, and directing their proceeds to the green targets chosen, before, during and after project implementation. However, because GBPs are conceived as a guide for voluntary commitments on the part of the issuers, they do not imply or recommend any form of impact evaluation and do not link disclosure or reporting to any standard except those that may be freely chosen by the issuers at the time of issuance.

Nevertheless, in spite of being perhaps too general, somewhat vague and somewhat under-ambitious in their purported undertaking, GBPs represent an important landmark in the recent history of green financing. The reason for this is that they clearly define an important difference from the traditional sustainable development

[3] A consortium of investment banks—Bank of America Merrill Lynch, Citi, Crédit Agricole Corporate and Investment Bank, JPMorgan Chase, BNP Paribas, Daiwa, Deutsche Bank, Goldman Sachs, HSBC, Mizuho Securities, Morgan Stanley, Rabobank and SEB announced support for the initiative after it was made public through the website of CERES, a leading NGO in the field of collective action for policies toward climate change.

approach and the rationale for a whole set of new financial instruments in support of the environment. Whilst sustainability reporting relates to the behavior of an organization with respect to the environment both in terms of its procedures and of the consequences of its acts, reporting on green bond issuance is seen as mainly focusing on specific projects, their structure and performance. The organization procedures and other actions are still likely to be important, but only to the extent that they may or may not yield credibility to its commitments and claims. In this respect, a sustainability report that identifies a negative condition and the need to change may be the point of departure and even a promising support for green projects that signal a step in a totally new and virtuous direction. Thus, in some sense, GBPs can be the basis to report on increasing sustainability of an economic agent, and the instrument to turn around a negative assessment of black or gray corporate subject.[4]

The World Bank (WB) has been the initiator and the main issuer and has thus already established some of the basic rules that identify green bonds. Because of the overriding importance of its mission to support sustainable development, poverty reduction and inclusive growth, the WB also claims that all its bonds, in a sense, have a green quality.[5] Within this general characterization, however, green bonds are seen by the WB as a "smart" financial product capable of concentrating investors' interest in sustainable investment opportunities focused specifically on climate change mitigation and adaptation.[6] To some extent, this dual approach based on the idea that all WB bands are green, but green bonds are more specifically so, reflects on the selection and monitoring process that is offered to investors as a form of assurance of the effectiveness of the targeting that GB pursue.

The due diligence/assurance[7] process proposed by the WB is thus threefold. First, eligible projects are selected through a rigorous review and approval process. This process is the same that the Bank follows for all projects, but in the case of GB is more focused on questions concerning climate change and natural resource issues and includes, in addition to the usual technical, economic, and institutional analysis

[4] In this sense, there may be an important element of additionality incorporated in green bonds, in the sense that their impact may be more valuable if it is considered with respect to a counterfactual, e.g., the possibly harmful projects that would be pursued by the same issuers in an alternative scenario.

[5] See, for example: *Green Bond, Sixth Annual Investors' Update, 2014, The World Bank-Treasury*: "All World Bank bonds support sustainable development, poverty reduction and inclusive growth. They fit well with investment strategies that incorporate Environmental, Social and Governance factors into the decision-making process".

[6] For more information on WB sustainable development projects see: http://treasury.worldbank.org/documents/IBRDInvestorPresentation.pdf

[7] Due diligence concerns all activities of information collecting and analysis on the structure and performance of an object of purchase on behalf of the purchaser. In the case of an investment, due diligence aims to enable the potential investor to make informed decisions concerning the risks and the opportunities that the transaction offers. Due diligence assignments is generally combined with assurance, a process aimed to focus on the credibility of the information reviewed during the due diligence assignment, whose lack may result in the abandonment of the potential investment.

of projects' scopes and opportunities : (i) an early screening to design concrete mitigation actions and to identify environmental and social impacts, and (ii) a further selection by environmental specialists of approved projects that meet the green bond eligibility criteria. These criteria are not specified in detail, however, and appear to delegate the selection to the staff on the basis of a mix of subjective judgments on intrinsic projects' characteristics (e.g., renewable energy production), and their expected impacts, in terms of mitigation or adaptation to climate change.

A second component of the WB process aims to guarantee the targeting of the GBs from a financial point of view. For this "Ring Fencing" is used, by crediting GB proceedings to a separate Green Cash Account from which they are invested in accordance with IBRD's conservative liquidity policy until allocated for eligible green project disbursements.

A final component is constituted by the Monitoring and Reporting phase, concerning project implementation both in the construction and operational phase, through investigation and disclosure of projects' progress, outputs and outcomes, and the evaluation of the objectives achieved. This information is projected to be made available on the main World Bank website and summaries and key impact indicators to be provided on the World Bank's Green Bond website.

The WB due diligence process appears simple and straightforward, and, so far seems to have satisfied investors. Several factors, however, render this process insufficient for other institutions and especially so for sovereign issuers. First, most institutions, governments or corporate entities, cannot claim, as the WB does, that a rigorous process of selection and implementation of all projects is already in place for them. Thus, some basic questions will have to be addressed on the capabilities to select and effectively carry out the projects put forward for financing. Second, project eligibility and impact evaluation in the case of the WB is predicated upon already existing "green assessment" procedures at both country and sector levels, while for most issuers no such processes are already in place. Public sector issuers, in particular, would have to provide investors of evidence that both their general strategies and the specific projects selected would contribute to the achievement of the objectives to which the GBs issued are aimed. Third, again in contrast with the WB situation, we could think of a large category of GB issuers, with a "black" rather than a green record in their environmental policies and investment history. While these issuers could provide an even more valuable contribution to green objectives, such as mitigation or adaptation measures, they would have the burden to demonstrate that the program/project proposed is likely to achieve its targets, despite the handicap of previous choices and the consequent unfavorable industrial and institutional framework. They would also have to show that a significant green impact is likely to be achieved by the individual project, either because of its size and qualities, or as part of a broader strategy.

More generally, and with reference to all potential GB issuers, one can ask what would have to be the key components of disclosure and reporting that investors would need, in order to make an informed decision on the matter. In theory, investors should be first guaranteed of effectiveness of bond targeting (ring fencing and timely disbursement against the stated goals). But in addition to these basic

requirements, they should also be interested in two main dimensions: (i) returns, and (ii) impact. The first dimension includes expectations and uncertainty of returns and of repayments, with risks possibly looming large in many cases of corporate and sovereign bonds. In this respect, disclosing and reporting needs may be very different for issuers that do not have a high credit rating, as instead was the case of the World Bank and the other institutions that followed its lead in the first wave of bond issuance, The second dimension concerns the evaluation of the outcomes and impact of the project, including direct and indirect, and intended and unintended consequences. For this task, while WB reports generally do make a brave attempt at describing and, less often, at providing some quantification of the intended effects of the GB supported program or project, an accepted set of best practices simply does not exist at the moment. In the case of sovereign debt, in particular, a methodology of impact analysis would have to integrate the environmental impact assessment with program evaluation, tying the principles of government green strategy with the characteristics of the program or project that the green bond issuance aims to finance.

Green bonds are perhaps the most characteristic security, but they are not the only innovative instrument of the new green finance. Other instruments include many other individual and packaged securities, directly or indirectly targeted to green investment, They also include, as in the Juncker Plan, asset or liability backed securities aimed to reduce market risk in a field, such as green innovation, where uncertainty is often pervasive. At the project level, innovative forms of financial design of project financing, project bundling and project securitizing are evolving to achieve optimal size and composition, by exploiting scale economy and risk diversification.

Sovereign issuances and guarantees of innovative instruments for sustainable and green investments, such as those of the Juncker plan, are especially important in fostering financial innovation and in general a more active government role in green bond regulation, insurance, tax treatment and cofinancing. In order to tap the deep pools of capital of institutional investors, these instruments have to achieve investment grade (at least BBB rating and competitive rates of return). However, both credit rating and rates of return largely depend on the characteristics of the financial products and the price of risk in the financial markets. Many green projects may thus fail to be financed because they are considered too risky, insufficiently remunerative or both, this being the consequence of imperfections in the capital markets, that are dominated by information asymmetries and agency costs. Part of the financial gap is thus caused by the failure to tackle with these imperfections and to match the demand for funds emanating from projects that are priced out of the market, because they are too innovative to be considered safe and because they do not appear sufficiently remunerative for the private investors, despite their positive economic impact for the collectivity. In many cases, green projects lack an articulated financial structure that allows them to be competitive in attracting financial resources: they may be too small, too specialized, dependent on very specific and risky sources of income, or, due to their public or quasi public nature, not capable to generate appropriable cash flows that may permit risk sharing through concessions

or similar private public partnerships. The role of the government in improving this situation is thus expandable on a number of fronts and may prove to be decisive. In addition to the issuance of sovereign green bonds, that can be sold to the public to complement the usual debentures to finance the budget, the government can reduce the market price of risk by judicious management of a number of financial instruments. For example, Sustainable Prosperity [8](2012) lists the following possible financial interventions:

1. **Credit Enhancement/Guarantees/De-Risking:** The government could use its own assets to provide a guarantee for some portion of the underlying liabilities to enhance the credit rating of the bond. This helps to reduce the bond's risk level ("de-risk"). (E.g., US Department of Energy Loan Guarantee program). Public entities can insure Power Purchase Agreements (PPAs) on renewable energy generation projects as well as provide credit enhancement wraps for Collateralized Debt Obligations (CDOs) of project loans to address political and other market risks and first-loss (default) risk.
2. **Backstopping:** The government could purchase sub-tranches of subordinated debt from early bond issuances to improve the risk profile of bonds by temporarily taking some first-loss layers from early issuances which would serve to lower their price and help the market gain familiarity. The government could also insure the credit or debt of the bond issuer. (E.g., European Investment Bank offers credit enhancement product targeted for clean energy). Governments can, as demonstrated in the case of the state of Pennsylvania, purchase and securitize energy efficiency loans to recycle capital for further lending.
3. **Tax Preferencing:** Using internationally standard qualifying criteria, governments could make the income from green bonds either tax-free or taxed at a lower rate than typical investments. For example, the United States provides tax credits for clean energy bonds.
4. **Bond Issuance/Marketing:** Governments at all levels could issue retail green bonds, similar to Canada Savings Bonds, but to fund renewable energy or other projects. According to a poll conducted by Nanos, 81.8 % of Canadians support the green bonds idea, and 62.2 % stated that they would purchase them if they had an interest rate similar to that of Canada Savings Bonds.

In addition to these financial interventions, the reduction of financial risk from issuing green bonds may come from the capacity on the part of the government and government sponsored institutions at engineering financial packages to fund projects. In these packages, the presence of sovereign bond financing would be symbolic of the government commitment to support investment, guarantee a proper use of the funding to improve the environment, and avoid default. Furthermore,

[8] Sustainable Prosperity is a national research and policy network, based at the University of Ottawa. SP describes itself as focusing on market-based approaches to build a stronger, greener, more competitive economy and in bringing together business, policy and academic leaders to help innovative ideas inform policy development.

because green investors are motivated by the expected impact of the investment on the environment, and not only by the expected return—risk combination, they will be more likely to favour a strategy of long term holding for green bonds, thus reducing the pressure on the secondary markets, with beneficial consequences also on the perceived risk of sovereign debt.

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The Investment Plan for Europe: A Contribution to Addressing the EU's Competitiveness Challenges

Markus Berndt

Abstract The Investment Plan proposed by the European Commission is a policy response to the long-term decline in the global competitiveness of the EU, which is vital for maintaining economic growth potential and our future well-being. The European Fund for Strategic Investments (EFSI) is an important element of this plan and aims at addressing structural investment needs. This note briefly discusses the view on the competitiveness challenge facing Europe, the specific, structural investment gaps and how the EFSI aims at contributing to addressing them.

1 The Challenge of Restoring the Competitiveness of the EU Economy

Aside from the current cyclical problems that Europe still faces, there are long-term structural challenges. In particular, there appears to be a need for Europe to reanimate productivity growth and enhance its global competitiveness, while adjusting to the needs imposed by demographic changes and climate change.

Since the 1990s, Europe has not kept pace with other leading economies. Productivity growth in the EU has trailed that in the US since the mid-1990s and was hit harder during the crisis than in other regions. Europe's potential for long-term, sustainable growth is suffering from a host of impediments, including institutional barriers, inefficient and fragmented financial markets and a history of underinvestment in important areas.

The competitiveness of EU economies depends on the capacity of firms and industries to drive and adapt to change through innovation, raising productivity. To sustain high income levels, Europe needs to excel in high value-added activities within globalised systems of production.

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Innovation has different facets. *Product innovation* advances the technological production frontier by developing new and better goods and services that capture market share. *Process innovation* improves ways of working, including management, to increase value-added for given inputs of labour and capital. The process of moving production towards the technological frontier—*catching-up*—involves firms adopting improved technologies and practices and incorporating product innovations into their product lines. *Economic dynamism* requires the growth of innovative, high value-added firms and sectors, allowing for a substitution of firms that are no longer competitive.

Almost all innovation involves investment and requires appropriate financing: for research and development of new products and processes; for adopting new technologies like Information and Communication Technologies (ICTs) and for workforce retraining; for innovative start-ups, small and medium-sized enterprises (SMEs) and larger companies that want and need to expand.

The ability of firms to drive and adapt to change, and to create high-value jobs, depends, in turn, on enabling environment.

Institutions and markets have to create the right incentives for innovation. Competitive and flexible input and product markets are important, as are well-designed regulatory and taxation regimes and property rights that incentivise firms to innovate at the same time as allowing for an efficient dissemination of innovation.

The *financial sector* is needed to facilitate the efficient allocation of resources by providing adequate finance adapted to the investment needs of innovative and growing firms. A complementary range of instruments, such as bank loans, venture capital, credit guarantees and securitisation, are typically important to allow innovators to take risks and grow.

Well-designed *infrastructure* enhances the productivity of people and firms throughout the economy by lowering the costs of combining different productive inputs and accessing markets and by increasing mobility and competition through efficient transport, ICT, energy and environmental infrastructure.

Human capital, i.e., high standards of education and health ensure that employees have the necessary skills, knowledge and capacity throughout their working lives especially in knowledge-intensive sectors.

We need to understand the gaps in Europe's competitive position at three levels: (i) the enabling environment, (ii) the ability of firms to drive and adapt to change, and (iii) the ultimate results in terms of productivity, trade performance and economic well-being. A recent EIB study revealed shortfall on all of these levels (EIB 2015). For example, in terms of research intensity and patenting activity the EU persistently falls behind comparable economies. R&D investment in advanced EU countries trailed that in the US and Japan already before the crisis. It declined sharply in the crisis and remains depressed. An additional 130 billion euros a year would need to be invested in R&D to meet the EU target of 3 % GDP. EU firms also seem to be slow at absorbing new technology. According to a recent study, keeping up with latest technologies in the advanced manufacturing sector will require an estimated additional 90 billion euros a year (Berger 2014).

Europe's largely bank-based and fragmented financial sectors face structural challenges in financing young, innovative and modernising firms. The availability of finance for start-ups and growth-stage firms is more limited in Europe than in the US. Matching US levels of venture capital financing as a share of GDP would require around 20 billion euros a year in additional venture capital activity in the EU. One of the reasons why venture capital is so restricted in the EU is the small relative size of capital markets in many Member States that limits exit opportunities for equity investors. Stock market capitalisation in the EU is not only about half the US size, but markets are also highly fragmented along national lines.

Years of underinvestment, exacerbated by the crisis, mean that many infrastructure assets in the EU are reaching the end of their economic life, creating an investment backlog. At the same time, infrastructure needs to be upgraded to meet the demands of the future, such as the need to ensure the security and sustainability of energy supply, to ensure efficient and sustainable mobility and logistics, to meet demand for digital services and to remain resilient to the effects of climate change and resource scarcity. With reference to different global benchmarks or EU policy goals, we estimate that some additional 300 billion euros investment in infrastructure is needed every year, on top of the investment that is already taking place. For example, we estimate that 100 billion euros a year is needed to upgrade energy networks to allow the integration of renewables, to improve efficiency and to ensure security of supply; that 50 billion euros a year is needed to upgrade transport networks to reduce congestion costs and trade bottlenecks and to facilitate an efficient internal market; that 55 billion euros a year is needed to reach the EU's Digital Agenda standards in broadband access and data centre capacity; that 90 billion euros a year is needed to rehabilitate environmental services and ensure water security in the face of climate change; and that 10 billion euros needs to be invested annually in state-of-the-art education facilities, mostly in higher education, to reach US-standards.

Investments in R&D, human capital, basic infrastructure, research and the growth of young and innovative firms all have positive spill-overs for the wider economy, which cannot always be fully captured by private investors. This is where public policy has a critical role to play.

Rebuilding the competitiveness of Europe's economy requires a concerted approach that looks at sufficient investment in enabling factors like infrastructure and human capital as well as direct innovation performance and sufficient access to finance for economically desirable modernisation investments. Structural reforms and appropriate regulation to ensure competitive, flexible and efficient markets for products, labour and finance—including action to deepen Europe's internal market—is one essential part of this approach. Public intervention that addresses market failures and catalyses private sector investment is another.

There is currently no shortage of liquidity but a lack of risk-taking capacity and confidence to unlock investment. Most governments face limited fiscal space over the short to medium term. Many banks still face capital constraints in view of necessary post-crisis regulatory tightening, the extent of stressed assets on their balance sheets and the low profit environment. These constraints are limiting the

ability of Member States and the European banking sector to take risks and catalyse valuable investment.

2 The Investment Plan for Europe

The aforementioned factors help us to understand why investment in crucial areas in Europe is low despite the liquidity available. The Investment Plan for Europe, announced in November 2014, aims to be a targeted response to the challenges outlined above. EFSI is specifically designed such that it can provide additional risk-bearing capacity, working alongside the other arms of the Investment Plan for Europe and the continued major lending activity of the EIB Group.

It is foreseen to have three strands.

First of all, *regulatory action* at the national and EU levels is needed to improve the institutional and market environment for investment, including the deepening of Europe's internal market.

Secondly, in order to address the bottlenecks that exist in the project pipeline, a new *European advisory hub* is set up to help public authorities and project promoters in Member States to identify, prioritise, prepare and implement strategic projects and to make more efficient use of EU funds, bringing together specialist advisory services currently delivered by the EIB and the European Commission.

The third part of the investment plan is the *EFSI*, which over 3 years is expected to mobilise around 315 billion euros of investment that help to address key market gaps and structural weaknesses and build a more competitive, sustainable and prosperous EU economy.

The EFSI will be a dedicated account, managed, funded and hosted by the EIB Group with risks shared between the European Commission and the EIB. It will focus on financing sectors where the EIB Group has expertise. These include strategic digital, transport and energy sector investments, including infrastructure investments to create the physical links needed to deepen Europe's single market such as energy interconnections. They also include investments in education and training, research and innovation. Financial support to small, medium-sized and mid-cap companies is aimed at helping them to modernise, grow and boost employment.

EFSI will be supported by 16 billion euros in guarantees from the EU budget and 5 billion euros from the EIB's own funds. These additional resources will allow the EIB Group to expand its financing activities, attracting substantial external co-financing via the focus on the provision of higher-risk absorbing products. EFSI supported products will range from higher-risk senior debt over mezzanine financing to equity-type and guarantee products, aiming at a catalytic effect on private finance. The actual funding of EFSI operations will not come from the EU budget. All EFSI-supported operations will be on the EIB's balance sheet, funded by the EIB. The guarantees provided to EFSI operations from the EU budget will

strengthen the EIB balance sheet such that they enable it to take on more risk without endangering its credit rating and funding model.

The estimate of 315 billion euros final investment impact is based on the EIB's track record in catalysing finance. Under current assumptions, EFSI's risk-bearing capacity of 21 billion euros would be used to enable the provision of around 60 billion euros in finance over 3 years. This financing is expected to be able to absorb more risk that standard EIB activities and catalyse private finance in order to unlock a total of around 315 billion euros investment.[1] This investment corresponds to around 0.8 % of EU GDP, 3.9 % of EU investment and 11.8 % of EU investment in targeted areas such as R&D, education facilities, transport, energy and digital infrastructure.

By investing in a greater number of smaller projects, EFSI can avoid "picking winners". Instead it aims at providing vertical support to key sectors in a way that enhances competition, creating incentives for innovation and productivity growth (Aghion 2015). To ensure the additionality of EIB intervention, all projects have to pass a rigid due dilligence and be commercially sound, economically and technically viable, and to have a clear added value for the EU. EFSI operations can take on the level of risk necessary to ensure that projects with high social-economic benefits attract sufficient additional funding and can go ahead. Project promoters can be from the public or private sector and EFSI support will be available to any eligible strategic investment in all Member States.

The EFSI will be established within the EIB and the EIB Group will manage the EFSI's operational activity on a day-to-day basis. This means that the EIB will be responsible for project delivery. Thanks to its establishment within EIB, the EFSI can be rapidly set-up and all of EIB Group's established operational capacity, expertise and market presence allow for a quick, efficient and diligent implementation of the initiative. In fact, the first projects that are envisaged to benefit from the EU guarantee under EFSI have already been approved. Until EFSI becomes operational their risk will be fully born by the EIB's balance sheet.

The Investment Plan for Europe is aimed at addressing the structural challenges of the European economy, restoring confidence, stimulating investment and promoting recovery, acting as a complement to the wider European structural reform process. It is focused on targeted interventions to support investment in merit goods that can help us to move the EU forward beyond the crisis.

[1] The estimate of the final impact the EFSI will have on investment is based on a conservative multiplier of 15. In this context it is useful to recall that in 2012 the EU Member States agreed to increase the EIB's paid-in capital by 10 billion euros. These extra 10 billion euros mobilised total investments of 180 billion euros—a multiplier of 18.

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The European Internal Market and Innovation: The Challenges Ahead

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Abstract The purpose of the European internal market is to allow all firms in the Union to compete freely, without artificial barriers built up to protect them. The Treaty provisions and the subsequent case law are quite comprehensive and they are meant to eliminate restrictive regulatory barriers, anticompetitive practices by firms and anticompetitive subsidies. However, especially with respect to State measures (restrictive regulatory provisions and State aid) the results that are achieved by the Union depend strictly on the follow on policies that are adopted by Member States. For example in public procurement European law deals mainly with adjudication (and only above a given threshold), while Member States are responsible for execution and sanctioning (and also adjudication below the threshold). Furthermore, in the process of reform of public utilities, liberalizations decided at the European level have to be followed up by coherent decisions at the Member State level. If such Member State interventions are not well thought out, the whole purpose of the reforms collapses. And indeed in public utilities, the European Union started in the 1990s by providing some very general indications to Member States and eventually, having recognized that markets were not sufficiently opened up, making its indications more and more stringent (but still leaving most of the responsibility of reform to Member States). Recently the Service Directive has extended this approach to liberalization to the general category of service activities. The Directive identified regulatory provisions that were prohibited and those that had to be justified by Member States. However the Directive did not introduce general categories of regulatory restriction to be justified, and instead chose to identify them precisely, falling short of providing an all-comprehensive list. A very effective revision of the Directive would be to introduce explicitly in the text the general categories of regulatory restrictions contained in the OECD Toolkit for Competition impact assessment (is the number of players restricted? Is their possibility to compete restricted? Are their incentives to compete restricted?). Should regulations have these effects, Member States would have to justify them. The regulatory reform that would be initiated in this way would promote the introduction of an innovation friendly regulatory structure.

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1 Introduction

The European Union is by far the most successful regional agreement in the world. It did not happen by chance. It was the clear intention of the founding fathers of the Union to set up an efficient institutional structure that was meant to resist in time. All the features of the European system are necessary for the Union to work properly and continue to do so after almost 60 years since its establishment. This is why all the regional agreements that have been created in recent years imitating the EU model,[1] having left out features wrongly considered marginal and not important, were usually unable to deliver similar results.[2]

The most important element of the European Treaties is that they originate from a visionary construction: economic integration as a solution to wars and destructions. This idea was not a new one and was already flashed out a few years earlier when the French foreign (and prime) minister Robert Schuman suggested the creation of the Economic Community for Steel and Coal (ECSC) on May 9 1950 as a way to prevent further war between France and Germany. According to the Schuman Declaration of the time the aim of the ECSC was to "make war between France and Germany not only merely unthinkable but materially impossible".[3]

The high profile objective of the European Community has influenced the type of instruments that were put in place in the Treaty—the creation of an area where the free movement of goods, services, capital and people was guaranteed—and the type of rights and obligations that the Treaty created. Indeed, unique among international Treaties, the provisions of the Rome Treaty were not directed towards Member States only, but created rights over which individuals and firms could litigate in Court. As a result, the respect of the Treaty was not left to the sole action of the European Commission and of the Member States governments, but to the judicial initiatives of all European citizens when their rights originating in the Treaty provisions were not fully recognized by private parties and, more importantly, by the Government itself.

The results achieved are not the sole responsibility of the Treaty and of the European institutions. For every European policy initiative there is an active role played by Member States that most of the times goes beyond the simple transposition into domestic legislation of EU rules. Very often Member States have to create new institutions, for example independent regulators, for implementing

[1] A number of such agreements were created in the developing world, such as for example the Mercado Commun do Sul (Mercosur), the Andean Community, the Common Market for Eastern and Southern Africa (COMESA), the Caribbean Community (CARICOM), the West African Economic and Monetary Union (WAEMU), the Economic Community of West African States (ECOWAS) and the South African Development Community (SADC), to name a few.

[2] See on this Heimler, A. and Jenny, F. (2013) "Competition law and policy in developing countries: national and regional enforcement", in Lewis, D. (Ed) *Building New Competition Law Regimes*, Edward Elgar.

[3] The text of the Shuman Declaration can be found at http://europa.eu/about-eu/basic-information/symbols/europe-day/schuman-declaration/index_en.htm

community rules. Sometimes for benefitting the most from Community rules, an industry has to be restructured horizontally and/or vertically. For example Member States had to decide whether the former electricity incumbent monopolist had to be forced to divest generators and/or the electricity grid in order to create a competitive electricity market. Some other time the role of the European rules is limited to some aspects of more complex procedures, for example in public procurement the Community main concern is adjudication (so as to open up markets), while Member States are fully responsible for the rules on execution and sanctioning.

All this means that the effectiveness of the European rules is very much dependent on the quality of the action Member States take at the national level. Sections 2 and 3 of the paper address these issues and show how Member States have accompanied the European initiatives in the building up of the internal market in key sectors of their national economies. However the regulation of many activities, especially in the service sector, remains domestic in character.

Recently the EU has moved to make the regulation of services more coherent with the free movement provisions. In particular, with the recently enacted Service Directive[4] the EU, along the lines of antitrust enforcement that more and more pursues the objective of promoting efficiency (these last issue being discussed in Sect. 4), identified categories of inefficient domestic regulations that if eliminated would not only promote entry but also innovation and growth. These categories were not sufficiently general. The paper thus ends (Sect. 5) with a discussion of existing provisions of the Service Directive and with some proposals for change that, if adopted, would allow the creation of an innovation friendly regulatory structure in the Union.

2 European Integration: Free Movement and the Principle of Mutual Recognition

The aim of the European Treaties is to create an economically integrated Union where, among other objectives to be pursued, competition is not artificially distorted. As a result a number of instruments have been introduced that address different types of distortions. The core of the Treaty is represented by the rules that promote the free movement as such. They make sure that Member States do not create, even unwillingly, artificial barriers to entry for goods, services, capital and people from other Member States and in this way do not restrict competition in an unjustified way. The State aid provisions make sure that Member States do not subsidize firms in the absence of some form of market failure. Finally the EU antitrust rules provide a check on the market power of firms when it is artificially maintained or increased.

[4] Directive 2006/123/EC of 12 December 2006 on services in the internal market. Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006 L0123&from=EN

Not only the introduction of trade related instruments affecting intra European trade is prohibited by the Treaty, but every public measure, including subsidies, that impedes the free movement of goods, services, capital and people is prohibited unless justified by other general interests strictly defined. In this environment the antitrust rules were originally introduced (implicitly) to make sure that firms would not reintroduce privately the restraints of trade that the European Treaty had eliminated. As a result of the introduction of this rich portfolio of instruments in the European Treaties, direct and indirect protectionism was banned within the European Union.

The European Commission, the guardian of the Treaty, and the European Courts have coherently and strategically promoted an application of the Treaty as extensive as possible, blocking all State measures that affected intra European trade directly and indirectly. This meant prohibiting State provisions independently from their intention to provide an obstacle to enter a market for firms from other Member States. A regulatory restraint that blocked a product freely available in another Member State was prohibited if such a restraint was not properly justified by linking it to the attainment of general interests objectives strictly defined. As a result the concept of discrimination that the European Courts developed through its case law was not simply that a regulatory provision be respected by everyone regardless of nationality, but that if the sale of a product/service is allowed in one Member State, it should be allowed in all, unless some general interests strictly defined are negatively affected.

This principle of mutual recognition, established by the Court of Justice back in 1978 with the well known Cassis de Dijon judgment, clarifies that free movement should not be interpreted simply as prohibiting direct and indirect discrimination on the basis of nationality. Mutual recognition has a much wider definition and in particular it promotes competition among domestic regulations of different Member States. The rule states that if a product is authorized to be distributed in one Member State it should not be blocked by some restrictive regulation existing in some other Member State, unless such a restriction can be justified in order to attain other general interest objectives strictly defined. Although mutual recognition was originally developed to promote the free movement of goods, it is now widely applied to services as well and, for example, is at the basis of the mutual recognition of university degrees within the EU so as to allow the free movement of professionals.

The principle of free movement is quite powerful. For example in a case launched by the Commission against Greece in 1998, the Commission was concerned that a Greek law that imposed that an optician shop be owned by a qualified optician who in turn could operate only one shop was against the free movement of establishments. The issue here is that the Greek law is not discriminatory because domestic and out of State opticians are treated equally. However the law was considered by the Court of Justice to be in contrast with the free movement provisions unless Greece was able to justify it with respect of the attainment of some general interests. And indeed the Greek government had defended the provision by arguing that it was necessary for public health. Instead, according to the Court, "(P)public health could be protected by guaranteeing that

certain actions will be carried out by qualified, salaried opticians or under their supervision" and, furthermore, that ownership of the shop by an optician was not necessary.[5]

Without any political decision or discussion, a domestic law was considered contrary to the Treaty simply as a result of a legal procedure. Based on an almost 60 years experience, in order to have standing, an internal market case has to have a number of characteristics: (1) the regulation of a given market has to differ among Member States; (2) such differences have to be considered unjustified by a tribunal, often by the European Courts; (3) the free movement coherent solution is easy to identify and does not require the exercise of ex-post controls.

In other words a Tribunal is not well equipped to exercise ex-post control or to fine-tune the regulation. I will provide an example that shows the limitations associated with a judicial approach to the internal market.

The Italian code for disciplining traffic on public roads provides that only automobiles are allowed to tow trailers. Motorbikes are excluded, while they are allowed to tow a trailer in most other Member States. The provision that did not allow motorbikes to tow a trailer on Italian roads was considered as an illegitimate quantitative restriction of imports (even if also Italian producers of tow trailers were affected by the ban) and was brought in front of the Court of Justice.

The Italian provision is clearly non discriminatory in the sense that it affects all producers (both Italian and foreign) and all (Italian) consumers equally. However the Court argued that "in the absence of harmonization of national legislation, obstacles to the free movement of goods which are the consequence of applying, to goods coming from other Member States where they are lawfully manufactured and marketed, rules that lay down requirements to be met by such goods constitute measures of equivalent effect to quantitative restrictions even if those rules apply to all products alike". Italy justified it by saying that the prohibition originated from road safety considerations, considering the specific contour of its national territory. The Court agreed that road safety could indeed represent "an overriding reason relating to the public interest capable of justifying a hindrance to the free movement of goods".

However the Court had also to ascertain that the measure was proportionate to the objective it meant to achieve. Here the Court suggested that in the absence of harmonization of traffic rules, "(A)although it is possible… to envisage that measures other than the prohibition (of motorbikes with trailers) could guarantee a certain level of road safety…, the fact remains that Member States cannot be denied the possibility of attaining an objective such as road safety by the introduction of general and simple rules which will be easily understood and applied by drivers and easily managed and supervised by the competent authorities".[6]

[5] Commission v Greece, Judgment of the Court, 21 April 2005 in Case C-140/03, available at: http://curia.europa.eu/juris/showPdf.jsf?text=&docid=58138&pageIndex=0&doclang=EN&mode=lst&dir=&occ=first&part=1&cid=8972

[6] Judgment of the Court, 10 February 2009, in Case C-110/05, available at: http://curia.europa.eu/juris/document/document.jsf?text=&docid=72844&pageIndex=0&doclang=EN&mode=lst&dir=&occ=first&part=1&cid=11543

In other words by this judgment the Court stops short of becoming a traffic regulator and rightly so. The Court simply says that the prohibition of tow trailers for motorbikes may not be necessary, but that is easy to understand and to implement. Indeed, judicial review is essential for ensuring some convergence in sectors where full harmonization through secondary legislation (Regulations and Directives) is not considered appropriate yet. Nonetheless the role of Member States in devising and implementing rules that are not contrary to the Treaty provisions remains of the outmost importance. However, contrary to what a regulator may decide, a judge could have never ruled in favor of entry of tow trailers for motorbikes, had tow trailers not be allowed to circulate in any Member State.

3 Free Movement Objectives and Domestic Policies

The European Commission very quickly understood that the Treaty provisions by themselves could not achieve full harmonization of regulation across the Union because in some areas the technicalities of regulation were quite complex and furthermore the domestic legal provisions over which to achieve convergence where quite numerous, not just yes or no, like in the case of motorbike tow trailers.

Take for example public procurement provisions, one of the first areas where the Commission initiated an action for achieving convergence of adjudication procedures in Member States. Here the issue is how to open up to competition from outsiders domestic public procurement markets. There are many ways by which a public administration could make successful entry by outsiders more difficult: (1) lack of proper advertisement of the bid to outsiders; (2) lack of transparency on the standard for adjudication; (3) narrow product definition; (4) widespread renegotiations after adjudication that are possible only for insiders. On all these issues judicial review would be very ineffective in the absence of a best-practice benchmark to use as a common reference standard. In such a case, only explicit harmonization can achieve convergence. This is why the Commission intervened with the directives already in the 1970s (the first directive for works was issued in 1971 and for supplies in 1976).

Today public procurement Directives impose on Member States a common framework on how the bidding process above a given threshold should be advertised, organized and carried out. In practice the Directives are concerned only with the bidding and the adjudication process (above a given threshold), leaving the execution, the sanctioning and the ex-post controls to national governments to regulate (including adjudication below the threshold), unless for example there are excessive cost increases after adjudication making the whole process of choosing the best supplier irrelevant.

There are differences in objectives between the Community and national governments. While a domestic legislation on public procurement would have as its objectives the pursuit of value for money or, in other words, the effectiveness of the purchasing activities of public Administration in achieving the desired quality at

minimum cost, the first recital of the new European directive on public procurement suggests that the objective to be achieved is simply the opening up of domestic procurement markets: "The award of public contracts by or on behalf of Member States authorities has to comply with the principles of the Treaty on the Functioning of the European Union, and in particular the free movement of goods, freedom of establishment and the freedom to provide services as well as the principles deriving therefrom, such as equal treatment, non-discrimination, mutual recognition, proportionality and transparency".[7]

While value for money and the opening up of procurement markets are fully compatible objectives, simply opening up procurement markets to foreign competition is not sufficient for achieving value for money. A different instrument has to be used for that purpose. For example guaranteeing the quality in a service procurement throughout the contract period can be assured only by introducing a system of incentives compatible with that objective. Competition as such does not achieve that objective. As Albano, Heimler and Ponti (2014)[8] discuss, one possibility that existing rules allow is to extend the length of a service contract in response of a high quality performance. Of course the process is incentive compatible, only if the possibility is allowed for in the procurement contract, i.e., the possibility is well known ex-ante and, given an observed performance, there is no uncertainty in the reward. This means that contracting authority cannot simply apply the rules but have to thorough understand them.

Public procurement is a good example for showing the interplay of different instruments in the proper regulation of a sector. Both EU and domestic legislations are necessary to address all the issues involved. This is however not always sufficient and Community rules have to be properly interpreted. One possibility for achieving value for money is to superimpose an effect evaluation objective to the procurement rules.[9]

Public procurement is not at all an exception. The necessity to integrate EU legislation with domestic rules together with the importance of an outcome oriented enforcement characterizes all areas where harmonization rules have been put in place.

For example in the public utility sector, where in recent decades the European Union put a great effort to create a competitive environment, the simple respect of the EU directives is certainly not sufficient for achieving positive results. Domestic institutions had to be created, for example a structure of independent regulators was necessary, and domestic legislative initiatives may be necessary too, for example

[7] Directive 2014/24/EU Of the European Parliament and of the Council of 26 February 2014 on public procurement. Available at: http://eur-lex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:32014 L0024&from=EN

[8] Albano, GL, Heimler, A. and Ponti, M. (2014), "Concorrenza, regolazione e gare nei serivizi pubblici locali: il caso del trasporto pubblico locale", *Mercato, concorrenza e regole*.

[9] See Heimler, A. (2015), "Appalti pubblici, vincoli comunitari e prassi applicative: quale spazio per gli aspetti sostanziali?", *Mercato, concorrenza e regole*.

vertical separation of the monopolistic components or horizontal separation of competing firms so as to quickly create a competitive environment.

Even though European initiatives are necessary for reform they are seldom sufficient and they have to be accompanied by appropriate domestic rules and proper enforcement. In any case, without the European efforts most public utility services would probably be still monopolistic in many Member States. Indeed, many Member States tried to block the EU liberalization drives, especially in their early phases, both in the planning/discussion process and in Court once the rules were adopted.

For example in telecommunication services the first liberalization directive issued by the European Commission in 1988 liberalized the market for telecommunications terminal equipment.[10] Immediately after the Directive was approved by the European Commission, six Member States, Belgium, France, Germany, Greece, and Italy, four of them funding members of the European Union, challenged the Directive in Court. They eventually lost, but the move shows that the consensus to start the liberalization process of telecommunication services was difficult to achieve, even for a simple opening up of the market for telephone equipment, at the time supplied monopolistically by the vertically integrated TLC service providers. Eventually full liberalization was achieved 10 years later in 1998, 15 years after the TLC market had been opened up to competition in the United States. The reason for this lengthy process was the difficulty associated in reaching consensus among Member States. The difficulties did not originate from a debate on whether competition was beneficial for consumers, but from the fact that incumbent TLC monopolists, often Government owned, would loose their rents as a result. Where consensus was easier to reach was in new markets, for example mobile or Internet services, where there were no entrenched monopolistic positions.

However, even though telecommunication services were fully liberalized in 1998 by the European directives, a competitive environment was not created immediately and a domestic institutional structure had to be established. First of all the network infrastructure enjoyed natural monopoly characteristics and competitive entry was only possible in some segments vertically connected with it. As a result the alternative TLC service providers had to gain access to the network infrastructure owned by the incumbent monopolist in order to compete. Even though under general guidance from the Commission, the specific conditions for access had to be identified domestically and independent regulators had to be created for that purpose. The same regulator had to establish at which level of disaggregation, the access to the network had to be sought and the price the incumbent monopolist had to be paid for providing such access. Of course the effectiveness of the independent regulators was essential in determining the actual degree of competition that would be created in the liberalized TLC markets.

[10] Commission Directive 80/301/EEC of 16 May 1988 on competition in the markets in telecommunications terminal equipment. Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=URISERV:l24119a&from=EN

Energy liberalization followed a much slower process and the unresolved question was what margin of discretion should be left to Member States sovereignty. From December 1990 to June 1996, the initial Commission position to allow direct transactions between as many producers and consumers as possible was blocked by the opposition of Member States believing that a vertically integrated structure for the industry with no possibility for direct transactions by consumers with alternative suppliers was preferable. In June 1996, after a long debate, the Council agreed on a directive concerning common rules for the industry.[11] The 1996 directive began the process of introducing competition while leaving important choices to the discretion of individual Member States. In essence not only the degree of competition to be achieved was a choice left for Member States, but also the structural reorganization of the industry was left undefined. As a result, the influence of the Directive was almost nil. The Commission reaction in 2003 was first to open up the possibility for consumers to choose the electricity supplier they desired, requiring that all non-household electricity customers become eligible by 1 July 2004 and all household customers by 1 July 2007.[12]

However, in sectors such as electricity, where entry into generation requires substantial investments and involves a lengthy authorization process, simple market opening does not by itself lead to the introduction of vigorous competition. Structural measures such as divestiture may be necessary. The directive was silent on this issue, reflecting different perceptions among Member States on the benefits of stronger competition. On their own initiative, some Member States imposed capacity divestitures on the former legal monopolist sometimes coupled with temporary measures to increase competition such as market share caps.[13]

In any case in all Member States the process of liberalization in electricity was accompanied by regulatory reform and by the creation of independent regulators, this time mandated by the most recent directives, that had to create the rules for the new market for generated electricity, establish the cost of access to the network infrastructure and make sure that demand and supply of electricity be always balanced so as to avoid black outs. Indeed Directive 2003/54/EC obliged Member States to introduce a regulated third party access regime, removing the possibility of negotiated third party access which had been permitted under the 1996 directive.

Notwithstanding these efforts, electricity markets remained concentrated and national in character. The Commission thus (in 2005) opened a sector inquiry into the functioning of the European electricity markets which was concluded in January

[11] Directive 96/92/EC of 19 December 1996 concerning common rules for the internal market in electricity, Official Journal L 027, 30 January 1997, pp. 20–29.

[12] Directive 2003/54/EC of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC—Statements made with regard to decommissioning and waste management activities, Official Journal L 176, 15 July 2003, pp. 37–56; Regulation (EC) No 1228/2003 of 26 June 2003 on conditions for access to the network for cross-border exchanges in electricity, Official Journal L 176, 15 July 2003, pp. 1–10.

[13] In the UK and in Italy, the existing state owned monopolists were split up into competing undertakings in order to create competitive markets, a move which in Italy has nonetheless maintained an incumbent operator with a significant market power.

2007.[14] The main finding was that in almost all Member States, the incumbent operator was vertically integrated with generation (and distribution) and the degree of cross-border competition is weak, due in part to a lack of inter-connection capacities. As a result of this evidence, the third package of liberalization directives were adopted in 2009 with clear obligations to separate the transmission line and to strengthen the capacity of the interconnection points so as to promote cross border trading in electricity.

Finally, 10 years after the process initiated, the indications to Member States on how to regulate and restructure the electricity market are precise, but still a big part of the liberalization effort is left for Member States to organize and to set up. The lessons that we can take from the process of reform of the electricity sector in the European Union is that for a reform to succeed its final objectives need to be clearly spelled out. Otherwise the risk is that domestic interests, very often aligned with those of the State owned incumbent monopolists, risk to prevail.

In rail services, although the rule making efforts by the European Commission to promote liberalization, have been very similar to those in electricity, the results are much less visible, the reason being that introducing competition in the rail transport sector is much more challenging than in the other public utility services. Vertical separation of the infrastructure may help, but is not sufficient. In rail, especially for passenger services, in order for competitive entry to be profitable it needs to be at a large scale, increasing substantially the risk of entry also because of the associated logistical problems (trains are difficult and costly to move). Council Directive No. 440 of 1991 on the development of Community railways and two complementary Directives (95/18 and 95/19) adopted in 1995[15] had the objective of creating a unified market of railways services throughout the Union. The system of regulation was to be based on common accounting rules and in particular on a common approach to separation between infrastructure and services as well as on the creation of access rights to rail infrastructure for international services. The Directives did not lead by themselves to much change. In 1998, the Commission presented further legislative proposals for what was eventually to become the first package of railway directives (Directives 2001/12, 2001/13, 2001/14).[16] The package required that certain essential functions for non-discriminatory network access

[14] European Commission (2007), DG Competition report on energy sector inquiry (SEC(2006) 1724, 10 January 2007). Available at: http://ec.europa.eu/competition/sectors/energy/2005_inquiry/index_en.html

[15] Directive 91/440/EEC of 29 July 1991 on the development of the Community's railways, Official Journal L237, 24 August 1991, pp. 25–28 and Directive 95/18/EC of 19 June 1995 on the licensing of railway undertakings, Official Journal L 143, 27 June 1995, pp. 70–74; Directive 95/19/EC of 19 June 1995 on the allocation of railway infrastructure capacity and the charging of infrastructure fees Official Journal L 143, 27 June 1995, pp. 75–78.

[16] Directive 2001/12/EC of 26 February 2001 amending Council Directive 91/440/EEC on the development of the Community's railways, Official Journal L 75, 15 March 2001, pp. 1–25; Directive 2001/13/EC of 26 February 2001 amending Council Directive 95/18/EC on the licensing of railway undertakings, Official Journal L 75, 15 March 2001, pp. 26–28; Directive 2001/14/EC of 26 February 2001 on the allocation of capacity and the levying of charges for the use of railway infrastructure and safety certification, Official Journal L 75, 15 March 2001, pp. 29–46.

be carried out independently of the provision of rail transport services. A third package of railway directives to open up the market for international passenger services by 2010 was approved in 2007.[17]

As a result of these directives some competition started to develop in freight transport services and competing operators gained in many domestic markets up to 15–20 % market shares. In passenger services, besides some Member States efforts to privatize rail transport services by organizing competitive bids for single routes, like for example in the United Kingdom, entry by new providers was delayed by difficulties associated with logistics and by the need to enter with a full network of coordinated routes so as to ensure a high degree of capacity utilization.

The only exception, and to my knowledge a worldwide exception, is Italy where a new competitor entered the market for high speed passenger transport services. In April 2012 the company NTV (Nuovo Trasporto Viaggiatori) started to operate on a large scale with 25 trains, 49 frequencies and 12 destinations. The entry of NTV occurred at a time of strong increases in demand for high speed services in Italy. In a few years of operations NTV served in 2013 12.6 % of the market and, according to the Italian Transport regulator, contributed to the decline of prices that took place (−9 %) and led to a strong increase in the quality of services also by the incumbent.[18]

Besides these few exceptions however, the competitive structure of the rail sector has remained pretty much stable in the EU. As a result, in January 2013, the Commission announced even more ambitious plans for further disaggregation of existing vertically integrated railway undertakings, alongside concomitant efforts to encourage greater integration of European railway markets. Furthermore the Commission proposed to introduce mandatory competitive tendering for (usually, state-subsidized) domestic passenger rail services, in order to introduce at least competition "for the market" in this area.[19] Besides strengthening the liberalization drive, the proposed "fourth railway package" contains measures addressing standardization of technical standard, improved safety, workforce issues, and the reorganization of the governance of the infrastructure.[20]

[17] See, in particular, Directive 2007/58/EC of the European Parliament and of the Council of 23 October 2007 amending Council Directive 91/440/EEC on the development of the Community's railways and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure (OJ L 315/44, 3.12.2007).

[18] See Italian Transport Regulatory Authority (2015) *Second Annual Report to Parliament*, available at: http://www.autorita-trasporti.it/wp-content/uploads/2015/07/Secondo-Rapporto-Annuale-al-Parlamento.pdf

[19] European Commission, Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EC) No 1370/2007 concerning the opening of the market for domestic passenger transport services by rail (COM(2013) 28 final), published 30 January 2013.

[20] The proposal is discussed, generally, in the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on "The Fourth Railway Package—Completing the Single European Railway Area to Foster European Competitiveness and Growth" (COM(2013 25 final), published 30 January 2013. See also Oxera *Agenda*: "The Fourth European Railway Package: does one size fit all?", November 2013, available at: http://www.oxera.com/Latest-Thinking/Agenda/2013/The-Fourth-European-Railway-Package-does-one-size.aspx, for an overview of the proposed changes.

While the Commission proposals for achieving technical standardization in rail services have been accepted by all parties concerned, those promoting greater liberalization, whilst largely supported by public transport authorities,[21] have been opposed by, amongst others, larger railway companies,[22] rail worker unions and, more importantly by the European Parliament.

Again also in rail services the reform started at the European level but for its success the European drive had to be accompanied by very relevant decisions at the national level, both in terms of regulatory institutions and of the industry structure. Certainly the entry of NTV in Italy would not have occurred without the European liberalization drive, but more importantly would not have occurred if Italian institutions would not have operated alongside proactively to accommodate the new entrants demands.

4 Antitrust Enforcement and State Aid Control: The Interplay Between The European Union and Member States[23]

The free movement provisions of the Treaty represent the legal base of all interventions promoting directly the construction of the internal market. They are accompanied by a number of other provisions that have gained a lot of importance in recent decades. Antitrust rules are meant to make sure that firms do not distort competition within the European Union and State Aid provisions make sure that subsidies pursue a legitimate general interest objective and furthermore do not distort competition. In the architecture of the Treaty both antitrust and State aid are clearly supportive provisions for guaranteeing that the free movement objective is not undermined by private strategies (antitrust) and by anticompetitive subsidies (State aid).

While State aid control is meant to discipline Member States and as such is not conceptually different from the free movement provisions, also directed to constrain Member States in their rule making activity, antitrust provisions are directed towards firms. As a result Member States that together with the Commission share the responsibility of antitrust enforcement easily accepted the obligations to enforce

[21] See e.g., Practical Law, "Council announces political agreement on "technical pillar" of Fourth Railway Package," published 5 June 2014, available online at http://uk.practicallaw.com/0-570-3839

[22] See e.g., CER Press Release, "European Parliament paves the way for the future of a healthy European railway sector," published Brussels, 26 February 2014, available at http://www.cer.be/press/press-releases/press-releases/european-parliament-paves-the-way-for-the-future-of-a-healthy-european-railway-sector/

[23] For a wider perspective on these issues see Anderson, R. and Heimler, A. (2007) "What has Competition Done for Europe? An Inter-Disciplinary Answer", *Aussenwirtschaft, the Swiss Review of International Economic Relations,* Issue 4.

these rules, creating specialized bodies for their enforcement and actively participating in the debates surrounding the correct interpretation of Community rules and becoming real partners of the Commission.

Mainly because of this positive interaction between Member States and the Commission, the standard of appreciation for the violations of the rules became much richer than was expected at the time of the drafting of the Treaty. Indeed, the Directorate General for Competition (DG Competition) and the competition authorities of Member States maintain today sophisticated enforcement programs addressing all major aspects of anti-competitive practices, having abandoned the formalistic approaches of the past and having adopted an always improving effect based approach.

In its early stages, European competition policy was predominantly concerned with vertical market restraints (agreements between firms selling complementary products) on the consideration that they tended to segment markets and therefore constituted the most obvious threat to the construction of a unified Europe. Such restraints were attacked through the application of Article 101 (then 85) of the Treaty to notified agreements and by developing form-based block exemption regulations. This approach was understandable as a political objective, i.e., making sure that national markets be not segmented by private restraints once they have been opened up by the application of free movement provisions. However, over the years such an approach was extensively criticized on the basis that most vertical agreements do not restrict competition and are instead pro-competitive. The introduction of the merger regulation in 1989,[24] and the emphasis on economic analysis that it brought with it, started to move the Commission away from form-based to effects-based enforcement.[25] Important further steps in this regard were the notice on the relevant market which was issued in 1997[26] and the new block exemption on vertical restraints that was issued in 1999.[27]

An insistence on substantive analysis is more and more accepted in most, if not all, aspects of the Commission's antitrust work and it is becoming the standard applied in Member States by national competition authorities. As a result, the European Community as a whole is moving closer to the substantive approaches to antitrust enforcement of the United States. To be sure, important differences remain between the two jurisdictions especially with respect to the treatment of abuse of a dominant position and to restraints associated with the exercise of

[24] Council Regulation (EEC) No 4064/89 of 21 December 1989 on the control of concentrations between undertakings *Official Journal L 395*, 30 December 1989, pp. 1–12.

[25] See for useful background Neven, Damien, Robin Nuttal and Paul Seabright (1994), *Merger in Daylight: the Economics and Politics of European Merger Control*, Centre for Economic Policy Research.

[26] Commission notice on the definition of relevant market for the purposes of Community competition law, *Official Journal C 372*, 09 December 1997, pp. 1–12.

[27] Council Regulation (EC) No 1215/1999 of 10 June 1999 amending Regulation No 19/65/EEC on the application of Article 81(3) of the Treaty to certain categories of agreements and concerted practices *Official Journal L 148,* 15 June 1999, pp. 1–4.

intellectual property rights. However, the degree of divergence are becoming smaller than they have been in the past. To a large extent, this reflects a process of learning based on enhanced economic understanding and on other jurisdictions' experience.

Contrary to antitrust where the legal and economic communities are all very active in the discussion of standards to be applied, on State aid, where prohibitions are only managed by the Commission, the debate is very limited. Economic research, which could contribute usefully to defining what should be treated as a competition restrictive subsidy, has, until recently, been scarce.[28] Nonetheless, the contribution of state aid enforcement to European welfare has been enhanced by recent reforms.

In 2005, the Commission launched its State Aid Action plan,[29] with economic analysis being used for identifying both the necessity and the proportionality of the aid, with an emphasis on the effect of the aid on market conditions. More recently the Commission is emphasizing the importance of ex-post evaluation, suggesting that feedback from State aid programs provided in the past, may become an important tool for justifying their renewal.

Like in the liberalization programs promoted by the EU, also in the area of State aid Member States show very often an adversarial attitude towards the efforts of the Commission to block incompatible aid, so that promoting a consensual evolutionary interpretation of the rules, as was done over the years in antitrust, becomes very difficult. The problem is that efficiency of public policy, not being an objective of European policy outside of antitrust, should be pursued at the domestic level. For State aid this would require Member States to make sure that any measure be not only evaluated with respect of its compatibility with the European rules, but also whether it is effective in achieving the objectives it is meant to pursue.

5 The Service Directive: How Pervasive European Interventions Can Become

The service directive,[30] adopted in 2006 and implemented by all EU countries in 2009, was meant to remove legal and administrative barriers to trade in services. The objective of the directive was to promote the free movement of services within the Community. Moreover the measures introduced, by increasing transparency and

[28] See Besley, Timothy and Seabright, Paul (1999), The Effects and Policy Implications of State Aids to Industry: An Economic Analysis, *Economic Policy*, 28 April 1999 and Heimler, A. and Jenny, F. (2012) "The Limitations of EC State Aid Control", *Oxford Review of Economic Policy*.

[29] State Aid Action Plan, *Less and better targeted state aid: a roadmap for state aid reform 2005–2009*, COM(2005) 107 final, Brussels, 7 June 2005.

[30] Directive 2006/123/EC of 12 December 2006 on services in the internal market. Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006 L0123&from=EN

making it easier for businesses and consumers to provide or use services in the Single Market, have also led to strong increases in efficiency. Some improvements may however be necessary for making the directive more effective.

The Directive promotes a fair, non discriminatory and transparent process of authorization for the provision of services. Member States should make it easy to enter any market, by making sure that all procedures and formalities be completed in a single contact point. Furthermore this single contact point has to make available a list with all the procedural steps a new entrant would have to go through in order to be granted an authorization. Such a list should contain also the maximum timing necessary for processing the application and be written in a language that a foreign applicant would be able to understand. All the measures associated with the single contact point makes entry easier for everybody, not just for foreign suppliers.

The directive does not stop here and addresses the way an authorization decision is taken. In particular the Directive prohibits domestic regulations that among others make an authorization to enter a market dependent on an assessment of demand conditions, that allow existing suppliers to participate in the process of authorization even simply as advisors, or that require entrants to have previously exercised the activity for a given period in their territory. In other words the Directive respects Member States decisions on which activity should be subject to an authorization process. It only intervenes on the criteria by which such authorizations are granted, prohibiting measures that do not have any welfare enhancing effect.

The Directive goes farther and identifies a number of situations where competitive entry may have been stopped in an unjustified way. This is the case for example when the authorization to enter is made dependent on a specific physical distance to be respected between service providers or on some measure of population served, when a regime of administrative prices (either maximum or more importantly minimum prices) is introduced or when a provider is obliged to have a specific legal form. In such instances the Directive requires Member States to provide a justification for the prima facie regulatory restrictions and prohibits the provision when the justification is implausible.

The Directive is in the process of being revised. There are no public documents that indicate in which direction the Commission suggests it should be changed. I would like to suggest two areas of improvements. One is related to the list of sectoral exceptions. As is well known, the Directive does not apply to a number of

sectors that are regulated elsewhere and are listed in article 2 of the directive.[31] One possibility would be to define more precisely the sectoral exceptions and relate them to specific activities within the sector that really deserve to be exempted from respecting the Directive. Indeed some activities may indeed be appropriate that they are not subject to the provisions of the directive (for example within the general category of health services, there may be a good reason why medical doctors are exempted), while others may not (for example nursery services).

Furthermore, the list of regulatory restrictions for which the Commission requires a justification is at the same time too precise and too short. It is too precise because it identifies specific restrictions on entry (physical distances and legal form) that affect the number of possible competitors in a market and specific restrictions on firms' strategies (price caps) that influence the incentives of markets participants to compete. At the same time the list is way too short because there may be many other regulatory provisions that produce the same effects.

The principles of free movement embedded in the Treaty are very general and it has been a shortcoming of the Directive interpreting them in a very detailed but highly incomplete way. The regulatory restrictions in place in Member States are much wider than simply those few identified in the Directive. An effort should be made to adopt much more general categories of possible regulatory restrictions and make sure that Member States justify them on the basis of general interest considerations. As a result of such an extensive review the whole system of regulatory restrictions in the Union would become much more transparent and outcome oriented.

A very promising solution would be for the revised Directive to ask Member States to justify with the Commission general categories of regulatory restrictions like for example, when the regulation puts a cap on the number and quality of suppliers, when the regulation restricts the possibility of suppliers to compete, when the regulation restricts the incentives of suppliers to compete. These are the

[31] (a) non-economic services of general interest; (b) financial services, such as banking, credit, insurance and re-insurance, occupational or personal pensions, securities, investment funds, payment and investment advice, including the services listed in Annex I to Directive 2006/48/EC; (c) electronic communications services and networks, and associated facilities and services, with respect to matters covered by Directives 2002/19/EC, 2002/20/EC, 2002/21/EC, 2002/22/EC and 2002/58/EC; (d) services in the field of transport, including port services, falling within the scope of Title V of the Treaty; (e) services of temporary work agencies; (f) healthcare services whether or not they are provided via healthcare facilities, and regardless of the ways in which they are organized and financed at national level or whether they are public or private; (g) audiovisual services, including cinematographic services, whatever their mode of production, distribution and transmission, and radio broadcasting; (h) gambling activities which involve wagering a stake with pecuniary value in games of chance, including lotteries, gambling in casinos and betting transactions; (i) activities which are connected with the exercise of official authority as set out in Article 45 of the Treaty; (j) social services relating to social housing, childcare and support of families and persons permanently or temporarily in need which are provided by the State, by providers mandated by the State or by charities recognized as such by the State; (k) private security services; (l) services provided by notaries and bailiffs, who are appointed by an official act of government.

questions the OECD suggests should be asked to identify regulations to be subject to greater scrutiny in terms of the impact on competition they may have.[32]

These questions are very general, they are completely in line with Treaty provisions and they fill up all possible legal restrictions to competition that may exist, excluding of course State subsidies that are already controlled by specific Treaty provisions. Indeed regulations may put a limit on the number of suppliers, on the activities these suppliers are allowed to undertake and/or on the incentives to compete suppliers may face. Very often these restriction are justified by the pursuit of some general interest. Sometimes existing restrictions may have been justified in the past but may no longer be so due to technological improvements, to changes in lifestyle or in consumer demands. Some other times these regulatory restrictions may not have been justified even when they have been adopted.

Adopting a much general standard for the type of regulations to be justified as the one I suggest, would extend the assessment of the impact on competition to all rules and regulations, not just to the new ones. Furthermore, the justification Member States would be required to produce would not simply be whether services authorized in other Member States should be blocked or not, but much more strategically whether the restrictions in place are artificially dampening the set of possibilities open to firms and consumers.

If Member States had to justify with the Commission any regulatory restriction they have in place by performing a thorough competition impact assessment, the weakening effect on innovation of many domestic regulations would be strongly reduced. And indeed new potential innovators, should they be blocked from entering a market because of a domestic restrictive regulation, instead of being obliged to lobby domestic Parliaments for regulatory reform, an activity that only big and established players could afford, could use the Commission and the judicial system to challenge these unjustified regulatory restrictions in place at the domestic level.

I will use the example of the regulation of for hire car services in Italy in order to show what could be achieved if that regulation would be subject to competition impact assessment. The very sketchy analysis I perform is paradigmatic of most countries in Europe and of many sectors of the economy.

In Italy, according to a 1992 law, for hire car services have to be booked in advance by users that request a specific journey for a specific time. In order not confuse them with taxis, for hire cars are prohibited from stationing in public areas and are obliged to return to the parking area after having provided service. For hire car service providers are impeded from picking up clients outside of the municipality that granted their authorization to operate and their number is restricted.

Today transport services are all exempted from the obligations imposed by the Directive and should not be. Furthermore the limitations on entry is not based on criteria related to population or distance by are quite discretionary and would not be caught by the existing provisions of the service directive. This should be changed.

[32] See Oecd (2011) Competition Assessment Toolkit. Available at: http://www.oecd.org/daf/competition/46193173.pdf

Indeed the first question to ask is why the number of cars for hire is restricted. The law provides no justification for the reason why quantitative limits have been introduced, while economic theory suggests that a limitation in supply is generally inefficient and ineffective. Even if there were negative externalities associated with higher numbers of for hire car services (which is highly doubtful), for example if an excessive number of cars for hire would increase traffic or pollution at unbearable levels in the municipality that issues the permits, instead of limiting the number of cars for hire it would be more efficient to impose a tax that would internalize such negative effects.

As for the other restrictions imposed on for hire car services, their justification is (was) to protect a general interest. Taxis have to be always available to provide services at a fixed maximum price. If for hire car drivers would be able to enter the market when demand for transport services is high, the income of taxi drivers would be reduced and the cost of their obligation to provide services at all time and at a fixed maximum price would risk not to be covered, disrupting an important service for the public. The two services had to be kept separate.

The regulation of for hire car services pre-dates the mobile phone, let alone the smart phone. While at the time the law regulating for hire services was introduced imposing that for hire car services be booked only in advance and by phone would not reduce the possibility to compete by service providers, today the same restriction is highly restrictive. A competitive impact assessment analysis would suggest which restrictions if any to maintain in place or how to change them.

Imposing in the Service directives that every regulation be justified in terms of its impact on competition along the three dimensions identified in the Competition Assessment Toolkit (is the number of players restricted? Is their possibility to compete restricted? Are their incentives to compete restricted?) would allow regulations to be always up-to-date and would finally create an innovation friendly regulatory structure in the European Union.

6 Conclusions

The European Union and its Member States have created a very innovative legislative system where regulatory initiatives taken consensually at the center need further domestic legislation to be implemented and enforced. While rule making at the European level is strictly controlled by Member States, each Member State is alone in the way it decides to go forward with respect to a Community initiative. In areas where there is no secondary European legislation, there are the Treaty constraints that bind everyone. Furthermore the case law of the European Courts has created general principles, like mutual recognition, that address the problems of disguised protectionism and of unjustified restrictions sometimes being created with respect to market access. However, in areas where there is no secondary European legislation, the intervention by the Courts falls short in creating an

optimal regulatory structure. Market access and mutual recognition by themselves do not allow innovative entry and do not promote growth and competitiveness.

The field of regulation has evolved differently from antitrust where the European Union and its Member States share competences in a very cooperative and forward looking manner. As a result the standard for the appreciation of antitrust violations has slowly moved away from formalism and the European Union has adopted a sound economic approach where the restraints are evaluated in terms of the competitive effects that would likely originate from them. Furthermore, the evolution in the interpretation of the antitrust rules has not been one directional from the Commission to Member States, but all authorities are part of a network where each Member has been able to promote change. In regulatory reform, with the exception of the United Kingdom that has initiated its own program of reforms much before the Commission, all other Member States generally resist as much as they can the liberalization initiative promoted at the center. Member States do not see themselves as part of a network and do not seem to share objectives nor instruments.

The Service Directive has tried to change the system, establishing general principles of regulation for all Member States to follow and has also introduced a system of peer review where Member States share their regulatory approaches and comment on each other solutions. However the categories introduced by the Service Directive that should guide Member States in their assessment of regulatory functions are both too precise and too narrow, just asking for justifications in the case of entry restrictions based on distances between shops or on the number of people being served and in the case of restrictions in the freedom to set prices. Furthermore the list of sectoral exceptions of the service Directive is too long and too general, exempting whole sectors like health care or transport.

In the process of revision of the Directive these two issues should be primarily addresses. First in the list of exceptions, instead of sectors, specific activities should be identified. This would expand the scope of the Directive to the benefit of the European economy. As for the type of regulatory provisions over which Member States should provide a justification, the OECD has developed a Competition Impact Assessment Toolkit that provides a very general checklist for identifying anticompetitive regulations (is the number of players restricted? Is their possibility to compete restricted? Are their incentives to compete restricted?). The experience of the OECD with the application of this Toolkit is quite articulated and the Toolkit has been successfully applied by many jurisdictions in the world. Introducing the principles of competition impact assessment as a checklist for justifying domestic regulations would make the Service directive a very important tool for regulatory reform and an instrument for promoting innovative entry and stimulating growth and competitiveness in Europe.

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The Greek Crisis and Its Structural Features: Some Insights from a Comparative Exercise

Cinzia Alcidi, Luigi Bonatti, and Andrea Fracasso

Abstract This paper looks into the recent experience of Greece and addresses why Greece has so far failed to put in place the social and economic changes necessary to resume growth. Economic and institutional features of the country as well as social values and cultural factors play a role in the judgement about such failure. Each of them needs to be considered and addressed in order to shape a different future for the country, but most have received only limited attention. This helps to explain why the internal devaluation that came along with the adjustment programmes (and the financial support) did not on its own deliver a rapid return to growth. The comparison between the southern regions of Italy (the "Mezzogiorno") and Greece suggests some stunning similarities. The experience and perverse effects of certain policies adopted in the Mezzogiorno serve as a warning that risks could arise in the relationship between Greece and the EU should serious and far-reaching reforms not be implemented soon.

1 Introduction

Although the long-running Greek crisis has not ended yet, the 2015 agreement with the EU, the ECB, the IMF and the ESM to meet the most urgent financial needs and start the negotiation of a third macroeconomic adjustment programme may have reduced pressure on the country to reform.[1] The sense of urgency for further action

[1] The Greek crisis started in early 2010. The country has signed three adjustment programmes, in 2010, 2012 and 2015, and received financial support for a total of about 300 billion euros provided by other euro area member states (through the Greek loan facility), the IMF, the European Financial Stability Facility (EFSF) and the European Stability Mechanism (ESM).

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has somehow faded, and faded even further thanks to the refugee crisis and the terrorist attacks in France which have moved the EU debate from economic matters to security and border issues.

While this greater calm regarding the Greek crisis should improve conditions for the implementation of changes, in reality it is hardly conducive to good outcomes. Complacency risks a loss of momentum for designing and implementing deep reforms in Greece. This is of utmost importance given that, as we shall endeavour to argue, the reforms that Greece needs the most are those associated with changes in the profound societal and economic features that underpinned the build-up and persistence of the crisis.

This is certainly not to argue that Greece has not achieved macroeconomic adjustment or undertaken changes and reforms since the outset of the crisis. Fiscal consolidation and external adjustment that typically represent the bulk of structural adjustment programmes have contributed to improving sustainability (at least in terms of flows) and to reducing distortions, even at the cost of a prolonged period of negative growth. Greece has also implemented a significant number of reforms, reflecting the unbalanced compromises between the political platforms of the Greek ruling parties and the requests put forward by the ECB, European Commission and IMF (hereafter, "the institutions"). According to the widely used Doing Business Indicators of the World Bank, for instance, Greece has recently made remarkable progress in various areas associated with doing business. Labour market reforms were also implemented, although mostly with the second programme in 2012, after much fiscal correction, heavily relying on tax increases, had materialised. This had placed a heavy burden[2] on firms generally, and impaired the already limited ability of surviving firms to expand into foreign markets. The overall result was mass redundancy, especially in small and medium-sized enterprises, which had to face much tougher conditions to access credit as well as falling domestic demand.[3]

Notwithstanding these interventions, as we maintain in this work, there are at least two problems with the observed pattern of reforms, in terms of their ability to address the country's weaknesses.

First, the composition and timing of the reforms implemented under the two programmes reflect a belated attempt to improve the business environment and to liberalise product and service markets (IMF 2014). The timing is not incidental, but rather reflects the political economy of reforms in Greece, where coalition groups in the non-tradable sectors of the economy have long managed to delay or even derail effective policy initiatives. Second, the strategy of internal devaluation, which was necessary to make Greece eventually regain the ability to access foreign markets, could not ensure a sustainable new growth model: (i) the fall in nominal wages was very slow and not matched by an equivalent contraction of good and service prices,

[2] Besides the increase of taxes on firms and VAT, taxation resulted in a dramatic increase in the cost of energy, a key factor of production in the Greek manufacturing sector, which is very energy intensive.

[3] See Gros (2015b) for a sceptical account of the role of the credit crunch.

due to the persistence of market barriers preventing adjustment[4] and possibly combined with profit dynamics internal to firms which had experienced substantial wage increases until 2009; (ii) the engagement of the country in international trade was too limited and got complicated further by measures (meant to raise additional fiscal revenues) that increased non-wage costs.

As Greece shares various traits and cultural factors underlying the unsatisfactory functioning of the economy and society in various regions of Europe's so-called 'southern periphery', we argue that a cursory parallel between Greece in the context of the eurozone and the "Mezzogiorno", i.e., southern Italian regions, in the context of Italy may provide insights to the relationship between societal and institutional failures on the one hand, and unsatisfactory economy performance on the other. The opposition of the core countries of the euro area to transforming the eurozone into a transfer union (see Bonatti and Fracasso 2013) can be better understood by referring to the parallel of Mezzogiorno in Italy.[5]

We suggest that future efforts should be directed toward tackling those institutional weaknesses and uncommendable societal values and beliefs that constituted the backdrop of the recent traumatic events. We are certainly not suggesting that Greek society should change so as to mimic any specific country which has proved not to be in distress. Rather, we warn that failing to address certain historically rooted societal vices may ultimately backfire, leaving the country in a situation of limbo characterised by limited growth, an unequal society and a high dependence on external financial assistance.

Given the recent overwhelming electoral advantage obtained by parties in favour of a third programme of financial assistance and adjustment, structural reforms could be easier to pursue than in past.[6] Most likely, those who have a relatively secure job in the formal economy, retirees and the wealthy have realised that a 'Grexit' option could do them more harm than good. Hence, it is possible that the reform implementation gap will be closed and the pace of change will accelerate both de facto and in the population's perception.

However, Greek government officials have repeatedly claimed that the current negotiations with the institutions are difficult because several creditors' demands appear to them politically difficult to accept and, above all, socially explosive: as the impact of the proposed reforms and additional fiscal measures on social stability is great, they argue, implementing such measures may risk gutting political support in the country for the programme. While country ownership is a key element for the success of any reform programme, experience with past programmes suggests that

[4] This in turn aggravated the impact of such a strategy on domestic demand, inequality and poverty.

[5] At the end of July 2015, the headlines of the Italian newspapers were dominated by the news that the annual report of SVIMEZ (the Italian public research institute focusing on the economy of the Mezzogiorno) was documenting how—according to many indicators—the economic performance of southern Italy had been substantially worse than that of Greece over the last 15 years.

[6] Indeed, all parties involved have an interest in the success of the programme, i.e., not only the Greeks, but also the European Commission, which invested much political capital in the process.

the country does not have administrative capacity to actually implement even reforms passed in the national parliament. This adds to the fact that one may wonder whether the legitimate attempt to preserve programme ownership may in fact ultimately hide, again, the protection of powerful vested interests and coalition groups refusing to come to terms with reality.

The paper is organised as follows. Section 2 provides an overview of the socio-economic conditions of Greece, highlighting some key structural features. Section 3 focuses on the internal devaluation and structural reforms, and explains why they failed boost exports as well as the causes of the dramatic fall of Greece's GDP. Section 4 draws a parallel between Greece and the southern regions (Mezzogiorno) of Italy, by examining economic factors, social values and cultural characteristics and discussing how they have affected the economy and the impact of policies. This section also contrasts the relationship linking the Mezzogiorno to the rest of Italy with that linking Greece to the rest of European Monetary Union (EMU). The last section concludes.

2 Socio-Economic Conditions in Greece

2.1 A Small Closed Economy

By standard measures of trade openness, Greece appears to be a closed economy. According to Böwer et al. (2014), Greece has typically exported one-third less than that predicted by a gravity trade model considering Greek GDP, size of the trading partners and bilateral geographical distances.

As shown in Fig. 1, if one excludes mineral fuels, which Greece does not produce, exports of goods have remained almost flat in nominal terms for more than a decade, regardless of the economic cycle. As percentage of GDP the share of export goods has always been below 10 % of GDP.

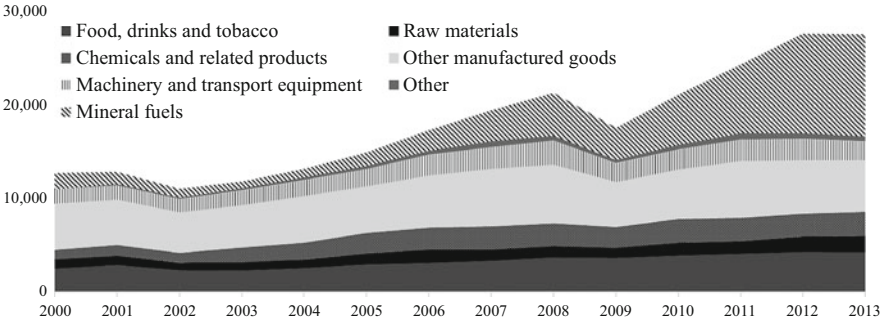

Fig. 1 Export composition: Goods, millions of euro. *Sources*: Eurostat, balance of payments statistics

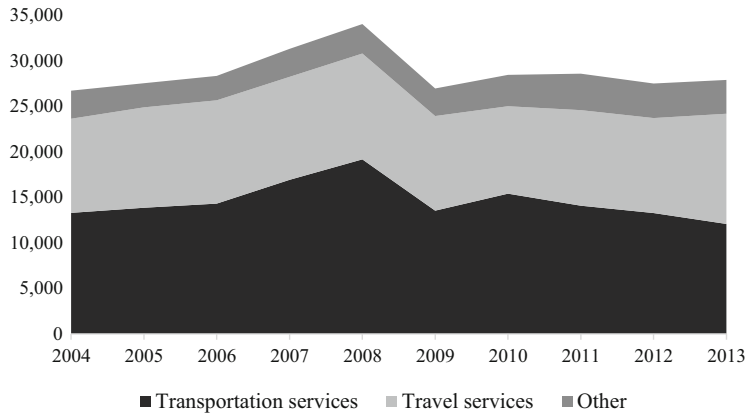

Fig. 2 Composition of service sector exports (millions of euro). *Source*: Eurostat, balance of payment statistics

Greece is the rare country where the share of exports of services is larger than that of goods. As illustrated in Fig. 2, two sectors, i.e., maritime transport services and tourism, represent almost all of it.

Such structure of exports affects the creation of value added. According to OECD data, the domestic value-added content of Greek gross exports in 2009 was 79 %, putting Greece in line with the average of OECD countries: this is evidence of the limited participation in international global value chains for the standard of a small economy and largely reflects the dominance of services. Direct exports by the "transport and telecoms industry" and by the "wholesale, retail and hotels" sector (including tourism and distribution services) accounted in 2011 for, respectively, over one-quarter and 14 % of the total value added of Greek exports: this reflects the country's specialisation in sea transport and tourism-related services, whose trade shares have increased remarkably since the mid-1990s. It should be noted that the increase in (the value of) transport services is not unrelated to the super-cycle in commodities, which had increased substantially their prices and the value of related services.

A relatively high share of foreign value added in total gross exports can be found only for two sectors: "transport and telecoms" and "coke and petroleum" industries. While the unitary share of foreign value added of the former is relatively low but applies to large export values, production in "coke and petroleum" industries is characterised by the highest share of foreign value added in Greek exports (about 70 % in 2011) but is small in size. A peculiarity of petroleum exports is that the vast majority are exported either to non-EU countries, mostly Turkey (Eurostat[7]) but also North Africa, or countries like Cyprus and Bulgaria and the overseas territory of Gibraltar. Hence, on the one hand Greece has to compete with other regional

[7] From 2004 to 2013 75 % of mineral fuels went to non-EU countries.

producers that are not only refining but also extracting, while on the other some of these countries are unlikely to be the final consumers, which suggests that tax shifting might play a role in this business. Hence, large foreign added value figures do not suggest high integration in the global value chain but indicate that Greece exhibits a commodity-exporter structure even though it is not naturally endowed with commodities and natural resources.

Focusing on the destination of the domestic value added in the manufacturing sector, it is worth noting that the share accounted by foreign final demand has been low since the mid-1990s: it has fluctuated around 30 %, which is 15–20 % lower than Italy, France, Spain and Portugal. The industries exhibiting the highest share of domestic value added in foreign final demand are small sectors, i.e., ICT and electronics, chemicals, and basic metals, representing less than 10 % of total gross exports. This is in line with Sufrauj et al. (2015), who show that Greece performs very poorly in terms of the number of large single-product bilateral trade flows, i.e., big hits, a measure that can be associated with the sophistication and development of the manufacturing exporting sector. Another feature of the manufacturing sector is that the value added it generates does not exhibit correlation with exports. Correlation computed over the period 1995–2014 is zero. As a benchmark for comparison, in Germany, where exports are driven by the manufacturing sector, such correlation is close to 90 %; but even in Portugal, which before the crisis exhibited features similar to those of Greece, such correlation is about 60 %.

Hence, once trade numbers are adjusted to account for re-exports and foreign value-added contributions, Greece appears to be an extremely closed economy, whose GDP growth cannot but be dependent on the expansion of domestic aggregate demand. It is then not surprising that the economy managed to grow at satisfactory rates only during the period in which the private sector could expand demand by accumulating relatively cheap debt and the governments could run large budget deficits as well.

Given that small countries tend to be relatively more open than large countries, such a limited degree of openness is puzzling, even more so when considering the EU and EMU membership of Greece. The single market and the single currency clearly failed to integrate the Greek real economy with other European economies.

In fact, this is not the only unusual economic feature for an old member state of the EU. Greece, for instance, has typically counted on a restricted employment base (with low female and youth employment rates), exhibited a large fraction of population employed in the public sector, tolerated a relatively large share of irregular and informal activities (above 25 %, according to Schneider et al. 2010), and developed a small manufacturing sector.[8]

[8] According to Williams (2014), although the overall level of informality in Greece is close to that in Italy and other countries, it presents different features. In Greece, informality has particularly to do with informal waged work, i.e., totally unregistered work, in addition to the other usual types, e.g., envelope wages, informal self-employment and paid favours, which are also present in other countries.

Greek companies tend to be small[9] and to operate in low valued-added service sectors, where R&D expenditures and innovative actions are not as necessary to survival. In the 2000s Greece was among the lowest-ranking countries in Europe in terms of business R&D expenditures (see the contribution by Veugelers & Cincera in Veugelers et al. 2015) and of total R&D expenditures per capita. According to the Innovation Union Scoreboard developed by the EU Commission, moreover, Greece has been among the worst performers. Overregulation and unnecessary administrative practices have traditionally stifled competition and served the interests of incumbent companies, at the expense of development and adoption of innovation.

Such an economic structure reflects the endemic competitiveness problem of the country, whereby GDP and employment growth depend on externally funded domestic demand, falling particularly in the non-tradable sectors of the economy. The share of tradable sector in the Greek private sector has fallen from around 58 % in the early 2000s to 51 % in 2007: the period of sustained growth for Greece after its admission to the euro area was thus associated with a greater reallocation of resources towards domestic activities.[10]

According to the Global Competitiveness Index developed by the World Economic Forum, Greece was among the least competitive EU member states in 2007 and in 2014 (World Forum Economic 2014). The global rise of China and Eastern Europe, as well as the introduction of the euro in the 2000s, represented two major shocks for the country: both exacerbated the problems associated with the fact that Greece's cost structure was typical of a rich country but its overall productivity was not in line with it. It is not surprising that in the mid-2000s the authorities had to boost fiscal expenditures (and cook the books), as well as turn a blind eye to the expansion of a foreign-funded real estate boom (Gros and Alcidi 2011; Alcidi and Gros 2015c) in order to ensure politically desirable levels of employment and growth.

2.2 Structural Imbalances and Social Dysfunctions

The burst of the debt bubble and the resort to external official financial assistance cum conditionality did not instantaneously change Greek political priorities. As noted by Mitsopoulos (2015), while Greek authorities surrendered to most of the requests made by the institutions and engineered improvements in cost competitiveness through the contraction of the productive sector wage bill, they postponed and even refused to address those regulatory and red tape excesses that

[9] According to the Structural Business Statistics Database (Eurostat) and Greece's National Statistical Institute, in 2009 Greece had 531,059 enterprises, of which only 378 were large while more than 95 % of the total were micro-enterprises (http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/countries-sheets/2013/greece_en.pdf

[10] Similar trends can be observed in all countries under financial assistance programmes, while Germany exhibits an almost constant value over the same time span (see Darvas 2015).

simultaneously reduced competition and weighed on the most productive companies. In particular, only the second Greek programme focused on product markets and non-wage competitiveness factors, and the implementation by Greek authorities was slow, partial and delayed (IMF 2014; Terzi 2015). Recent figures suggest that Greece has recently achieved substantial progress in product market reforms, and in 2013 the OECD composite indicator suggested Greece was ahead of the other euro area countries. As noted by Gros et al. (2014), however, this index is based on legislation and not on output; indicators based on surveys, such as the Global Competitiveness Index by the World Economic Forum, reveal limited change.

According to Maselli (2015), participation in the labour market of people over 55 increased by 50 % in the euro area between 2000 and 2014, whereas it remained constant and low in Greece. While one could argue that there is no intrinsic merit to having a large share of the elderly in the labour market, budget-related concerns should have led Greek authorities to reform the pension system. Pension-related expenditures (most of which are non-means tested and intended for anticipated old-age pensions) doubled during the period in Greece, whereas they increased by 50 % in the euro area. This may help to explain why, notwithstanding the brutal impact of the crisis, the rate of severe material deprivation for those over 65 diminished (from 17 to 14 %) between 2007 and 2013. Even more interestingly, while in 2007 the rate of severe material deprivation for those over 65 was 1.5 times the figure for those under 16, in 2013 the rate for the latter doubled to almost twice the (falling) rate for those over 65 (Eurostat). A pattern, we believe, consistent with a generous pension system and a weak social protection system.[11]

A form of "disjointed corporatism" could be observed as well, whereby the main union federations (over-representing the public sector) and the employers' organisation (SEV) failed to establish effective social pacts (Featherstone 2011). This helps explain the stubbornly high rate of structural unemployment, especially among the young people, and the problems encountered over a long period to reform labour market regulations.

Private and public dysfunctional behaviour did not cancel out but, rather, reinforced each other: weak control over public expenditures was combined with corruption and problems in raising tax revenue. Tax evasion is estimated to be at around 25 % of Greece's GDP. Moreover, according to the World Governance Indicators published by the World Bank, there has been a severe deterioration in the degree of control over corruption throughout 2000–2014 (see Fig. 3). Diffuse rent-seeking activities, low levels of generalised trust and of altruistic attitudes, widespread opportunistic behaviour, and pervasive clientelism and cronyism appear all

[11] Data on income inequality strengthen the observations above. According to the *EU Employment and Social Situation Quarterly Review* (Supplement, September 2014) income inequality in the country, measured either in terms of the gap between the upper and the lower income quintiles, i.e., the 80/20 income quintile ratio, or with the Gini index, increased remarkably after 2010. Incomes of the poorest declined the most as real income in the bottom quintile fell by more than the other quintile groups.

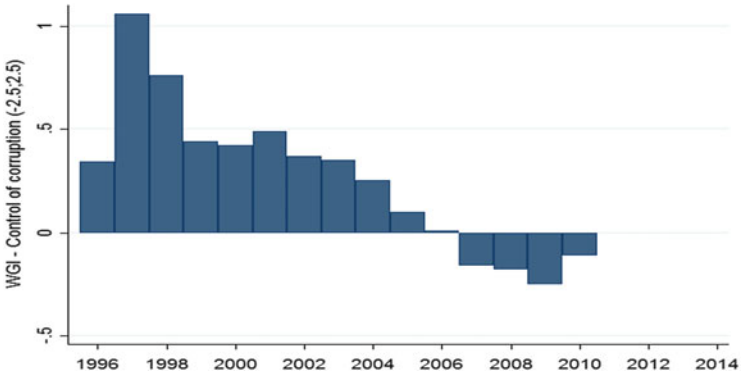

Fig. 3 Index of control of corruption (−2.5 lowest control; 2.5 highest control), 1996–2014. *Source*: World Government Indicators

to be connected with a weak culture of legality and poor endowment of social capital and civic mindedness.[12]

As observed by Katsimi and Moutos (2010) the restoration of democracy in 1974 and EEC accession failed to reduce corruption, nepotism and tax evasion. As the authors claim, the dismantling of the political system in place before 1974 forced incumbent governments to build consensus through social and economic policy measures. Strong trade unions and employer associations, as well as a politicised bureaucratic apparatus, added to this trend. "During this period the older individualistic (or family-based) system of patron-client relationships was supplemented by one dependent on favours bestowed on party members by the party machine" (p. 571). Many civil servants started using discretion to favour politically-connected citizens, and bureaucratic complexity and over-regulation was instead applied to the majority of citizens. This, in turn, enabled corruption, nepotism and private interests to capture the functioning of public administration. To a certain extent, the admission of Greece into the EEC fuelled societal demands and did not correct behaviour, as the optimistic expected. Interestingly, the observed attachment to statism in service delivery has typically not been matched by an efficient public administration: notwithstanding high costs associated with the public education and health systems, Greece has exhibited among the highest values of private expenditures for private health care and education in the EU.

Syriza owes its success to a population having reckoned with a past political elite elected and re-elected for decades but that had done little to improve the social and economic fabric of the country. As argued by Featherstone (2011), a "paradox of Greek governance has been the juxtaposition of liberal democratic formal structures alongside a political culture marked by clientelism, rent-seeking and corruption.

[12] This is consistent with Phelps (2015), who argues very effectively that Greece's current economic ills have little to do with austerity policies but are rooted in structural causes that are closely intertwined with widespread societal values and beliefs.

The short-term, piecemeal political attitudes that stem from this culture severely constrain reform initiatives on politically sensitive issues such as the pension, health or labour market systems." Such a dismal context did play a role in keeping the attractiveness of the country low: as pointed out by Pelle (in Veugelers et al. 2015), the sub-indicators of the WEF Global Competitiveness Index suggest that Greece performed poorly in terms of attraction and retention of talent.

Although this cultural, social, institutional and political background could not block the reforms demanded by the institutions, which attached conditions to their assistance programmes, it has nonetheless contributed to deferring and slowing down a number of urgent measures that address strong interest groups. This is one of the reasons why we believe that interest groups remain a serious hindrance to the country's future prospects.

3 Internal Devaluation and Institutional Reforms

The fundamental assumption of standard IMF adjustment programmes is that fiscal consolidation, usually a key part of the programme, combined with a limited capacity to import, induced by restricted access to external funding, reduces domestic demand and hence wages and prices, i.e., internal devaluation. The devaluation accompanied by structural reforms is expected to improve competitiveness and to boost exports. This should allow external demand to compensate for the fall in domestic demand and contain the recession or open the way to recovery. Such mechanisms clearly did not work in Greece, as they did in other programme countries.

There are both macroeconomic and institutional explanations for such failure.

3.1 Failure of Internal Devaluation

As argued above, Greece represent a rare case of small closed economy (Gros 2015a) and in addition to this, the structure of its exports, where imported commodities play a crucial role, suggests that only a limited amount of them is sensitive to wages and other cost-competitiveness measures (Alcidi and Gros 2015a).

Since the start of the first adjustment programme and up to 2014, wages fell by over 20 % in absolute terms according to Ameco data and even more relative to the euro area average. Such a wage compression has been the result of the deep recession and the dramatic increase in unemployment, as well as of the labour-market measures undertaken in the framework of the adjustment programmes.

It should be recognised that until 2009, the correlation between wages and unemployment was very weak in Greece (see Fig. 4). Fluctuations in unemployment had remained very limited during the boom years while wages had increased substantially. By contrast, the large adjustment in wages that happened later seems

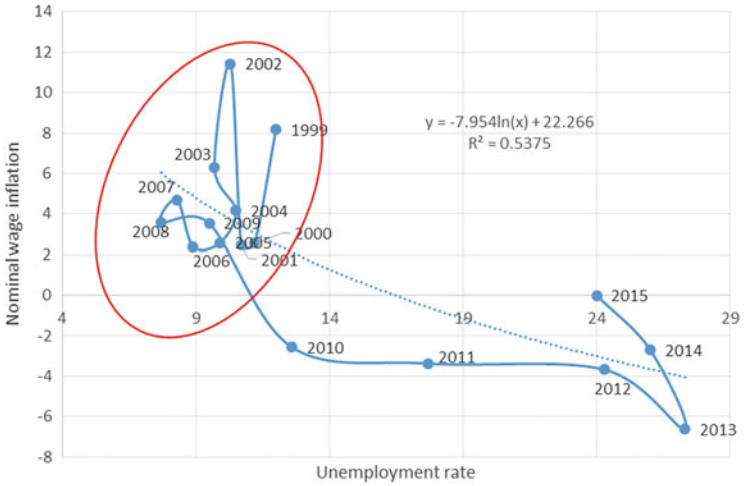

Fig. 4 Phillips curve, Greece, 1999–2014. *Source*: Own elaboration based on Ameco

to be proportionate to the increase in unemployment, at least according to what one could expect from the Phillips curve relationship, and comparable to the experience of other countries such as Portugal, where wages fell less but also unemployment increased less. The emergence of a Phillips curve kind of relationship between wage inflation and unemployment after the start of the crisis is also supported by Daouli et al. (2015). Using micro data, they find evidence of a wage-unemployment rate relationship, at regional level, for groups of workers with relatively limited bargaining power (the young, those with secondary education, and those residing in rural areas) for the first time after 2012. The authors attribute this change to labour market measures undertaken during the adjustment programmes and in particular to the abolition of the extension principle, i.e., the application of collective agreements to non-members. While this may be the case, given that most labour market measures were implemented late and only partially and that the majority of employment is concentrated in small and very small enterprises where wage bargaining is informal, it seems quite unlikely that the liberalisation of collective dismissals had a strong impact on wage formation. By contrast, cuts in public sector[13] and minimum wages (Yannelis 2014) are very likely to have had a direct impact on wage formation in the private sector. Similarly, the dramatic increase in unemployment induced by a depressed domestic demand and numerous defaults of firms must have affected wage dynamics.

Of course, this does not explain why the fall in wages translated only partially into lower prices. Price competitiveness, as measured by broad price indices, like

[13] See Christopouloua and Monastiriotis (2015) for differences in wage dynamics in the private and public sector.

the consumer price index (CPI), improved by much less than wage-cost indicators would suggest. Several concomitant explanations may be at work.

First, a rebalancing of income accruing to factors of production, labour and capital may have occurred. Following a period of excessive wage growth which reduced profit margins, firms may have benefitted from the wage fall by enjoying higher profits thanks to prices not adjusting to wages. Of course, this can only be possible where firms are not price takers and enjoy market power. As mentioned earlier, this is indeed the case in Greece in most sectors. A second explanation relates to the increase in the costs of other inputs of production, namely energy and capital. Energy plays a particularly important role in Greek industry and energy efficiency is very low. According to various sources,[14] electricity cost for business and households rose substantially between 2008 and 2013 and at higher rate than in other EU countries, this may have off set, at least partially, the gains from the fall in labour costs. Last but not least, credit gradually became more expensive and more difficult to access without collateral (Mitsopoulos 2015), especially beginning in 2012, when banks were strongly hit by debt restructuring. A third explanation for the incomplete adjustment in domestic prices relates to taxation. Data suggest a large difference between changes in prices including or excluding taxes. The increases in VAT rates imposed by the adjustment programmes clearly led to an increase in the consumer price index, hence masking the adjustment in wages to prices.

A further aspect to be considered is that since a large percentage of goods consumed in Greece is imported and goods account for about half of the consumer price index, the CPI changed little even when wages had declined.[15]

It is difficult to establish which explanation is most relevant, but they were most likely all at work at the same time and all point to only one effect, a slow and partial internal devaluation. Other than these economic factors, institutional features of the Greek economy have led to the failure of the internal devaluation to boost exports.

3.2 An Institutional Problem

It is worth noting that even tax increases, which in principle apply to all sectors in the same way, might have, de facto, had a greater impact on the traded sector due to the existence of different degrees of tax evasion between the traded and non-traded sectors. The non-traded sector, which is dominated by (low-value) services providers, in many cases self-employed or employed in small enterprises, tends to use

[14] http://greece.greekreporter.com/2014/10/31/greece-champion-of-electricity-hikes/
http://www.ekathimerini.com/151560/article/ekathimerini/business/greeks-pay-dearly-for-natural-gas-while-electricity-rates-keep-rising

[15] By contrast, in the case of service where labour is the main input, prices have adjusted more than for goods.

little capital, to engage only marginally in international trade and to rely excessively on cash transactions. All these conditions make tax avoidance and evasion easier. This implies that a rise in tax rates makes it relatively more attractive to remain in the non-traded sector and may even draw resources away from the traded sector. This is the opposite of the outcome that the programmes wanted to produce. Indeed, reallocation of resources from the non-tradable to the tradable sector was one of the explicit objectives of the second adjustment programme.

From this perspective, one way of thinking of Greece is as a country that has a production possibility frontier with a narrow tradable sector (see Fig. 5). When this is the case, changes in relative prices (tradable versus non-tradable) have little impact on production in the tradable sector. This means that the structure of the Greek economy is such that changes in domestic prices and wages are deemed to produce only limited impact. External factors like global commodity prices are likely to have larger effects.

Overall, both economic and institutional factors suggest that not only the internal devaluation failed to reduce the internal prices enough to restore external competitiveness, but also that it would not have been in any case sufficient to deliver important positive effects for the economy. This notwithstanding, a drastic correction of relative wages and prices was inevitable if Greece was to stay in the eurozone: Greek wages and prices had been inflated by the credit bubble of the first decade of the euro and had to go back to a level consistent with the country's fundamentals. Similarly, Greece's domestic demand and GDP were fed by cheap borrowing from the rest of the world and were largely inflated with respect to the country's productive potential: external official support much greater than what Greece received from its partners would have been necessary to avoid a severe fall of its GDP. This was clearly politically unacceptable to some EU member states and unfair to others.

Given the features of the Greek economy, this led to an extremely painful situation: the economy relied dramatically on domestic demand funded by foreign debt and weighed down by excessive government; fiscal consolidation combined

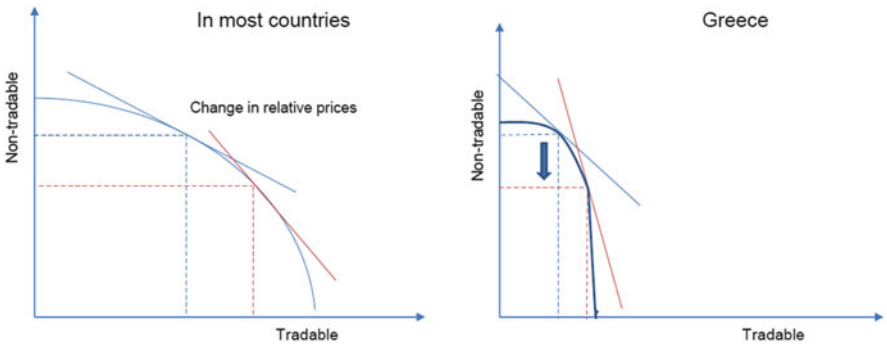

Fig. 5 Production possibility frontiers. *Source*: Authors' own elaboration

with a sudden end to private lending as well as falling wages led to a depressed economy, with great uncertainty and increasing inequality.

For all the reasons explained above, the Greek traded sector has always been small and it was very unlikely that it could expand when access to credit became more difficult and taxes increased. This suggests that internal devaluation, while at the same time inevitable and *conditio sine qua non* for change (Alcidi and Gros 2015b), could not be the sole solution to Greek problems. Well-designed and well-implemented structural reforms are critical. Notwithstanding undeniable efforts to reform the country, the timing and composition of the reforms undertaken under the first and second programmes exhibit various shortcomings (see Terzi (2015) for a thorough assessment). Reforms under the first programme were almost entirely directed toward restructuring the public sector (tax system, transparency, public wage bill, privatisations, and pensions) despite the low administrative capacity of the public administration. Reforms under the second programme were better designed but implemented either partially or with delay, thereby reducing their overall effectiveness. Empirical evidence, in fact, indicates that the simultaneous and coordinated introduction of reforms in the labour and product markets could have delivered quicker and better results (see Anderson et al. 2014; ECB 2015; Terzi 2015).

As it will be argued in the next section, Greece necessitates also profound societal changes in values and culture in order to be a successful member of the euro area and undertake a sustainable growth pattern.

4 Greece and the Italian Mezzogiorno

While some of Greece's peculiar features were discussed in the previous sections, we would like to emphasise here a number of apparent similarities between the situation of Greece in the euro area and that of the Mezzogiorno in Italy. This has some relevance especially in the light of the fact that various commentators claim that large and long-run fiscal transfers within the eurozone risk transforming southern Europe into a large Mezzogiorno (Tilford 2012; Wolf 2012).

To start, there exist important similarities between Greece and the southern regions of Italy. In terms of GDP per capita, for instance, Greece looks closer to the Mezzogiorno than to other parts of Italy, as can be seen in Fig. 6 and in Table 1. Similar findings hold for the share of manufacturing activities in local GDP; according to the data collected by SVIMEZ and the World Bank, manufacturing accounted in 2014 for 7.9 and 8 % of the GDP in southern Italy and in Greece, respectively, whereas in northern Italy the share is 17.7 %.

Limited trade openness appears to be an issue in most regions in southern Italy as well as in Greece, and exports to regional GDP ratios are low (Table 2). Notwithstanding the serious statistical problems in allocating the origin of exported goods within a country, for instance when wholesale retailers are based in a region but trade goods are produced in another one, the differences between the north and

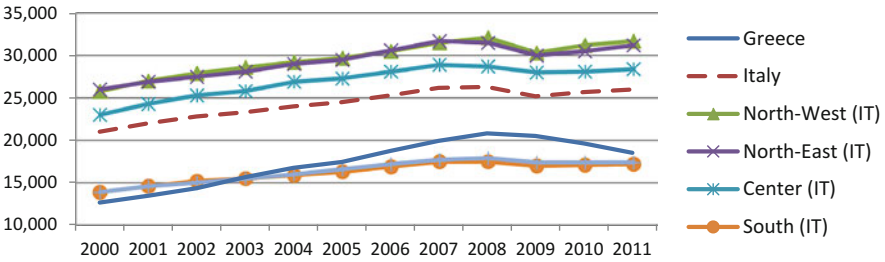

Fig. 6 GDP per capita (in euro) at current market prices, Greece and Italian regions, 2000–2011. *Sources*: Eurostat (ESA95)

Table 1 GDP per capita (in euro) at PPS in Greece and Italy in percent of the EU average, 2001–2011

	2001	2003	2005	2007	2009	2011
Greece	87	93	91	90	94	80
Italy	119	111	105	104	104	102
North-west (IT)	146	137	128	125	125	124
North-east (IT)	145	134	127	126	124	122
Centre (IT)	131	124	117	115	115	111
South (IT)	79	74	70	70	70	67
Islands (IT)	79	74	71	70	72	68

Source: Eurostat (ESA95)

Table 2 Merchandise exports over GDP %, 2011–2014

	Campania	Puglia	Basilicata	Calabria	Sicily	Sardinia	North-west Italy	North-east Italy
2011	9.6	11.6	12.7	1.1	12.4	16	27.8	31.8
2014	9.6	12.1	10.6	1.1	11.7	15	29.8	34.7

Source: ISTAT, External Trade and internationalization

south of Italy are extremely marked (and cannot be explained by geographical differences). Furthermore, both the Mezzogiorno and Greece have a small manufacturing sector that suffers from a serious competitiveness problem, and small private companies are active in low-valued added sectors and hardly innovative.[16]

In addition, both the Mezzogiorno and Greece are characterised by problematic labour market conditions, such as limited participation (the ratio of NEET—not engaged in education, employment, or training—young citizens in 2014 was 38 % in southern Italy, 30 % in Greece and about 20 % in northern Italy and Spain), a

[16] In 2012, the average number of employees per firm was equal to 3.2 in Greece, 4.3 in central-northern Italy and 2.8 in southern Italy (while the EU-28 average was about 6).

large share of workers in public employment, high long-term unemployment rates, and diffuse irregular occupations.

With all due exceptions, in both areas public institutions have tended to be weaker than in other OECD regions, corruption more widespread and the public administration relatively inefficient. The Mezzogiorno appears to share with Greece low levels of tax morale, social capital and generalised trust, together with a relatively high incidence of those forms of opportunistic behaviour that negatively affect market transactions.[17] Generous and protective welfare state provisions have often been abused with a view to entrenching political clientelism,[18] thus giving credit to the argument that transplanting to an environment poorly endowed with social capital institutions (like those typical of a modern welfare state) conceived for contexts richer in social capital tends to produce perverse results.

Following the lead offered in the famous book *The Moral Basis of a Backward Society* by Edward C. Banfield (1958), several scholars have noticed the existence in various areas of the Mezzogiorno of a value system of honour and shame, associated with what has been dubbed 'amoral familism' as well as patron-client relationships playing the dominant role of social integration.[19] This situation has been related to the difficulties encountered in making people share identification and interest in the political community, to the limited dimension of local voluntary organisations, and to the widespread diffusion of clientelism. Horizontal *un-personal* interactions among agents, helpful to contain transaction costs, could hardly emerge in such a context, whereas interactions based on personal links (often called 'improper intermediation') has increased. Even in post-modern urban contexts, people lacked the class solidarity typical of industrial societies and upward mobility has hinged on personal loyalty and familiar connections; cynical individualism has gone hand in hand with opportunistic behaviour and an instrumental approach to the institutions, consumerism and short-termism (typical of those seeking to extract everything possible from any interaction without worrying about its consequences for others and its long-term implications).[20]

[17] According to Paraskevopoulos (2007), the index of social capital in Greece was equal to 0.06, at the same level of the new members of the EU, against an average value of 0.31 for the old members of the EU.

[18] As discussed in Piattoni (2001), clientelism and patronage in several countries have been used, on the one hand, to preserve power and, on the other hand, to protect particular interests.

[19] The founding principle of amoral familism can be summarised in the following terms: "Maximize the material, short-run advantage of the nuclear family; assume that all others will do likewise" (Banfield 1958: 85). According to Sabatini (2009), the intensity and quality of intra-familiar relations in Italian regions exhibit an inverse relationship and the southern regions are characterised by strong but poor quality links.

[20] This description captures only the general negative traits of a large and diversified territory. It certainly fails to capture several virtuous examples in several civil society organisations and institutions. As often observed, the existence of criminal organisations, such as Mafia and Camorra, led to the emergence of commendable civil society groups fighting against criminal practices, as well as an advanced legal code to fight such associations.

Moreover, both in southern Italy and Greece, one can find traces of a "consumer society without a production base": consumption patterns are not consistent with the capacity of generating income, and wage and price dynamics are distorted and not conducive to market adjustment.

During the crisis, moreover, influential opinion leaders in both societies refused to explore the deep roots of contingent and recurring problems, whereas they started a search for scapegoats and blamed the EU and the euro, according to what Robert Hughes (1993) called a 'culture of complaint'.

All this suggests that, short of profound reforms and a radical change in the systems of values and beliefs in Greece, there is indeed the chance that an automatic system of fiscal transfers turns the euro area periphery into a European Mezzogiorno. While it is possible that core countries' great concerns for the risk of moral hazard consequences of fiscal union are somehow exaggerated, the parallel between Greece and the prolonged experience of the Italian regions in the Mezzogiorno is a warning to neither err on the other side nor underestimate the importance of properly establishing private and public incentives.

Of course, we are aware that there exist important differences between the Mezzogiorno and Greece as members of two different currency unions (respectively, Italy and the EMU).

First, from the early 1970s on, southern Italy has been subject to a policy mix (and its unintended effects) that one cannot observe in Greece. The existence of an automatic fiscal transfer mechanism in Italy and a firm political commitment of the national political elite to support the most backward regions were conducive to substantial and permanent transfers in favour of the south (close, on average, to 20 % of the south's GDP). These transfers supported (private and public) consumption and local employment. In contrast, Greece has not participated to a full-fledged fiscal union. Indeed, although it has been a net recipient of non-negligible amounts of European funds since its accession to the EEC in 1981 (as much as 2 % of GDP since the early 2000s, but twice or three times this ratio in the previous decades), it is only in the aftermath of its accession to the EMU that Greece gained easy and cheap access to massive external funds (its external debt rose from 40 to 80 % of GDP in the period 2000–2009). Facing export difficulties and lacking large fiscal transfers from the other members of the euro area, GDP growth in Greece had to be sustained through the expansion of domestic demand financed by heavy borrowing from the rest of the world.[21] This has exposed Greece—differently than the Mezzogiorno—to the sudden stops and reversals of private capital flows that are typical of global financial markets.

Both in Greece and in the Mezzogiorno, thus, the long-lasting gap between consumption and the capacity to generate income has made the respective societies

[21] The adoption of the euro allowed Greece to access foreign financial resources at relatively low interest rates. This is what allowed Greece to grow at a rate well above the EU average in the period preceding the crisis, although at the cost of accumulating an unsustainable amount of debt and of letting prices and nominal wages increase more rapidly than in the core countries of the eurozone.

addicted to external resources. Such persistent inflow of external funds has contributed to keep prices and wages high with respect to productivity and hindered the functioning of basic market mechanisms of adjustment. In 2012, the average hourly wage in the manufacturing sector in Greece was three and four times that in Romania and Bulgaria, respectively. The mean and median hourly earnings for industrial and construction workers are reported in Table 3 and provide a similar picture.[22] This is also reflected in the particularly low residential mobility and worker reallocation rates (OECD 2015).

The second difference between the two areas is that the pronounced decentralisation which took place at the beginning of the 1970s attributed to all Italian regions new relevant competences (such as managing the public health system) and the faculty of spending large amounts of money received from the central government. Given the poor social capital endowment of the south and the clientelistic attitudes of the local elites, this power devolution has led to a systematic misuse of public funds and distorted resource allocation in the Mezzogiorno. As a matter of fact, the ability of local politicians to bargain with the central government over the inflow of substantial funds from the rest of the country has become relatively more important for the local population than the way in which these funds are used locally. Therefore, the external origin of a large percentage of the money spent by public entities in the south has reduced the incentive for the local population to exert control over how this money is spent. This is a less relevant issue for Greece in its relationship with the euro area, since—as stated above—the net transfers that it has received from the EU are substantially less (in proportion to GDP) than those received by the Mezzogiorno from the rest of Italy (and in addition they have decreased over time as a proportion of the country's GDP).

Finally, the wage bargaining process in Italy is mainly centralised, and negotiated wages are valid throughout the country in spite of the remarkable productivity and unemployment differentials across the regions. This has exacerbated the effects of having a less developed area (the south) sharing the same currency (and thus the same nominal exchange rate) with a more developed area (the north). No such thing occurred for Greece, since there is no centralised negotiation and common wages across the euro area.

All in all, while these differences suggest that the parallel between the Mezzogiorno in Italy and Greece in the euro area should not be stretched too far, the above discussion indicates that such a parallel is worth making, in particular when thinking of possible reforms in Greece and at the EU level.

[22] Using the data provided by SVIMEZ, in 2007 the unit labour costs in the manufacturing sectors (calculated as value added per employee over the labour cost per employee) were 12% greater in southern and central-northern Italy.

Table 3 Mean and median hourly earnings (in euro) in industrial and construction sectors

	Skilled manual workers						Elementary occupations					
	Mean earnings in euro			Median earnings in euro			Mean earnings in euro			Median earnings in euro		
	2002	2006	2010	2002	2006	2010	2002	2006	2010	2002	2006	2010
Euro area (18)	10.54	11.69	12.82	9.95	10.99	12.22	10.34	10.04	10.38	10.21	9.22	10.14
Bulgaria	0.77	1.04	1.74	0.63	0.78	1.5	0.52	0.68	1.2	0.42	0.55	0.99
Czech Republic	2.32	3.48	4.43	2.19	3.29	4.22	1.84	2.7	3.43	1.71	2.53	3.2
Germany	14.19	15.26	15.6	14.22	14.94	15.33	12.36	12.27	12.5	11.93	11.55	11.86
Greece	**6.6**	**9.03**	**10.41**	**5.79**	**7.98**	**9.09**	**5.07**	**7.5**	**7.9**	**4.53**	**6.44**	**6.99**
Spain	7.44	8.99	10.1	6.49	7.94	9.16	5.56	7.19	8.59	5.15	6.63	7.65
France	11.7	12.88	12.71	10.46	12.05	12.17	10.53	10.92	10.84	9.5	10.35	10.65
Italy	8.6	10.08	11.22	8.16	9.4	10.57	8.53	9.16	10.59	7.85	8.8	10.38
Hungary	2.08	2.71	3.49	1.81	2.36	3.04	1.61	1.95	2.53	1.42	1.71	2.19
Poland	2.67	3.15	3.88	2.35	2.8	3.53	2	2.41	3.18	1.77	2.1	2.83
Portugal	3.81	4.14	4.59	3.25	3.55	3.98	2.96	3.36	3.98	2.64	3.03	3.52
Romania	0.89	1.51	2.19	0.75	1.3	1.9	0.55	0.98	1.39	0.47	0.86	1.24
Slovenia	4.17	4.9	6.62	3.84	4.61	6.04	3.68	3.91	5.59	3.08	3.75	4.95

Source: Eurostat

5 Closing Remarks

The crisis that started at the end of 2009 forced Greece to abandon its unsustainable growth model based on the accumulation of external debt and to undertake a painful adjustment. In the first months of the Tsipras government, many Greeks were induced to believe that the country could have the cake and eat it too, i.e., to keep the euro and interrupt the adjustment process under way. This would have been possible if the rest of the eurozone were willing to substantially subsidise the Greek economy for an indefinitely long period of time. In essence, this is what was at stake in the long months of harsh confrontation between the Greek government and the core countries of the eurozone. In the perception of both the population and the leading elite of these countries, permitting Greece to stay in the eurozone without completing the adjustment process, which it had committed to undertake in exchange for the great financial support already received from its partners, would have induced other member states to follow the same track. This would have transformed the eurozone into a transfers union and the euro periphery into an enlarged 'Mezzogiorno' subsidised by the rest of the countries in the EMU.

The strategy of the Greek negotiators in the first half of 2015 relied on the threat of leaving the eurozone if the other members would not accept the interruption of the agreed adjustment programme while, at the same time, ensuring all the financing necessary to keep the Greek economy going. Obviously, this threat appeared effective insofar as 'Grexit' would have caused major turmoil in European financial markets and possibly a collapse of the entire eurozone. However, the prevailing perception in the spring of 2015 was that the effects of a possible Grexit were manageable, without excessive risks and costs for the rest of the eurozone. A large majority of the Greek population, moreover, expressed a clear preference for sticking to the agreed adjustment programme if this was necessary to keep the euro. In other words, as soon as the threat on which the entire negotiating strategy of the Greek government relied was exposed as not credible, the Greek negotiators had to resign, an agreement was signed, and the Greek government had to pass through the ordeal of a new election to side-line those groups in the coalition opposing the deal.

The acknowledgement that the promise with which Tsipras had won the January 2015 elections—namely to stay in the eurozone while negotiating the reduction of public debt and putting an end to adjustment programmes signed with the Troika—could not be met, aroused hostility toward the European institutions and the core countries of the eurozone. Such hostility was encouraged by a culture of contempt and victimisation widespread in Greece among many unscrupulous political entrepreneurs searching for scapegoats toward whom to redirect popular resentment fuelled by the suffering caused by the crisis. However, in spite of this sentiment, a large majority of the Greek population ended up accepting the deal reached in the summer of 2015. One may wonder why. Probably, those who still have kept a relatively secure job in the formal economy, the retirees and those in possession of some wealth have realised that they have more to lose from a possible Grexit. It

remains to be seen if this basis of consensus is robust enough to permit Greece to rebuild its institutions and relaunch its economy, as is necessary if the country wants to start to grow again at an acceptable and sustainable rate. This question is even more crucial if one considers that, for all the reasons explained in detail in the previous sections, Greece needs to act on the institutional, social and cultural causes of its low productivity and limited competitiveness in order to resume sustainable long-term growth.

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Greek Export and Labor Market Performance: Facts and Myths that Can Help Devise a Useful Growth Strategy

Michael Mitsopoulos

Abstract The Greek paradox of falling wages that do not lead to increased exports can be reconciled with standard economic theory, once a number of facts are taken into account. Actually, exports of goods that have not been facing the additional adverse effect of highly increased after tax energy prices for industrial users have been increasing steadily during the crisis. In addition, once the collapse of the economy was well under way, labour market reforms in Greece introduced flexibility that stabilized employment, especially among SME's. At the same time in spite of modest product market reforms the increasing distortions of a tax system that overtaxes honest productive individuals and businesses, which are by definition more likely to be engaged in businesses that offer higher value tradable goods, further undermined growth and export prospects. Finally, real interest rates on corporate loans, wages and the efficiency of product markets are found to have an important impact on manufacturing employment. Product market reforms and reducing uncertainty thus emerge as key policy priorities if the increase in employment, export performance and wages are a desired policy priority.

1 Introduction

As Greece is once more convulsed by uncertainties, European leaders, naturally distraught after dealing for so many years with Greek politicians that appear to them as uncooperative, have let once again the "grexit" genie out of the bottle. Azariadis's (1981) self-fulfilling prophecies, which he strived to claim as likely in his seminal work, are becoming once again self-fulfilling. As everybody agrees that Greece is likely to stumble into the abyss economic activity freezes, money flees the country and the tax base shrinks. Having long forgotten the experience of Ireland during the 70s and early 80s, as described by Flinter (2006), the ever

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increasing taxes on a shrinking tax base further chase out of the country the most lucrative, for the tax authorities, individuals and companies, undermining the achievement of closely scrutinized fiscal targets.

There is today an understandable disappointment among genuine Europeans, and philhellenes at heart, with a country in which the domestic political system does not seem to offer the solutions that are only in its capacity to offer. Furthermore, the latter has repeatedly given the impression that it does not understand that European leaders have also their own problems in their home countries, and that therefore Greece needs to take the initiative to solve its problems. For years Greek politicians have failed to muster the will, the competence and the determination to hammer out a comprehensive plan, in spite of private sector contributions like McKinsey (2010), that will convince partners and markets and shift Greece from the current low Cooper and John (1988) style equilibrium to a, stable, better equilibrium that is fully compatible with the principles of the European Treaties.

This paper aims to provide certain facts that could be useful for the design of components of such a plan that remains the large missing piece in the puzzle of how to restore the prospects of a European Greece. They relate to exports, labor and product markets, taxation and private sector financing. In Sect. 2 the export performance of the country is assessed. It is argued that ever since the onset of the crisis, in spite of the widespread perception that the contrary is true, the export performance of Greek economy has been improving. But a series of policy mistakes have undermined key exporting sectors leading to their collapse. As a result the ever improving performance of other sectors, for which these policy failures have not been fatal, has not been able to secure the overall improvement of the export performance. To make matters worse, this pattern reflects the fact that the country has been losing key industries that are crucial nodes in the effort of any country to move from the production of modestly sophisticated goods higher up the value chain. In Sect. 3 it is argued that labor market reform has worked in Greece exactly the way it was supposed to work: it has shifted the adjustment process towards wages even while allowing employment numbers to recover. The unfortunate development here is that this adjustment has been so necessary as a result of the policy mistakes that had already accumulated by 2012. Section 4 briefly covers the issue of product markets and the business environment. Given that the slow progress in this area is broadly accepted as a well documented fact, a few specific examples are offered that demonstrate that indeed such perceptions have substance. But also an argument is made that while a lot remains to be done, a lot has been done. Section 5 addresses the myth of tax-evading and under-taxed Greeks, demonstrating that at the individual level numerous Greeks that pay their taxes are so overtaxed that the most lucrative, for the state, parts of the income distribution have been chased out of the country, along with the more organized economic entities that are also more likely to export. In the final Sect. 6 the issue of private sector financing is raised. Using a short panel data for euro area countries, it is suggested that the competitiveness gain achieved in Greece through the fall of wages in the manufacturing sector, that is mainly associated with exports of increased

sophistication, has largely been lost by the financial suffocation created by the "grexit" linked self-fulfilling prophecy.

2 Export Markets Performance

While all labour cost and competitiveness indexes somehow reflect the fall of employee compensation in Greece, these complex indexes fail to convey the simple message that the compensation per employee in Greece has become by 2014 almost half the euro area average, as shown in Pelagidis and Mitsopoulos (2014) and Mitsopoulos and Pelagidis (2014b). In addition, the decade-long crowding out of the private sector through the generous employment terms offered by the public sector, as argued for by Malliaropoulos (2011), explains why even in 2009 average employee compensation in the private sector was, comparatively with other euro area countries, very low, as shown in Pelagidis and Mitsopoulos (2014) and Mitsopoulos (2014). On the other hand, compensation including non-wage compensation[1] was excessive in the public sector. Strangely, it is the latter sector where the internal devaluation was less aggressive and took place later, as shown in Pelagidis and Mitsopoulos (2014) and Giannitsis and Zografakis (2015).

At the same time the "internal devaluation" was especially strong in the manufacturing sector, where till 2012 wage income was reduced predominantly through layoffs in spite of the fact that the sector had, according to Pelagidis and Mitsopoulos (2014), by any measure low levels of employee compensation. This was unfortunate, as according to McKinsey Global Institute (2012) the sector accounts for over 70 % of global trade and corporate R&D expenditure.

The failure of the internal devaluation to improve the export performance of the Greek economy did not follow only from the failure to reduce existing non-wage costs and inefficiencies while wages fell. It was a result of increasing non-wage costs and introducing new risks and burdens on the productive economy that more than compensated for any competitiveness gain from the fall in wage costs and from whatever useful reforms were indeed advanced. For example, as part of the adjustment program Greece had proceeded to significantly increase excise taxes on energy that is used in productive activities, as analyzed in Mitsopoulos and Pelagidis (2014b). After taxes on energy for industrial use rose over 60 % since 2009 Greece has become a country that has a unique combination of high after-tax prices for industrial use in both electricity and natural gas. These after-tax price increases followed as the result of tax increases that were necessary to cover inefficiencies in production and in the operation of the grid. In addition, a meaningful deregulation of the energy sector still is politically impossible to envision, in spite of the fact that this situation places at the same time the incumbent producer in

[1] This comment applies in particular to the value of the retirement packages offered in the public sector, and that are included in the value of total employee compensation by Eurostat.

a difficult situation and leads to high production costs that inevitably are passed on to consumers. For political reasons these costs are then passed on in particular to industrial consumers rather than households that wield more votes.

As a result industry in Greece has to pay up to 80 % more for energy than companies pay in other EU countries, and labour costs would have to fall tremendously to compensate for this excess cost in energy intensive exporting sectors like steel mills, where energy forms 40 % and labour less than 10 % of the costs. In late 2014 a study by Roland Berger Consultants (Roland Berger 2014) for the Greek Union of Industrial Consumers of Energy (UNICEN) documented the price of energy for key countries and for key energy intensive industries, taking into account also information that is not published. Such are special agreements that allow industries to shift consumption away from times where consumption peaks and that are not included in the data published by Eurostat given their confidential nature. The calculations of Roland Berger Consultants document the significant competitive disadvantage of the Greek industrial energy consumers. The resulting evolution of exports in energy intensive sectors like steel and textiles is most revealing when compared to the aggregate minus these sectors as well as minus volatile food and fuel exports (Fig. 1). In spite of the large fall in wages, the rapid increase in energy costs imply that exports of these commodities that are price takers on the international market plummeted once the tax increases kicked in during 2011.

It is also useful to compare available data on the export performance between Greece and Portugal. Portugal, which has much lower taxes on energy prices for industry (as shown in Mitsopoulos and Pelagidis 2014b), had a strong export performance after 2009 in iron and steel products (Fig. 2), while in Greece the

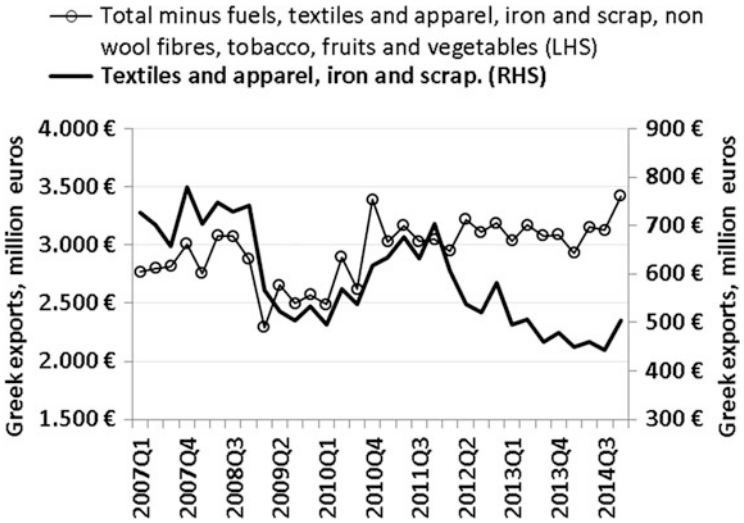

Fig. 1 Exports of energy intensive steel and textile products and of other non-fuel products. Quarterly data. *Source*: Eurostat

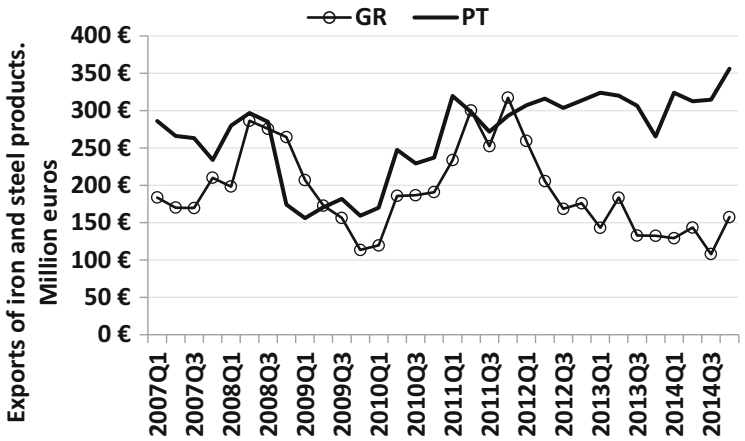

Fig. 2 Exports of iron and steel products, Greece and Portugal. *Source*: Eurostat

rapid rise of energy prices, after all taxes are added, coincided with a decline of the related exports, in spite of the fact that the Greek steel mills were among the most efficient globally as a result of large investment programs during the years before the crisis. Now all major steel mills in Greece have ceased operation, many historic companies have filed for bankruptcy and others gradually shift production and new investment abroad.

Another sector that has consistently suffered in recent years in Greece is textiles and clothing production, which are subject to the high taxation/price of electrical medium voltage (5 €/MWh)—a paradox given that it is an energy intensive industry that for administrative reasons is placed in the higher after-tax pricing band usually reserved for less energy intensive industries. While in Portugal textiles and garment production decisively contribute to overall export growth, as shown in Fig. 3, in Greece after the recovery of the global economy they kept declining, punished not only by the inefficiency of certain companies in the sector but also by these high energy costs. It is interesting to note that among the European countries only Greece is a major producer of cotton, which is exported almost entirely unprocessed. Thus the pricing of energy for the textile industry has managed to turn Greece into the rare case of a country that has the natural resource and fails to build a manufacturing base around it—or rather more accurately that had this manufacturing base but managed to tax it to death.

Steel and textiles largely account for the stagnation of the Greek non-fuel exports, both as an absolute measure and when compared for example with countries like Portugal. Thus it is not true that in the wake of the crisis the Greek economy did not increase exports—in spite of the impact of uncertainty, which will be examined in the last section of this paper, non-fuel exports with the exception of key energy intensive sectors did increase steadily after 2009, and actually this increase has been accelerating during 2014 as Fig. 1 showed (possibly supported

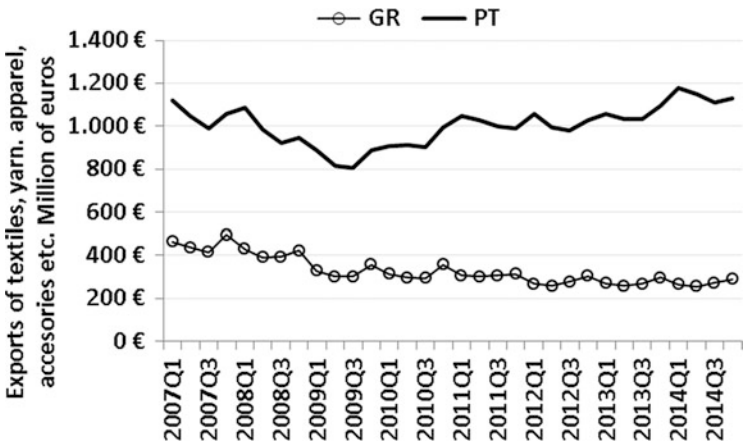

Fig. 3 Exports of textiles, yarn, apparel, accessories etc, Greece and Portugal. *Source*: Eurostat

by a weaker euro as well, given that the majority of Greek exports is to non-euro area countries).

Fuel exports also deserve a special reference here. Their role is mentioned briefly by economists like Gros (2015) and according to the Atlas of Economic Complexity (Hausmann et al. 2011) their footprint on the capacity of the economy to move up the value chain is more limited when compared to other sectors. But in Greece the sector has been a major contributor to the increase in exports during recent years and there is a story behind this increase. Two large companies (Motor Oil and Hellenic Petroleum) completed multi-billion euro investments in new production lines. These investments were aimed directly at export markets leading to a very large increase of these exports. While these exports are also matched by imports of crude oil, before it is re-exported as a refined product and at a given profit margin as accurately pointed out by Gros (2015), it remains that these two companies demonstrate clearly how large companies can proceed with large, export oriented, investment that make a visible difference in the current account and that support well paid and highly skilled jobs even during a severe downturn. It has to be added here that steel and textiles are sectors of intermediate to low sophistication, according to the Atlas of Economic Complexity (Hausmann et al. 2011 and the related research). But according to the same work, cited also in Mitsopoulos (2014), they are also very interconnected with activities that allow a country to acquire the capability to produce more sophisticated products. Therefore the decline of the steel and textiles industry, as a result of the taxation and pricing of energy, deprives the country of a crucial jumping board to a more sophisticated manufacturing base. It is unfortunate that this happens at a time where major improvements in infrastructure (the privatization of a major terminal in Piraeus port and its connection with the rail grid), the removal of a law that for decades forbade the establishment and modernization of existing manufacturing activities in Attica along with a gradual improvement of licensing laws remove some of the major bottlenecks to manufacturing activity in Greece. Williamson (2011) and Hausmann (2012) argue that a country

can form its comparative advantage through the economic activities it allows to flourish. Therefore, especially for Greece it appears of high importance to salvage and expand existing networks of manufacturing so that the country can create a more complex economy that expands beyond the usually cited comparative advantages of tourism, shipping and agro/food production—one has to add the comment of Rodrik (2014), that follows a long line of research, with respect to the importance of a manufacturing base for the development effort of any country. Such a line of thought may also answer at least partially the first question posed in the conclusion of Böwer et al. (2014): also "supporting the laggards", along with the obvious emphasis on the sectors that are known to perform well, might be a necessary part of a comprehensive growth strategy for the country.

3 Labor Markets

Labour market reform has been at the centerpiece of the Memorandum of Understanding (MoU) driven policies initiated in 2010. The IMF had been pointing out for years the need to deregulate labor markets in Greece (Pelagidis and Mitsopoulos 2014), focusing mainly on the minimum wage, even while numerous important distortions in this market had been documented by work like Burtless (2001). Along with the reduction in the minimum wage that was legislated and implemented by 2012, the labor market reform also dismantled a complicated mechanism that added skewed sector and professional wage agreements on top of the agreement for the minimum national wage. While no data exists on the aggregate impact this nexus of agreements had on raising wage costs, evidence presented in Pelagidis and Mitsopoulos (2014) suggests that indeed such agreements did have a traceable impact on the average wages within the affected sectors. Given though that these agreements predominantly affected larger companies, and according to a sample of 250 large companies that published accounts in 2013[2], wage costs for such companies were less than 7 % of turnover, it is unlikely that this distortion was the major hindrance to the increase of competitiveness in larger Greek companies. Still, by 2012 the situation in Greece had become unprecedented. As a result of major policy mistakes a policymaker's nightmare had become true: a fiscal crisis had turned into a financial sector meltdown that affected real activity in an economy where predominantly smaller companies were disproportionally dependent on bank financing. Tracing published accounts of Greek companies one can see how between 2010 and 2012 the number of smaller companies declined by over 10 %[3], while larger companies demonstrated a fall in profits and turnover but also

[2] The accounts are provided by the database of ICAP SA.

[3] Published accounts of limited liability companies and partnerships. Larger companies publish accounts according to IFRS, and these 1400 companies demonstrated deleveraging in spite of the fall in turnover and profits. The remaining 26,000 companies of smaller size, per company,

an aggressive deleveraging. In an environment of extreme financial suffocation smaller companies literally died like flies while more resilient larger companies used all their cash flow to pay down debt—something that had become the best and safest investment a company could make as a result of the extremely high real interest rates.

A custom query of data provided by the statistical office of IKA[4] allows us to complement other publicly available data regarding wages and employment by tracing the development of the distribution of salaried employment across gross basic monthly wage in euros and company size. Company size is determined by the number of employees that are insured at IKA, and the available data includes only companies except construction sites.[5] This breakdown according to the size of companies, given the number of employees insured at IKA, shows that layoffs were particularly evident among smaller companies (Fig. 4), in particular when one compares the distribution of employees of this size class with the development of the distribution of employees in large companies. The pressure forced on smaller companies and that has been documented by the large decline in their number during the 2010–2012 period is therefore manifesting itself also in their employment numbers. Smaller companies, that by definition are more vulnerable especially during a downturn (a fact also reflected in the financing terms they have access to, e.g., Anderson and Stallings 2014; ECB 2014a, b, 2015), were forced during the crisis to proceed with aggressive layoffs either to secure survival either simply because they succumbed. Medium companies proceeded with milder layoffs (Fig. 5) and large companies effectively made no net layoffs (Fig. 6).

Since 2012 the data provided by IKA allows us to gain further insights. As the new laws allowed for lower wages, smaller companies shifted the distribution of the wages paid to their employees towards the new reduced minimum wage, without increasing substantially the overall number of full—time employees. Medium sized companies during the same period of time proceeded with new hiring, albeit at low wages, while keeping the wages of their existing employees mostly stable—something demonstrated by the fact that the distribution of their employees expands towards the left even while it remains mostly unaltered otherwise (Fig. 5). And larger companies seem to have simply increased low-wage employment once the political situation stabilized after 2012. Looking now at the data for part-time employment, we can see the large increase of such among smaller companies since 2012 (Fig. 7). It seems that as smaller companies took advantage of the reduced minimum wage to actually reduce wages for existing employees, they

demonstrated a decline in the number of companies that publish accounts of about 10 % during this period.

[4] IKA is the main private sector social security fund, www.ika.gr

[5] Construction sites have experienced a steep decline in employment after 2010 but their exemption does not affect the validity of the results that can be drawn from this data given that they represent a relatively small fraction of all employment that adheres to different legal rules and the fact that construction, both for dwellings and for infrastructure projects, have faced very specific challenges related with policy failures that disproportionally affected them.

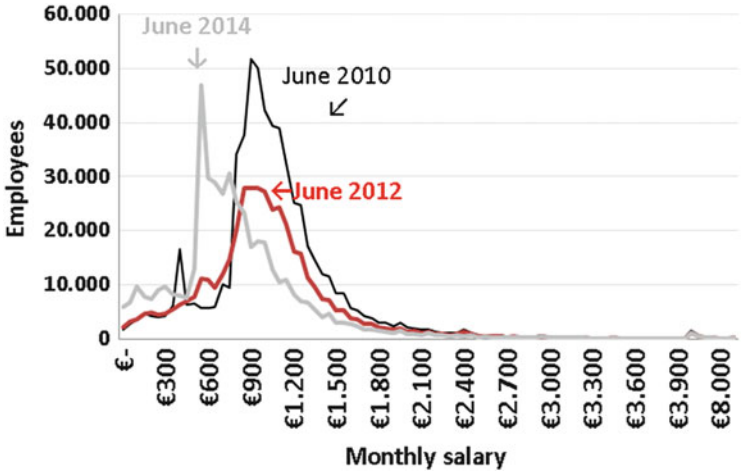

Fig. 4 Distribution of employees insured at IKA per bracket of gross monthly wage. Companies with up to 24 insured. Full time employment (Note for this figure and Figs. 5 and 6: Full time jobs with less than the minimum wage within a given month mainly reflect new hires or departures within the month. Their sum broadly matches the announced churn from ERGANI system of the Ministry of Labor and Social Security. IKA data (IKA (www.ika.gr) is the primary private sector social security fund). Gross wages include employee contributions and only basic wages without overtime, perks etc., analysis by author)

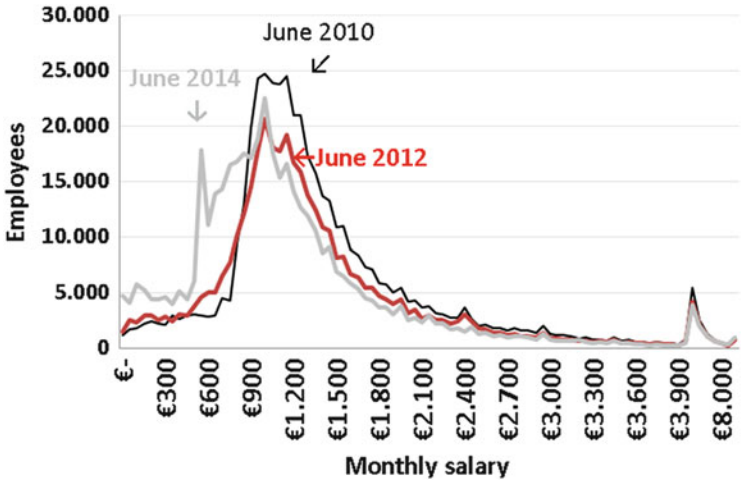

Fig. 5 Distribution of employees insured at IKA per bracket of gross monthly wage. Companies with 25–249 insured. Full time employment only. IKA data, analysis by author

also proceeded with new hires—possibly of employees laid off during the 2010–2012 period, with part-time contracts.

What is also noteworthy is that between 2012 and 2014 the number of full-time employees that earn a gross monthly salary between 550 and 750 €—that is the full

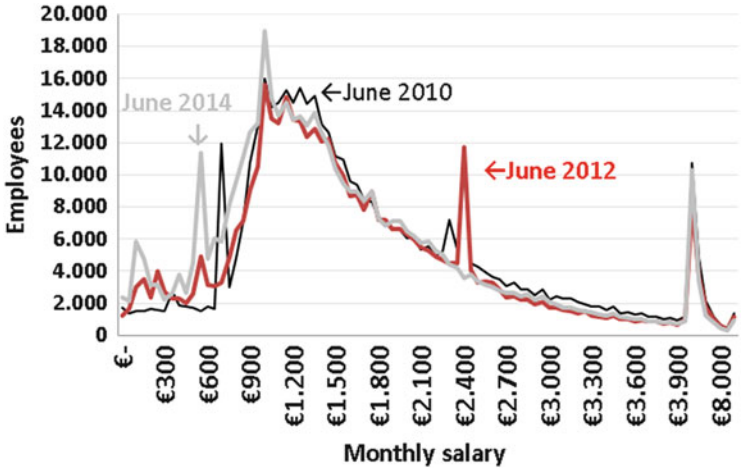

Fig. 6 Distribution of employees insured at IKA per bracket of gross monthly wage. Companies with over 250 insured. Full time employment only. IKA data, analysis by author

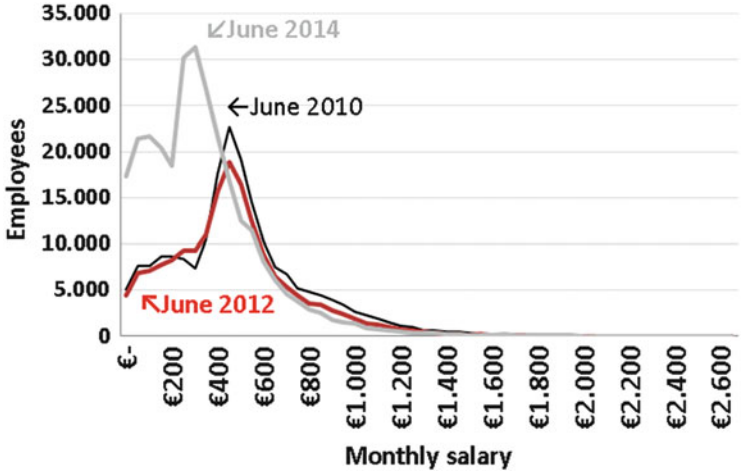

Fig. 7 Distribution of employees insured at IKA per bracket of gross monthly wage. Companies with up to 49 insured employees. Part time employment only. IKA data, analysis by author

time employees that are likely to be affected by an increase in the minimum wage—has increased substantially—by about 146,000 employees to a total of 241,000 or 15 % of all full time employees according to the data of IKA.[6] The increase of these

[6] This estimate excludes the number of employees that are documented in the sampled months to have earnings below the minimum wage and that represent the churn of new hiring and departures with less than a full month of work.

employees is allocated to some extent to new hiring's by medium companies (that proceeded with some layoffs during the 2010–2012 period) and predominantly to employees whose wages were reduced by smaller companies (that proceeded with more layoffs during the 2010–2012 period).

Pelagidis and Mitsopoulos (2014) document how during 2010–2012 the economy adjusted given the inability to reduce wages. The ways of adjustment were layoffs and reduction in non-wage compensation that ranged from perks to reducing overtime and expensive night and weekend shifts. After January 2012, as also shown in Fig. 8, basic wages (documented by data published in the monthly bulletins of the webpage of IKA) started to fall and employment stopped its rapid decline during 2012, stabilized and then during 2014 started to rise once again. This aggregate data demonstrates thus that indeed labor market reforms worked in Greece as they were expected to work, by allowing downward wage flexibility and thus leading to the preservation and even creation of jobs. The available data suggests that the analysis ECB President Mario Draghi offered for the Spanish job market in his Jackson Hole 2014 speech (Draghi 2014) directly applies also to Greece.

The additional data query provided by IKA allows us to gain a more detailed insight into the adjustment process of the Greek labor market before and after the labor market reforms that had fully applied by the summer of 2012. While it is arguable if wages were the most important problem of Greek companies in 2010, and if labour market reforms ought to take such precedence over product market and business environment reforms at the time (the contrary is argued for in Mitsopoulos and Pelagidis (2011) and Cacciatore et al. (2012) offer further and more recent support to this position), it remains a fact that once the Greek depression was fully under way and GDP had declined over 20 %, labor market reforms

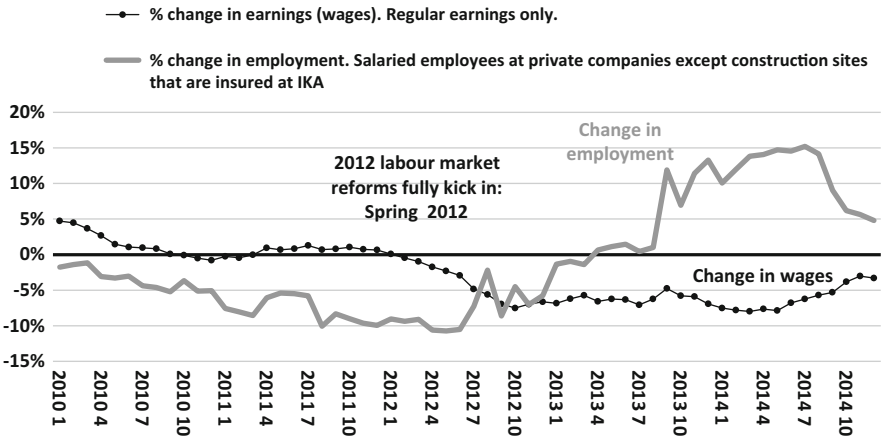

Fig. 8 Regular earnings include only basic wages without overtime, bonuses etc. and only include employee, but not employer, social security contributions. Enterprises that exclude construction sites. *Source*: IKA (www.ika.gr), analysis by author

indeed coincide with the stabilization and recovery of employment, especially among SME's. Given the predominance of SME's in the Greek corporate landscape (The Economist 2012a and the data of the European Commission SBA factsheet European Commission 2014) this can also explain the force with which the Greek depression affected the job market. But while the crisis hit the numerous less resilient SME's, the clear response of the job market to the flexibility introduced in 2012 suggests that it offered a critical space for adjustment especially for SME's that generally have fewer options during a crisis.

4 Product Markets

Mitsopoulos and Pelagidis (2009, 2011) argue that by 2009 the main problem of the Greek economy were regulations and associated administrative practices that stifle competition, as well as the accompanying administrative practices and corruption. These increased the cost of introducing innovations in production and hindered the streamlining of supply lines that would allow productive ecosystems to grow, as argued by extensive OECD research (only indicatively Nicoletti and Scarpetta (2005) is cited here among the numerous OECD economics department papers) and as also argued for in Mitsopoulos (2014). They also hampered research based innovation to expand, as argued in Chapter 3 of Pelagidis and Mitsopoulos (2014) and numerous work quoted in this chapter. In spite of their importance, these issues were not addressed with the same determination the fiscal and internal devaluation agenda were advanced, as argued by Mitsopoulos and Pelagidis (2012, 2014a) and Pelagidis and Mitsopoulos (2014). This happened in spite of the fact that Greece clearly stood out (among OECD work, competitiveness surveys and research work) as the country with the largest potential to improve cost competitiveness through the reduction of red tape and waste and, it has to be added, as the country with the smallest potential to improve cost competitiveness through the reduction of the productive sector wage bill.

And while progress has finally been made on these fronts, in some cases quite substantial, Fig. 9 for the product market regulations reflects the simple fact of the Greek reform paradox: Greece has implemented many important reforms since 2010, improving in many cases the regulatory environment. But given the fact that the country started out in 2010 as probably the worst regulated country in the euro area, both following statements are true: Greece has done a lot, and Greece needs to do a lot more in order to reduce its regulation related non-wage costs in a way that will allow the country to be competitive.

For example, the stringent regulation of road freight transport (Mitsopoulos and Pelagidis 2011, Appendix 1) that introduces major inefficiencies in the supply chain of the Greek economy, by increasing for example the number of empty journeys of road haulage trucks (Fig. 10) has been subject to a lengthy and half-hearted deregulation that so far has not been able to yield the desired results. This example is indicative as the deregulation of road freight haulage was the first major structural

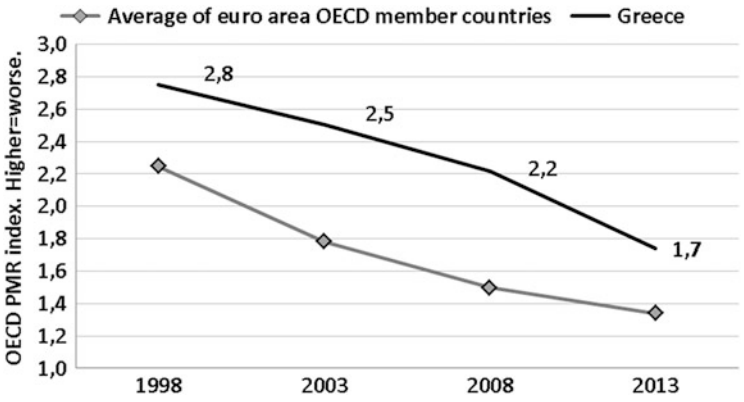

Fig. 9 OECD Product Market Regulation (PMR) index. Arithmetic average. Higher = worse

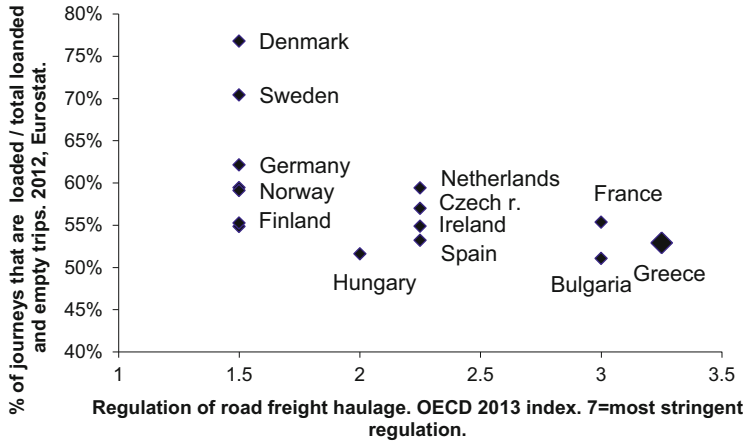

Fig. 10 National transport, all account and for hire trucks. OECD PMR index and Eurostat data, author analysis

reform the Troika of the official sector lenders (EC/ECB/IMF) tried to impose on the Greek administration in 2010. But as it settled for a non-truthful deregulation it essentially set the precedent for all subsequent attempts at growth enhancing non-labour market reforms, sending at the same time a strong signal to markets that were following reforms as a way to gauge the level of trust they could place in the Greek economy.

Thus the eventual deregulation of entry barriers and, finally after 2012, the creation of an office that would accept applications for new licenses was paired with the gradual implementation of changes in the law that required new entrants to offer high bank guarantees and to license only expensive latest technology (fulfilling the most demanding emission requirements) trucks. Given the slump in

business as a result of the crisis such newer and thus expensive trucks simply are not a viable economic option for the majority of road haulers in Greece today. To make matters worse for new entrants, pre-2010 licenses were allowed to keep operating old and energy inefficient trucks. This effectively forbade the majority of the own use trucks that (reflecting the pre 2010 situation of high regulation were very numerous and that are mainly of intermediate efficiency) to convert into for hire trucks. Furthermore, a ministerial decree followed by an amendment in the related law in December 2014[7] specified excessive and detailed mandatory terms of a contract between cargo owners and truckers. As a result, fares were also de-facto re-regulated.

This case also demonstrates how in spite of such regulatory developments in the end lawmakers failed to protect especially small trucking companies. First, controls against foreign trucks that violate EU legislation performing national transport work are still lax allowing for unfair competition on domestic haulage routes. In addition, the law adopted in 2010 intended to force smaller companies to merge into larger entities, ruling out a structure where larger hauling companies subcontract work to small trucking companies. Thus, a business model that has worked successfully in many European countries and that has already worked well in Greece, as long sufficient care is taken to ensure an environment in which these smaller companies can thrive, was essentially legislated away. On the other hand, lawyer fees for real estate transactions and the representation before courts, the incorporation of companies and numerous other services and fees for engineers, to name two of the most important professional groups, now have been mostly deregulated.

This balance between reforms that have not been implemented, or retracted, and reforms that have been implemented, can be found across the board. For example, the re-introduction of a limitation to only sell infant baby milk in pharmacies, the maintenance of barriers to entry in the profession of pharmacists and the effective state monopoly in energy are matched with the deregulation of cruise ship home porting[8], the increasing activity in the privatized part of Piraeus port and the abolition of excessive limitations on the sale of pre-frozen bread, to name a few examples from either side.

[7] Article 41 of law 4313/2014 amending article 11 of the 2010 law.

[8] Minimum requirements on the manning of Greek flag coastal ships keeps placing them at a competitive disadvantage on routes in the Adriatic causing ferries with the Greek flag to suffer a substantial competitive disadvantage. Additional restrictions on day cruises create even more competitive disadvantages for shipping companies serving traffic towards Turkey from the islands.

5 Distribution of Tax Burden, Company Size and Non-wage Competitiveness

A strong stereotype prevailing is that "Greeks do not pay taxes". A careful scrutiny of facts reveals that tax rates in Greece always have been very progressive for obvious political reasons. We argue here that there are some Greeks that pay a lot of taxes, even while others benefit from a competitive advantage of low taxes. But it is the former that are part of the productive, official, economy that by definition is associated with better organized companies that also are the ones that are more likely to export and hire labor with better terms (ILO 2015 suggests that larger companies employ more full time salaried labor and are more productive).

First, traditionally most low income earners and pensioners were exempt from income tax due to a generous tax-free threshold of income.[9] The tax-free threshold has generally been calibrated in such a way that the majority of the approximately 2.8 million pensioners (see Mitsopoulos and Pelagidis 2011)[10] pay no income tax on their pensions. Also, out of the over one million self-employed, about half are farmers that used to be exempt from any income tax for decades and until recently—the taxation of their income is still vigorously discussed. In addition, until recently for many other professional groups ranging from truckers, taxi drivers to pharmacists flat and low taxes were computed by law regardless of the real income. Lax audits that applied to a limited number of remaining particular professional groups like doctors, engineers and lawyers (most of the MP's actually happen to be lawyers) simply offered them de-facto the benefits that these other groups of self employed enjoyed for years de-jure.

Regarding now the currently less than two million private sector salaried employees, it is important to look at the total tax wedge that includes social security contributions. This is because social security contributions in Greece are at the upper end of the range imposed by developed nations. Thus, the low income tax burden on low wage earners is compensated for by the high social security contributions (SSC), meaning that in the end their total SSC and tax wedge is indeed above the OECD average, something the available OECD data shows in particular for single-earner families with two children. For higher wage earners the progressive income tax system and the additional flat tax that applies during the past years to high incomes raises the total tax wedge well above the OECD average—Fig. 11 shows the difference is up to 10 pp.

[9] The tax free threshold was 12,000 € before the crisis and lately a tax exemption for all salary earners and pensioners that effectively again leads to those having up to 12,000 yearly income to pay no income tax. With the formula adopted in 2013 for 2014 onwards the tax-free threshold that applied to all taxpayers up to this level now is retained only for those declaring relatively low incomes.

[10] 800,000 pensioners are from the farmer's fund that pays low pensions of up to 400 € per month, but for which effectively no matching contributions were ever paid which means it is more of a minimum guaranteed income than a pension.

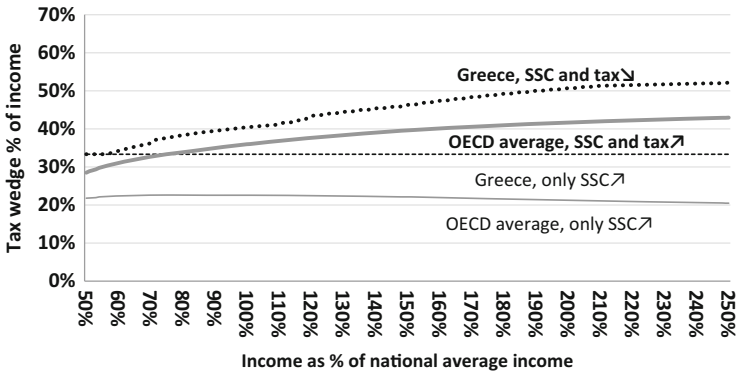

Fig. 11 OECD 2014 data. One earner family with two children. *SSC* Social Security Contributions. Tax is Personal Income Tax

According to the latest available data (Mitsopoulos and Pelagidis 2014b cite data from the most recent census of public sector employees), there are also 640,000 general government employees. They now also pay some more substantial SSC, but their tax wedge simply reduces the net payment they receive from the government budget. Thus, we have an economy with approximately 2.8 million pensioners (of them about 600,000 former government employees) and 640,000 public sector employees that depend on the income generated and taxes paid by less than two million private sector employees and over one million self employed, many of whom are effectively exempt from income taxes and substantial social security contributions. Of these, the higher earning private sector employees (especially when heads of family) are faced by a high and progressive tax wedge amidst numerous agents that effectively carry a much lower tax burden. In the end, such a tax system offers huge incentives not to be productive and not to earn officially declared incomes that are the result of productive activities, as those wage earners with higher incomes do not face only the relatively high tax wedge, but in addition the constant instability of the opaque and ambiguous tax laws and their erratic implementation. At the same time the high tax rates plus the problems of the tax laws and the tax system imply that a choice of self-employment, that offers increased opportunities to evade taxes, is for many a rational choice. The high prevalence of self-employment, of the highest in Europe, is thus no coincidence (documented in Pelagidis and Mitsopoulos 2014), as the job market has shifted in that direction responding to the incentives offered by the tax system.

This situation has significant distributional implications (Matsaganis and Leventi 2013), as it leads to an opaque and unstable tax environment that drives away FDI with more strength than high rates would (Hajkova et al. 2006 and subsequent OECD work) and is also reflected in the tax gap, especially for VAT, where numerous exemptions have an impact that is difficult to distinguish from the impact of tax evasion (European Commission 2013b). Other work, like Artavanis et al. (2012) also may not be able to fully separate the impact of often obscure legal

exemptions and outright tax evasion. Still, in spite of so many that benefit from exemptions and evasion, a core majority of millions of taxpayers do pay their personal and corporate taxes, and these taxes are high, unstable and often outright unjust. For them the accusation of "Greeks not paying taxes" simply adds insult to injury.

High and badly conceived taxation not only encourages clandestine employment and tax evasion, meaning that the tax base remains in the country but does not pay what is due. An overlooked consequence is that it also eliminates a part of the tax base that would be there under a more rational tax system. A recent study by ICAP (2015) documents the composition of the estimated 200000 high-skill Greeks that have migrated during the years of the crisis, chased away by unemployment, low wages, corruption, lack of meritocracy and opportunities for career development. A stunning 30 % of them firmly says it will never return, and a further 51 % deems this unlikely during the next 36 months. The survey of ICAP also asked them the wages that would suffice for them to return. Using, for those that are working and not currently enrolled in studies, these wages to estimate the direct income that they would earn in Greece leads to an estimated more than four billion euros annually, of which the state would collect almost two billion euro annually in direct taxes and social security contributions, excluding extraordinary taxes currently applicable and under discussion. In addition, the current equilibrium has a number of important consequences for the way the economy operates and organizes itself. The combination of unstable and high taxes that are levied on those that are operating predominantly within the bounds of the official economy puts them at a strong competitive disadvantage with respect to those that can operate in the unofficial economy. But those that operate in a more organized way depend predominantly on salaried labor, which ILO (2015) finds to be beneficial in many ways that range from a lower danger for employees to become poor to higher productivity for the economy, and are exactly those that operate within the official economy. They are also those that invest stronger and with longer horizons, that are more likely to invest in innovation, that are more likely to export and that are larger in size. The Economist (2012a) explicitly argues that the prevalence of smaller firms in countries like Greece is directly linked with their deficit in non-wage competitiveness. Finally, they are also those that the adjustment program, according to the spirit expressed by numerous representatives of the official lenders, should empower, but in the end completely alienated with the adopted policy mix described in Mitsopoulos and Pelagidis (2014a).

In addition, as a result of the relatively high and progressive tax wedge, as can be seen in Fig. 12, the majority of the mass of the distribution of private sector monthly wages is squeezed in a narrow band between the tax-free level of wage income and the area where the progressivity of the tax system starts adding substantially to the total tax wedge.[11]

[11] A peculiarity of the distribution is the spike at about 5000 €/month. This is easily explained as at this level the SSC flatten out—they no longer increase regardless how much income increases as

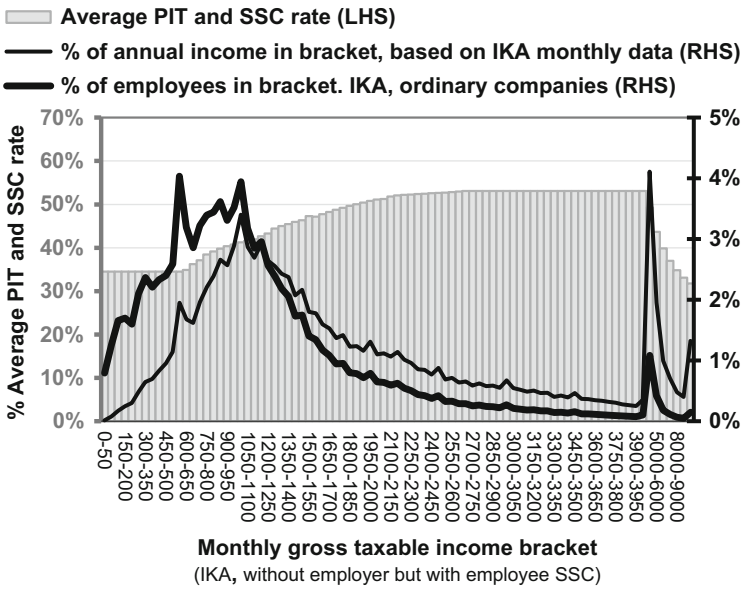

Fig. 12 IKA data and OECD tax wedge data for 2013. Greek tax and social security laws. *SSC* Social Security Contributions, *PIT* Personal Income Tax, IKA main private sector social security fund

According to the European Commission tax data, up to 2012 the Greek government was collecting as a percentage of GDP about 5 bp less than the euro are average—and that in spite of the fact that as we have seen the individual tax wedge for salaried employment in Greece is not only well above the OECD average but also very progressive.[12] The tax paradox therefore is that while Greece levies high taxes at the individual level, it collects relatively few taxes as a percentage of GDP. This paradox is explained through the small number of those to whom these taxes apply. The dynamic evolution of this pattern can also be observed in the data presented by and Giannitsis and Zografakis (2015). During the crisis years 2008–2012 the data they use documents a great fall in the incomes of the highest income 10 % and 30 % Greeks. This has important consequences for the public purse, given that these earners are the most lucrative for the state. This fact is also reflected in the data of the same study that documents that the 10 % of the households with the highest income paid 51.4 % of all income and property taxes in 2012, even while the aggregate income of this group declined 30 %. Given that

benefits and in particular pension benefits also do not increase any more. But this spike is useful in the sense that it underscores how the market reacts to the incentives offered by the tax policies and rates.

[12] This is due to a large extent to the relatively high, when compared to other countries, unconditional tax-free threshold. In other EU countries there is a much lower tax free threshold, but then there are more substantial cash transfers and tax benefits in the case where a family has children. Then, of course, a relatively progressive income tax rate is added.

this income group paid in 2012 in income and property taxes 23.7 % of their declared income (and in addition SSC of course that are not included in the study), this fall of incomes of the given decile by 14.2 billion euros between 2008 and 2012 implies a very substantial loss in tax income for the government. At the same time the study documents a sizeable increase in the income of pensions and from (heavily subsidized by the EU) de-facto tax-free farming activities. The strategy of replacing the loss of the income taxes that followed from the further hollowing out of the anyhow thin tax base (30 % of all taxpaying families in 2012 paid 79 % of all income and property taxes) could only work in the short term. Ultimately the migration of high income individuals and companies abroad will increase the paucity of the productive base of the country, leaving too few agents that create value and that add to the tax base that pays pensions, public sector wages and the cost of basic infrastructure and facilities.

6 Financial Suffocation of the Private Sector

A growing literature has started to quantify the impact of uncertainty (e.g., Bachmann et al. 2013; The Economist 2012b; 2013; European Commission 2013a). It goes without saying that during the past years uncertainty facing economic agents in Greece has been at very high levels. This section uses the real cost of borrowing for non-financial companies as a proxy of both the cost of financing and, to the extent that it is inevitably incorporated in it, the indirect impact of uncertainty. In the case of Greece the impact of uncertainty has an obvious positive correlation with the deflationary pressures and the persistently high cost of borrowing in Greece at the time of historically low interest rates in the rest of the euro area.

This section argues therefore that the increasing cost of financing corporate loans in Greece (Fig. 13) reflects to a large extent the impact of the uncertainty the productive economy is exposed to, directly and indirectly. In addition it is argued that at least during the years of the recent crisis, the cost of financing for the private sector has had a measurable impact on economic activity in the sector that has the strongest contribution to higher value exports: manufacturing.

The facts presented here are intended to complement the work of key opinion influencers that comment on the weak performance of Greek exports, like Alcidi and Gros (2012) even though the importance of the cost of financing in the private sector, as opposed to the cost of public debt, is stressed in Gros (2010). Still, Gros (2015) directly argues that companies in Greece faced no larger financing constraints when compared to Portuguese companies.[13] On the other hand, the

[13] He cites a perceptions index from the World Economic Forum Global Competitiveness Index. Given the sampling methodology and the fact that larger companies have a higher response ratio to these surveys, it is possible that the WEF index used by Gros does not fully reflect the financing constraints faced by smaller companies.

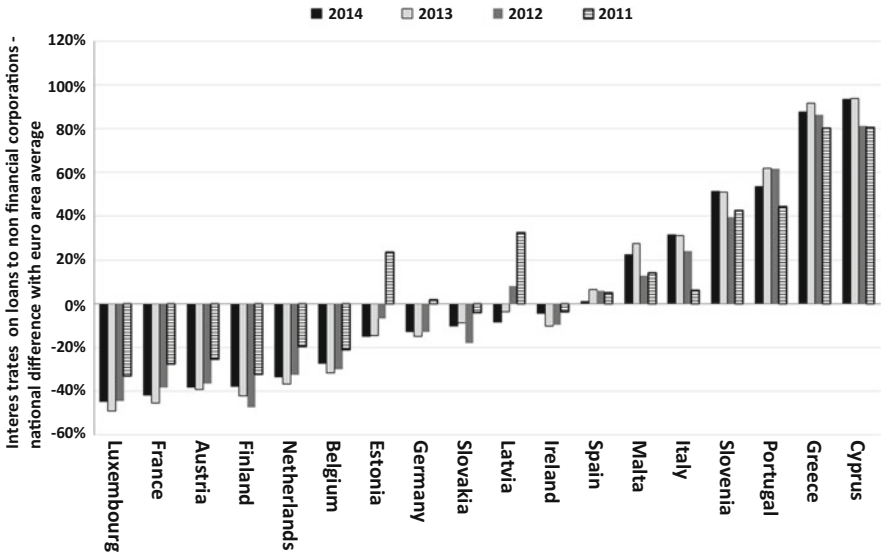

Fig. 13 ECB data. Outstanding amounts, loans up to one million

analytical results of the ECB Access to Finance of Enterprises Survey (European Central Bank 2014b, 2015) documents persistently much higher and unmet financing needs for (the relatively numerous) Greek SME's and crucially a much larger exclusion of SME's from bank financing, as they do not even apply for loans in anticipation of a rejection. In addition Böwer et al. (2014) stress the implications of the institutional immaturity of Greece on the openness of its economy and also acknowledge the adverse impact of uncertainty especially on export performance. Motivated by the opportunity to further investigate the impact of uncertainty during the past years, this section proceeds with a simple quantitative exercise in order to examine to what extent the deterioration of the financing conditions for the private sector may indeed have impacted Greek companies and if it may have crowded out the impact of the documented decline in wage costs.

The dataset used includes euro area countries with data from 2006 till 2013.[14] Data was collected from the European Commission AMECO database for employment (in the corporate sector and for the manufacturing sector), population, compensation per employee (for the whole economy and the manufacturing sector) and the sector wage share and consumer price index changes (with and without constant taxes, with finally an adjustment for constant taxes being made in the used data for cases with large deviations like Greece). The data of interest on corporate loans is sourced from the ECB and a series of indexes from the World Bank Governance Indicators and World Economic Forum Global Competitiveness Index (WEF GCI) reflect measures relating to dimensions of institutional maturity and the efficient

[14] Before 2006 and for 2014 especially interest rate data was not complete for the majority of euro area countries.

working or product and labor markets, as well as dimensions as the education system. The dataset immediately poses a number of clear challenges, as with 14 countries and 8 years of data we have a short panel. The number of countries included was determined by the selection of a dataset that includes as many major euro area countries as possible for as many years as possible, which means that trying to include more countries would have led the dataset to become even shorter. Table 1 lists the included countries. The review of selected descriptive statistics reveals a great heterogeneity among countries with respect to the employment ratio in manufacturing, compensation per employee in manufacturing, the selected institutional index and real interest rate on corporate loans.

An OLS regression of employment ratios for all employment and separately for manufacturing employment on per employee compensation (respectively for the whole economy and the manufacturing sector), interest rates and a small number of institutional variables (one at a time) demonstrates in the visual inspection of the residuals patterns compatible with both strong heteroscedasticity and autocorrelation, while related tests confirmed the visual impression. Given the shortness of the panel, demeaning within countries and proceeding with a SURE estimation appeared a promising first candidate, but while there were visible reductions in the apparent problems with the residuals, in particular after a within group demeaning and less after taking the deviations from the mean for all countries and years, the correlation matrix had low cross correlations suggesting that the SURE approach was not the appropriate one. An alternative approach to allow for separate AR (1) autocorrelation within each country's data confirmed the existence of significant autocorrelation and it also led to a visible improvement of the fit. But this approach faced evident limitations posed by the shortness of the panel and in addition this approach was compatible not only with such autocorrelation but also with the inherent memory of statistics like the employment ratio or the institutional quality. Still, these attempts provided useful insights regarding the properties of the dataset and in the way of showing that for separate groups of countries and for the period examined an increase in wages and interest rates did not lead always to a reduction in employment. In particular, in some cases increases in wages went together with increases in employment. In the end, a random effects feasible general least squares approach was adopted, taking mainly into account the disappointing performance of the SURE approach and the fact that for this approach the relative shortness of the dataset poses less of a problem. In addition the nature of the data used is compatible with this approach as in spite of the reservations often expressed about the appropriateness of this approach it is able to incorporate the strong memory of the employment ratios and institutional variables (e.g., Greene 2003; Baltagi 2001; Wooldridge 2010). Within-groups demeaning led to the immediate improvement of the residuals available for visual inspection, while the between-groups regression re-introduced some of the information that had been lost by the within-groups demeaning. In the end, for the regression in which the institutional parameters were represented by the WEF GCI product market efficiency subindex, the estimates for the impact of per employee compensation in manufacturing and real interest rates have coefficients that are

Table 1 Descriptive statistics of dependent and independent variables

	ME	Ri	GME	W	ME	Ri	GME	W	ME	Ri	GME	W	ME	Ri	GME	W
	Austria				Belgium				Finland				Slovakia			
Average	0.08	1.33	5.12	48.4	0.06	1.48	5.13	57.0	0.08	0.91	5.11	48.1	0.10	1.35	4.49	13.0
Std. dev.	0.00	1.43	0.23	2.9	0.00	1.40	0.06	3.8	0.01	1.58	0.20	2.5	0.01	1.50	0.18	1.5
2010	0.08	0.86	5.00	47.9	0.05	0.45	5.08	57.4	0.07	0.57	4.92	47.9	0.09	2.71	4.34	13.4
2013	0.08	0.11	4.88	52.9	0.05	1.29	5.08	63.0	0.07	−0.09	5.03	51.6	0.10	1.84	4.25	15.0
Δ13/10	0.00	−0.76	−0.12	5.0	0.00	0.84	0.00	5.6	0.00	−0.66	0.11	3.7	0.00	−0.88	−0.10	1.7
	France				Germany				Italy				Slovenia			
Average	0.05	1.79	4.77	49.7	0.10	2.64	5.05	46.7	0.08	2.76	4.25	42.2	0.11	2.73	4.49	21.2
Std. dev.	0.00	1.28	0.27	3.6	0.00	1.06	0.19	2.2	0.01	1.00	0.06	3.3	0.01	1.35	0.11	2.1
2010	0.05	0.94	4.69	50.7	0.09	2.56	4.97	46.6	0.08	2.06	4.16	43.4	0.11	3.48	4.52	22.1
2013	0.05	0.99	4.43	54.4	0.10	1.51	4.92	50.4	0.07	3.50	4.17	46.6	0.10	3.61	4.32	23.8
Δ13/10	0.00	0.04	−0.26	3.7	0.00	−1.06	−0.05	3.8	0.00	1.44	0.01	3.2	0.00	0.13	−0.20	1.7
	Greece				Ireland				Portugal							
Average	0.04	5.10	4.06	24.9	0.06	3.36	5.24	42.9	0.08	3.70	4.40	16.3				
Std. dev.	0.01	1.78	0.17	1.1	0.01	1.21	0.15	1.3	0.01	1.33	0.13	0.8				
2010	0.04	4.61	3.91	26.5	0.05	4.77	5.09	43.4	0.08	2.83	4.32	16.8				
2013	0.04	7.90	3.93	23.1	0.05	2.78	5.21	43.4	0.07	5.51	4.26	17.1				
Δ13/10	−0.01	3.29	0.03	−3.3	0.00	−1.99	0.12	0.1	−0.01	2.69	−0.06	0.3				
	Spain				Luxembourg				Netherlands							
Average	0.06	1.94	4.43	35.0	0.07	0.73	5.35	51.9	0.05	1.90	5.28	53.3				
Std. dev.	0.01	1.10	0.18	2.3	0.01	1.48	0.10	1.7	0.00	1.63	0.08	3.4				

2010	0.06	1.35	4.20	35.7	0.07	−0.28	5.50	51.7	0.05	2.11	5.17	53.1
2013	0.05	2.38	4.32	37.6	0.07	0.16	5.33	54.7	0.05	−0.29	5.26	58.1
Δ13/10	−0.01	1.03	0.11	1.9	−0.01	0.44	−0.17	3.0	0.00	−2.40	0.08	5.0

ME: Manufacturing employment to population ratio, national accounts. AMECO/European Commission
Ri: Real interest rate as % on corporate loans (existing stock, up to one million, to non financial corporations) minus HCPI yearly change with constant taxes. ECB and Eurostat data
Goods market efficiency (GME): WEF CGI goods market efficiency sub-index. Higher = better
W: Nominal per employee gross annual compensation in manufacturing in 1000 €, AMECO/European Commission
Averages and standard deviations taken over the 2006–2013 period

compatible with the coefficients observed in a number of the other approaches. It is worthwhile to mention that the importance of product market efficiency is also documented in Böwer et al. (2014).

With many other institutional variables, like labor market regulation, the overall results worsened in the sense that the significance of all variables declined, in some cases by a large extent even while an examination of vector inflation factors revealed multicollinearity along expected lines for various institutional variables. The inclusion of nominal interest rates and the wage share respectively also yielded worse results, and in the end it appears that nominal compensation of employees and real interest rates yielded the best regression results. This may follow as a result of nominal wages being more representative of developments within a single currency area with low inflation and of real interest rates capturing the acuter financing constraints posed on companies in countries that also experience stronger deflationary pressures. Overall, the exercise yielded the best results, in the sense of the highest significance, when manufacturing employment to population was regressed on nominal per employee wages in the manufacturing sector, along with real interest rates and the goods market efficiency index. This is the result reported in Table 2.

Table 2 Random effects FGLS regression

Valid cases	112					
Total SS	0.004	Degrees of freedom	108			
R-squared	0.506	Rbar-squared	0.493			
Residual SS	0.002	Std. error of est	0.004			
F(3108)	36.931	Probability of F	0.000			
Y: Manufacturing employment to population						
CST: constant,						
X1: Real interest rate,						
X2: Goods market efficiency[a] WEF GCI,						
X3: Manufacturing nominal yearly compensation per employee.						
					St/zed	Correlation
Variable	Estimate	Std. error	t-value	P > |t|	Estimate	with Dep Var
CST	0.004153	0.001511	2.749456	0.007	–	–
X1	−0.001272	0.000323	−3.932735	0.000	−0.293291	0.008600
X2	0.014383	0.002757	5.217292	0.000	0.397326	0.563276
X3	−0.001086	0.000176	−6.177334	0.000	−0.505253	−0.564267

[a]Goods market efficiency is a composite indicator from the World Economic Forum Global Competitiveness Index that includes both hard data and survey answers from an equally balanced strata of larger and smaller companies regarding the intensity of competition, effectiveness of anti-monopoly policy, market dominance, taxation, the business environment, FDI, tariffs, foreign ownership, buyer sophistication and other dimensions. A higher value represents a better performance

Overall this exercise suggests that a change in the level of wages and in corporate loan interests can have an impact of compatible dimension on employment in the manufacturing sector. Given that by definition exporters beyond raw materials and unprocessed food are manufacturers, this result suggests that the financing terms during the past years in the euro area have been as important for producers of manufactured goods as wages, at least as far as employment is concerned. In particular, according to the regression results of Table 2 and given the documented evolution of real interest rates and wages, Greek manufacturing lost about 40,000 jobs after 2009 and till 2013 because of the prevailing private sector financing terms even while the decline in wages led to a gain of about 33,000 jobs. The documented net loss of 62,000 jobs can be explained on the one hand on the fact that the linear regression may not properly reflect the extreme circumstances observed in Greece and on the other hand by other factors, like the increases in the cost of energy discussed in Section 1, but also the collapse of trade credit after 2012, and anew after the November of 2014. Finally, reforms that impact the efficiency of product markets are found to be very important for the increase of employment in manufacturing, and while there is progress in this index for Greece in the period examined, Table 1 suggests the dimension of this progress was small compared to the changes observed both in the cost of financing (increase) and wages (decrease). This development could be assessed as unfortunate given that a more determined reform effort could have increased employment both directly, and of course indirectly through the increase of confidence and its impact on the cost of financing for the private sector. Böwer et al. (2014) also link such developments with the ability of the country to become more extrovert.

7 Conclusion

An analysis of Greek non-fuel exports shows that indeed, in spite of the unprecedented difficulties Greek companies face, there is a steady increase in those products where extreme disincentives do not make it impossible for Greek products to remain competitive in international markets. High energy prices for industry have hit in particular energy intensive sectors, leading them to an effective collapse. The loss of exports from these sectors has masked the steady increase in the exports of other, less energy dependent, sectors. In addition, the increase in the export of refined fuels conveys a useful message regarding the role a few large companies can have in the increase of the export performance when they complete specific investment projects.

A careful analysis of labor market developments suggests that the increased flexibility introduced in 2012 has worked in the expected way, allowing in particular SME's that are less resilient and that therefore were hit harder by the crisis to maintain and create jobs, even if the cost of this development is lower wages and the expansion of part time employment. Still, maintaining and increasing employment is vital to stop the decline of economic activity and social coherence and

therefore the insight provided by the available data is of high value with respect to the design of related policies.

Progress with respect to product market deregulation and the improvement of the business environment is documented as partial, with important reforms both being implemented and still pending at the same time, even while this partial progress does not suffice to instill confidence in markets. In addition, the "tax paradox" of Greece with high and unstable taxes at the individual level encourages not only tax evasion and lobbying for tax exemptions, that put the productive parts of the economy at a comparative disadvantage, but are also crowding out of the tax base in the sense that companies and individuals that are more productive simply leave the country. This process is also described as a factor that contributes to the decline of organized companies, like exporting companies.

Finally it is argued, through a simple quantitative analysis, with the manufacturing sector employment to population ratio as a dependent variable, that the deterioration of financing conditions for the private sector has largely cancelled out the advantages manufacturing companies could have expected from the fall in wage costs, implying that the fall in wages has in the end not offered any comparative advantage to Greek exporters of manufactured goods—it simply has to some extent compensated for the persistently high country risk.

Overall, the presented evidence is in line with the evidence of other related work. The emphasis on structural reforms that can increase competitiveness via a reduction of non-wage costs and that will instill confidence should be the cornerstone of any growth plan that aspires to be successful. But the normalization of the financing conditions for the productive economy emerges as the other essential cornerstone of such a plan.

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Sustainable Development: Valuing the Future for the Environment and Equity

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Abstract We argue that sustainable development is at its essence the destruction and creation of expansion options under the shroud of uncertainty. Without this options approach, the future is undervalued because of uncertainty and the opportunity to stage investment. As a result of this undervaluation, protecting the environment, in particular combatting climate change, is underinvested in favor of short-term returns. We extend this argument to income and wealth distribution arguing that public policy should favor longer-term investment and suppress returns on shorter-term capital. That is, policy should favor the future. In making this argument, we extend the analysis of the influential book by Piketty to real options analysis of investment under uncertainty. We find that taking into account the term structure of investment is more important than the average rate of return on capital in income and wealth distribution. Valuing the future not only benefits the environment but also results in a more equitable income distribution. Both are at the heart of sustainable development.

1 Introduction

To some, sustainable development means a process of growth where future generations are not made any worst off than present generations (Mitlin 1992). In the strictest interpretation of sustainable development, the substitution between various forms of capital are not permitted. This strict approach to development implies that the stock of man-made capital increases at least at the rate of population growth while natural capital remains preserved. In the weaker form of sustainable development, substitution between various forms of capital is permitted.

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Diverging from this approach to sustainable development based on the substitution of capital, we argue in this paper that sustainable development constitutes growth that does not destroy the *options* of future generations but in fact creates new options termed expansion options. This approach to sustainable development bridges between these stricter and weaker interpretations by stating that the *options* of future generations should not be compromised by the actions of present generations. In the stricter interpretation of sustainable development, this options approach would imply that the consumption of natural capital could reduce the options of future generations and therefore should be limited. In the weaker interpretation, sustainable development would imply that growth is permitted even if options are destroyed as long as options of equal or greater value are created.

This process of the destruction and creation of options has profound implications to how the future is value and to income and wealth inequality. We argue that if sustainable development is not approached from this options approach the future will be undervalued in investments and that inequality will become more perverse. Eventually both outcomes lead not only to environmental deterioration but also to social and political instability.

2 Linking the Future with Inequality

Two paramount issues are dominating the political debate in the first decades of the twentieth-first century: the state of the environment and particularly climate change and the inequality of wealth and income. Both issues could lead to economic instability deeper into the century: climate change through destabilizing agricultural production, extreme weather events and uncontrollable migration—events that we are already experiencing; wealth inequality through destabilizing democracies and leading to social upheavals.

In an earlier paper (Knudsen/Scandizzo 2014), we argued that the discount rate was too high once uncertainty and the ability to stage investments were taken into account. We showed that the optimum discount rate should favor the future, that is, be low, and even negative depending on the degree of uncertainty. Also that it was not just the level of the discount rate but its term distribution that was important. We argued that the return on investment should favor more the future for both economic and environmental reasons.

Similarly, Piketty (2013) published a monumental historical and theoretical book on capital and growth. The link between our earlier paper on valuing the future and Piketty's work on inequality is the rate of return on capital. Piketty argued empirically and through simple models that the rate of return on capital was too high with the consequence that capital and wealth distribution were becoming more unequal and threatened to become even more askew in the future. His argument was built upon a simple relationship between the capital output ratio, the rate of return on capital and the growth rate of output. In particular he argued that when the rate of return on capital is higher than the growth rate of output, and

the gap between the two increases, capital and wealth distribution also becomes increasingly unequal. To counter this tendency, he argued for a wealth tax.

In this paper, we will deepen this link between our earlier work and Piketty's thesis by arguing that, in a dynamic economy with expansion options and the capacity to stage investment, the rate of discount should be lower than the return to capital within a stage. The resulting lower rate of discount if applied through policy will result in a more equal distribution of income and wealth. In other words, viewing investment choices through the lens of creation and destruction of expansion options will drive investments toward greater economic and environmental benefits and more equal income and wealth distribution in the future. Such an outcome is the essence of sustainable development.

3 Valuing the Future

One of the most perplexing issues of economics is how to value the future. That valuation is critical to the most important decisions facing investors and governments—how to allocate capital between different investments in combatting and adapting to longer term environmental consequences such as climate change.

What separates future outcomes from the present in this allocation is the rate of return on capital or the discount rate for future net returns. Once a rate is chosen, then capital can be allocated between different possible investments until the marginal return on capital is driven down to the discount rate. Likewise, the discount rate reflects the value of consumption today versus that in the future. Higher discount rates imply that present consumption is valued more than future consumption. Investments that yield immediate benefits tend to get priority as the rate of return rises.

There is wide disagreement among economists on what discount rate to use in evaluating projects. Some argue that the average return on capital is the most appropriate, usually around 7 % as investment today could compensate future generations by this return compounded. Others argue that the anticipated growth rate of an economy, currently about 2–3 % in industrial countries is the appropriate discount rate. Some defend the use of the riskless rate of interest, usually specified as the long-term return on top rated government bonds, currently between 1 and 2 %. Finally some like Stern (2006) argue for an ethical rate of discount, nearer 1 %. A survey of economists conducted by Weitzman (2007) yielded the crowd opinion of a mean discount of 4 %.

The choice of discount rates has minor impact when deciding between investments with short-term payoffs say within 5 years but for investments for longer term outcomes like combatting climate change it is critical as the outcomes are likely 50 to a 100 years off. Selection of a 7 % rate of discount means that to avoid 1000 € damage 50 years from now we should only be willing to invest (sacrifice consumption) today of about 33 €. While using a 1 % would up the investment to 608 €.

The choice of the appropriate rate of discount for evaluating investments to mitigate or adapt to climate change has triggered a wide debate in the literature—almost dividing in parallel to that in politics—between more liberal economists who lean to a lower discount rate that would demand action now to combat climate change to more conservative economists who see no need to choose a lower discount rate than the return on capital and question if action today is justified. Heated debate has lead to doubt on one of the most publicized reports on climate change where Stern (2006) argued that actions today were economic justified even though the damage from climate change may even be decades to a century away. His critics countered that he had put the veil of formal economics over a politically driven conclusion. By choosing a low discount rate, he had assured his conclusion under the guise of adhering to rigorous economics. A higher discount rate would find that action today to combat climate change would be limited or even not justified under current estimates of damage in the future.

Reinforcing the debate for waiting to combat climate change has been real option theory where the option to wait plays an essential role. Under uncertainty, the option to wait demands a higher return to investment before action is triggered. Also higher uncertainty raises the value of the option to wait forcing greater time to pass for more information to accumulate before action is triggered. The combination of a conventional rate of discount and the option to wait would force a delay in action to mitigate and to adapt to climate change. These factors operating in parallel along with the low but finite probability that the science on climate change may be wrong have played strongly into the hands of those who argue that governments should devote few resources and take only limited action against climate change.

3.1 The Appropriate Discount Rate for Climate Change Investments

Much of the debate on the appropriate discount rate for evaluating investments to combat climate change centers on the parameters of the Ramsey equation, which derived from a growth model that optimize intergenerational utility. While this Ramsey Growth model is constrained by very specific assumption (a single decision-maker for example), it is considered the "logical" relationship between the rate of return of capital, the time preference of consumption, the elasticity of consumption and the growth rate of consumption. In other words, the Ramsey equation binds a relationship between the return on capital and macroeconomic parameters such as the savings rate, putting to test whether the variables are "reasonable" or consistent with observation.

Stern in the Review selects very specific values on the Ramsey equation parameters, in particular a 0.1 time preference, meaning that future consumption is nearly equal to present consumption. Then he specifies the long run growth of consumption at 1.3 % and a constant elasticity of consumption to utility. These assumptions

yield a discount rate of 1.4 %. Using this discount rate, Stern Review argues that expenditures today are justified to avoid a 1 % perpetual loss in global GDP due to climate change. It proposes that the choice of a "low," ethical discount rate is justified as appropriate when extinction is a possibility.

Nordhaus (2007) in a blistering attack on the Stern Review argues that the low discount rate is inconsistent with reasonable assumptions on the observed rate of return on capital and the savings rate:

> To a first approximation, the *Review*'s assumptions about time discounting and the consumption elasticity would lead to a doubling of the optimal global net savings rate.

Also the ethical argument is suspect according to Nordhaus:

> Global per capita consumption today is around $10,000. According to the *Review*'s assumptions, this will grow at 1.3 % per year, to around $130,000 in two centuries. Using these numbers, how persuasive is the ethical stance that we have a duty to reduce current consumption by a substantial amount to improve the welfare of the rich future generations?

Even more dramatically, the observed return on capital is about 7 %; in a 100 years, $10,000 invested today would yield nearly nine million dollars. Even if the rate of capital is less, it is clear that future generations will have a higher income perhaps sufficient to compensate for the effects of climate change. Combined with the uncertainty of climate change's effects, critics of action today argue that economies should wait to make the substantial sacrifices of income in combatting climate change or investing in adaptation. But a counter argument is that the effects of climate change could be sudden and dramatic. Action today is justified even if the probability is low of catastrophic climate change effects.

Weitzman (2013) in a later article tackles the discounting problem with the prospect of a catastrophic event sometime in the future where consumption could be driven to zero—the economist's way of characterizing mass human extinction. How much would a current generation pay to avoid such a disaster in perhaps the distant future? Weitzman uses a fat-tailed distribution, that is, a probability distribution where the tails have higher probability than say a normal distribution, which is thin tailed. The fat-tail distribution puts a higher probability on extreme, catastrophic events. His conclusion is nonsensical as he quickly points out—an infinite amount. The obvious solution is to limit the upper bound of present consumption loss for avoiding the catastrophic outcome. But such a bound is arbitrary so it does not get us any farther in asking on how much society should sacrifice to avoid a future loss, that is, what should the discount rate be in evaluating current investment.

Pindyck (2013) in a follow up article argues that even a thin tailed probability distribution could result in a similar conclusion to the fat-tail one. He adds that if marginal utility is bounded then the sacrifice today does not need to be infinite. But then again what is that bound?

Pindyck adds another wrinkle to the problem by arguing that there are other possible catastrophes in the future, including nuclear attack, bioterrorism etc. so even if say a 10 % loss of current GDP was justified by climate change avoidance of other catastrophic events could also demand additional sacrifice of income. How

then with multiple catastrophic events does society determine the relative weight to give to each? As Pyndck writes:

> If catastrophes—climate or otherwise—would each reduce GDP and consumption by a substantial amount, then they cannot be treated individually. Potential non-climate catastrophes will affect the willingness to pay to avert or reduce a climate catastrophe, and affect the economics of "climate insurance."

In another approach, Weitzman tries an intermediate path by defining a risk-adjusted discount rate. He describes two forms of risk—diversifiable risk and non-diversifiable risk. In the former, risk can be reduced by diversifying a portfolio and in the later it cannot.

The basis of this approach to the discount factor is the CAPM approach to asset management where an asset that has a low or negative correlation with the market is considered more valuable. This hedged investment, one whose returns move less in sync or against the market, should have a lower discount rate than the return to equity (capital). If the return of a climate investment is closely correlated with the private returns of the market, then no hedge is implied and the discount rate is closer to the return on capital. If it is a hedge moving in an opposite direction to the market, then it is closer to the risk free rate. Weitzman in a highly stylized model shows that in such a hedge scenario the discount rate should be less than the market return and move down over time.

Critical to how fast the discount rate should move down over time is the Beta with respect to the returns to the broad market. By assuming that investment today in climate mitigation is essentially a hedge against a future event yields an adjustment of the current discount rate and a declining rate over time. For example if Beta is equal to 0.5 and the return on capital is 7 % and the risk free rate is 1 % then the initial rate of a hedged investment should start with a discount rate of 4 %. In 25 years the rate should be 3 % and in 50, 2.3 %.

While acknowledging that no one can specify the exact Beta to use, Weitzman concludes that, over reasonable ranges, Beta is a real and significant pull downward to the discount rate of climate hedged investments.

3.2 An Alternative Approach to Environmental and Longer Term Investments

The debate over the appropriate discount rate is unresolved but critical. Today one can only agree that it should not be too high—near the return on capital—as this rejects the possibility of a low probability but catastrophic events. But then again it should not be too low—near the risk free rate on bonds—as this would weigh the future consumption nearly the same as today's consumption. It is in the intermediate range of say 4 % that as the economists' survey pointed out consensus exists—the Goldilocks consensus. Whether it should diminish over time depends on how diversifiable is the hedge resulting from investment in climate mitigation or

adaptation. Essentially that is the state of the discussion but gets us no closer in evaluating real world investments, especially those that have benefits and costs which extend deep into the future such as investment in climate change mitigation and adaptation. An alternative approach is demanded which steps around the debate on the discount rate and instead appeals to our intuition.

We know that the future is uncertain perhaps deeply uncertain. We also know that investors take actions today that have very uncertain outcomes or may result in possible benefits many years from now. We also know that companies engage in research with uncertain outcomes that may or may not result in development of a product for the market. We also know that society takes actions today to avoid irreversible but uncertain damage in the future. And as argued above, a "reasonable" rate of discount discourages or possible eliminates all these actions.

What perhaps is going on is not that the rate of discount is incorrect, whatever it may be, but that the analysis is incomplete. Most investments are staged or phased in. Land is acquired, a store built in a market, and then more stores are opened if successful. Research is conducted and if promising results are found, a development stage is embarked upon. Countries grow in stages from the movement from agriculture to industry to services. A staged approach is the observed manner by which investment takes place. It is also the prudent approach especially when uncertainty in the future is high.

Furthermore, an investment may be made in a stage where apparently the returns in that stage do not justify the costs unless making that investment captures the option to expand into future returns and that benefit of expansion is weighed in the initial decision to invest. If the future is not viewed solely through the prism of future diminished value, but through the lens of possible future opportunities that can only be potentially realized if the initial investment is made, then apparently unjustified investments could become the norm. If strings of continuing future investment opportunities are envisioned but only can be captured if a string of investments are made, then the "apparent" rate of discount may be less than the rate of discount when these expansion opportunities or options are missed. In fact, it may appear that the corrected rate of discount once future options are taken into account is actually negative. That is the investment should be made as the future is more valuable than the present.

The discount rate applied in any stage is not the issue but how uncertainty and staging investments leads to action now even in the face of "market" interest rates. In other words, for investments in mitigating or adapting to climate change, the issue at hand is not only what is the discount rate applied within a stage but also how does uncertainty and prudently staging investments bring forth future expansion options.

In climate related investments to mitigation or adaptation, returns and costs are highly uncertain even when calibrated against the best of the climate models. Also because of feedback effects, unknowns on sequestration of carbon and future emissions, the mitigation needed to abate climate change is uncertain. Likewise the effects and costs of climate change are also uncertain, particularly in any location. For example how high to build a seawall or a dam cannot be determined

from past data but must be estimated based on models of possible future events. Both mitigation and adaptation require, for efficiency in allocation of capital, a stage approach that allows possible future investments as more information is retrieved from events and more refined projections. But if initial apparently uneconomic first stage investments are not made then the option to avoid more consequential damage is not realized.

The stage approach is embodied in real option theory where investments under uncertainty are staged, potentially proceeding to later stages as more information is accumulated. In this real options approach, the first stage faces the option to wait, which tends to postpone enactment of the investment but also can benefit from an expansion or exit option in a second stage. These later options can expire—have a finite time for taking advantage of the opportunity—as in the case of irreversible environmental damage or have increasing investment costs due to increasing costs in achieving the same benefits.

In the first case of the expiring option, if action is not taken in a timely manner, so much environmental damage is caused that it cannot be reversed. Such a case could be the destruction of biodiversity or a rainforest such as the Amazon. In the second case of increasing investment costs, the damage is reversible but at higher and higher costs over time. In both cases, we can frame the investment choice as a staged and option laden cost benefit analysis that could be discounted at some conventionally agreed discount rate. The two stages are determined by the fact that investment opportunities are sequentially ordered and second stage investment and related benefits are contingent on the first stage investment being undertaken. In other words, adopting the first stage investment produces an uncertain flow of net benefits, evolving over time according to a stochastic process, and, at the same time, empowers the decision maker to adopt, if and when she decides to do so, a second stage investment. This in turn is expected to produce a second round of uncertain net benefits, which also follow a stochastic process, but are ruled by different parameters. The economic attractiveness of the first stage investment depends on an extended net present value ENPV—the expected stream of benefits and costs along with the option to wait and the expansion or second stage option.[1]

We begin with the simplest case where we have a stage investment choice. In the first stage, an uncertain stream of benefits and costs are assumed to follow a geometric Bernoulli random process, where outcomes in the future become more uncertain the more distant in time. For simplicity, we assume that there is no trend component with net benefits randomly distributed around a mean. In other words, the first stage faces only a random process where the future outcomes are more and more uncertain with time but distributed about a constant mean. This process as applied to climate change would mean that the effects are not getting worse but the possible outcomes are more uncertain the farther out we look into the future.

[1] In the Mathematical Appendix to this paper, the detailed assumptions and proofs are presented. In the body of the paper, we will explain the results in graphs.

By itself, the first stage investment decision would be quite demanding in terms of return. The benefit cost ratio would have to be above one by the value of the option to wait, whose value depends on the uncertainty of the process. In other words, the uncertainty of future outcomes would demand prudence before undertaking a first stage investment. This prudence is characterized by the value of waiting for more information.

If however there is the potential for a second stage investment that can only be realized if the first stage is undertaken, the incentive to do the first stage is enhanced. By initiating the first stage investment, the option to do a later investment is realized. The value of this second stage expansion option depends on uncertainty with the higher the uncertainty the more value is this options everything else equal. The investment decision to proceed with the first stage is thereby influenced by the opportunity to acquire this second stage option.

As scientists have argued in IPCCC reports, weather events will in the future become more variable and severe. We model this crudely that the variance of the process when the second stage is applicable will be greater, that is more severe in the second stage. We therefore have a process of investments that is phased between two stages and where the outcomes are more variable in the second stage.

To illustrate refer to Fig. 1 where we have modeled the investment decision for the first stage based upon the variability of outcomes for a second stage and for different mean second stage benefit cost ratios. We also assume that variability exists in the first stage but is less than in the process of outcomes for the second stage. In figure one, we assume for illustration a standard deviation of 30 % for the first stage process.

Along the vertical axis is the benefit-cost ratio necessary to trigger the first stage investment. Note that when there is no uncertainty in the second stage it takes a benefit-cost ratio of 1.5 (rather than 1) to embark on the first stage investment. This "wedge" of a premium of 50 % represents the value of the option to wait. The benefit-cost ratio must overcome this wedge with superior benefits.

As the uncertainty of the second stage process increases (moving out on the horizontal axis), the second stage expansion option begins to counter the waiting option. Depending on the benefit cost ratio of the second stage, the curves crossover the unity benefit cost ratio for the first stage indicating that a benefit-cost ratio of less than one in the first stage can trigger the first stage investment.

The calculations underlying Fig. 1 are for a discount rate of 4 %. The less than one benefit cost ratio for first stage investment demonstrates that for even higher discount rates, first stage investments can be triggered even if the benefit-cost ratio of the second stage is less than one provided that uncertainty in the second stage is significantly high.

In Fig. 1 as just described, the level of uncertainty in the first stage was not related to that of the second stage process. If we relax that assumption—driving a relationship between the two—where the first stage uncertainty increases (non-linearly) with the second stage process, we get Fig. 2.

In this case, the increases in uncertainty of the second stage drives up the value of both the option to wait and the expansion option, requiring a higher level of

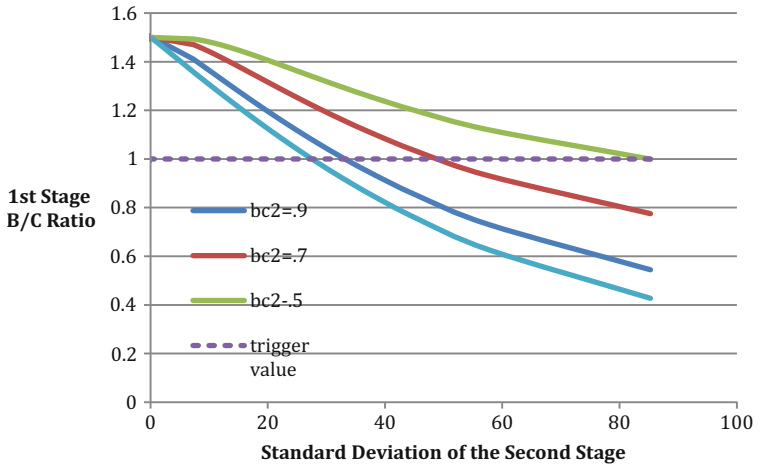

Fig. 1 Effect of second stage uncertainty with option to wait equal investment in stages

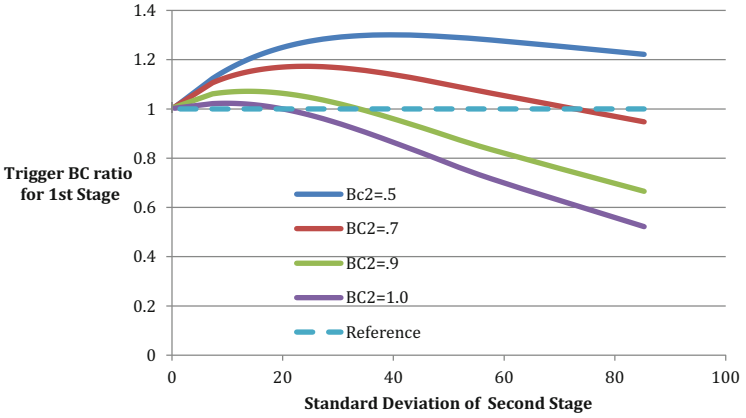

Fig. 2 Trigger for first stage with uncertainty linked

uncertainty in the second stage to drive the benefit cost ratio of the first stage below 1, the certainty trigger value. For benefit cost ratios of near 1 for the second stage, the uncertainty can be relatively low for benefit-cost ratios of the second stage to decline below 1. For low benefit cost ratios in the second stage (B-C = 0.5 in Fig. 1), the uncertainty has to be quite high before the benefit cost ratio is 1 for the first stage. Interestingly even if the benefit cost ratio of the second stage and the first stage is less then one investment in the first stage can be triggered by second stage uncertainty.

This two-stage analysis can be extended to multiple stages as demonstrated in the mathematical appendix with uncertainty in later stages, effectively operating

counter to the discount rate generating an effective discount rate which has uncertainty embedded in it. This uncertainty can be shown to drive the discount rate to very low levels and even cause a cross-over point where the effective discount rate is such that the future becomes more valuable than the present. In other words, with high levels of uncertainty in the future and phased investment, governments should be willing to invest now to acquire future options to tackle climate change. Such a point of view is consistent with common sense, when disaster is possible in a highly uncertain future and where a staged approach to investment can be implemented.

We have demonstrate that perhaps the critical factor in initiating investments today is not just the discount rate, but the uncertainty of the potential benefits of future investments. While uncertainty in a one-stage investment decision plays a delaying role for more information before commitment, the presence of a second stage with higher levels of uncertainty can drive this first stage investment. The critical factor then in deciding to invest today moves beyond consideration mainly of the discount rate, but also must focus on the variability of benefits in the future and how expansion opportunities can be captured by acting now. Strategically phasing investment is not just the common sense way to proceed with the challenge of confronting longer term environmental issues such climate change that are critical to sustainable growth, but is consistent with real option theory.

But critical to this approach is that the investor, whether in government or the private sector, is able to view the future as opportunity to expand to realize uncertain gains or avoid uncertain costs. If the future is viewed as a static replication of the present then the immediate and short-term rate of return will dominate and growth will not be sustainable or will be low. Dynamic, sustainable economies are signified by entrepreneurs and government that view the future as a string of uncertain opportunities, whose potential value override the short-term return on capital. Thus, capital should be allocated among investments according to the equality of marginal return to marginal cost of capital, both extended by the value of future options. In such an economy and with this insight by the public and private sector, ex ante it would appear that investment is too high and too extended to the long term. It would appear that investors are willing to accept a rate of return lower than the immediate short-term investor opportunity.

The issue is how to motivate such a view of the future among investors. How does government help create a dynamic economy where future uncertain value motivates investment? Risk aversion has little to do with it as we have made no assumptions about the appetite for risk—the key is to create expansion opportunities (options) and at the same time to avoid having investment stuck in the short term returns.

Public policy and incentives must be oriented to research and development, the creative engine behind expansion options. It must also discourage short-term investment through tax policy. Such tax policy already exists through much reduced capital gains taxes in the United States but usually the time period for capital gains to be realized are too short (1 year). Also policy must focus on instruments that are tied to the future. For example carbon markets where investors can buy carbon credits that can have long term rising value as the effects of climate change demand

more stringent reductions in carbon emissions. Government can also cause disruptive investments that tear apart static markets with innovations such as in automobiles or telecommunications. The key for government policy is to create dynamism both through pushing returns to the future and by creating new, but uncertain investment opportunities in the future. In its own public investment analysis, government must adopt an imaginative approach which uses real options and creatively values options for expansion in the future putting more value on these options the more uncertain are returns (or avoidance of costs) in the future. Whatever the mechanism what remains true is that the short term return on capital is too high weighing too heavily present returns and not the future where expansion options reside.

4 Inequality and the Rate of Return on Capital

In the previous section, we have argued that the rate of return on capital cannot be high in the short term as it discourages needed investment for the long term, especially when economies are faced by the effects of uncertain but long term environmental consequences such as those driven by climate change. We have supplemented that truism with an additional factor—that in an economy with expansion options the optimal rate of return to maximizing net benefits is lower than the rate of return on capital. How much lower depends on the value of these expansion options, which in turn depends in part on uncertainty. It follows that public policy should encourage an economy where expansion options are abundant and encourage an entrepreneur class motivated to seek these opportunities. But in many economies such conditions do not exist, resulting in a rate of return on capital that is too high, that is above the optimal effective return on capital.

As demonstrated by Piketty, the consequences of this higher rate of return on capital can be increased inequality if the return is higher than the growth rate of the economy and this gap increases over time because growth is falling more than the rate of return. Piketty's argument is that in this case, capital income will grow faster than wage income with a consequent worsening of income distribution. While he predicts a lowering of growth rate, which would converge to a level of about 1 % per year, closer to the long term historical rate, he does not identify any specific mechanism which would determine growth. However, one possible determinant of a lower rate of growth in the future may reside in the deterioration of the environment induced by the present generation tendency to undervalue the future.

One way to explain such a link between Piketty's argument and the undervaluation of the longer term growth options described in the first part of this paper, is a simple economic model.

Start from the Harrod–Domar model, where demand is defined by the Keynesian multiplier:

$$Y = \frac{dK}{s}$$

where Y expected (demand side) income, dK autonomous investment and s marginal propensity to consume.

Supply Q is assumed to be proportional (through the capital output ratio k) to installed capacity K:

$$kQ = K$$

In general, demand will grow at the rate dI/sY where $I = dK$, and supply at the rate $\frac{dQ}{Q} = \frac{dK}{K}$ and equilibrium (Y = Q) will be achieved only under the so called warranted rate of growth $g = \frac{dK}{K} = \frac{s}{k}$. This equilibrium can be achieved by chance (but it would be unstable) or, in a stable way, if one of the two parameters, i.e., either the saving rate or the capital output ratio can adjust. The Kaldor–Pasinetti solution consists in using the (functional) income distribution as a way to change the marginal propensity to save, while Solow's solution uses the flexibility of the capital output ratio in a neoclassical production function.

Piketty's case can be seen as a yet another way to explain how a stable g can be achieved. The inverse of the capital output ratio 1/k, in fact, can be interpreted as $Q/K = (P + W)/K = g/s = 1/k$, where P and W are respectively income from profits and from wages. Thus, in order to achieve equilibrium, return on capital, $\rho = \frac{g}{s} - \frac{W}{K} \rightarrow \rho = \frac{g}{s} - \frac{(1-\alpha)}{k} = \frac{\alpha}{k}$, so that capital's income share must be $\alpha = 1 - \left(\frac{g}{s} - \rho\right)k$ and must adjust downward the higher is the (warranted) growth rate, the lower the propensity to save and the lower the rate of return to capital. In Piketty's analysis this rate is assumed to be determined according to Ramsey neoclassical formulation as: $\rho = \phi + \eta g^*$, where ϕ is the pure rate of time preference, η is a measure of the convexity of the representative agent utility function, and g^* is the expected growth rate, which would coincide with Solow "optimal" rate if equated to the marginal productivity of capital. This rate will be overestimated if the rate of discount used to select investment projects does not consider the value of future expansion options. If $g^* = g$ and $k = k^*$ to achieve equality between the warranted and the expected rate, this will imply $g^* = \frac{s}{(1-s\eta)}\left[\phi + \frac{(1-\alpha)}{k^*}\right]$ but, with the environmental effects of project choices neglected, by systematically disregarding the project expansion /growth options, effective growth will fall short of the predicted (and the optimal one). As a consequence, realized growth g^{**} will be less than expected: $g^{**} < g^*$ i.e., $g^{**} = g^* - e$, where e is the reduction in growth as a consequence of the systematic over-estimate of growth, so that realized growth will be: $g^{**} = \frac{s}{(1-s\eta)}\left[\phi + \frac{(1-\alpha)}{k^*}\right] - e = \frac{s}{(1-s\eta)}\left[\phi + \frac{(1-\alpha)}{k^{**}}\right]$, where k^{**} is the capital output ratio which ensures equilibrium at the realized rate of growth. Because effective growth is lowered by the use of a larger than optimal discount rate, project selection will be less efficient, capital accumulation will be lower, but the capital output ratio

(and the marginal productivity of capital in a production function setting) will be higher. As a consequence, the rate of return to capital will be higher seemingly validating the discount rate used. Thus, through an overvalued discount rate, an undervaluation of the future will reverberate in a lower realized growth rate and essentially create a vicious circle of increasing inequality, deteriorating environment and decreasing growth. Note that this undervaluation e will be greater the higher is uncertainty as future expansion options will be more valuable.

In an economy with expansion options, we have thus found that the rate of return needs to be adjusted downward by a factor closely related to the value of these options. The key to growth is not only a lower rate of return on capital but the continuing string of expansion opportunities. While the resulting growth rate may or may not be higher than the effective rate of return on capital when adjusted for future expansion options, in a dynamic economy with many opportunities for expansion, growth will be higher. Since such a dynamic economy demands a lower return on capital, the spread between return on capital and growth should be less and therefore inequality be less.

5 Conclusions

We have argued that sustainable growth is critically linked to appropriately valuing the future and to reversing the tendency to increase inequality as demonstrated by Piketty. To achieve these elements of sustainable growth a lower rate of return on capital is required, along with investors motivated by expansion opportunities. An economy characterized by the dynamic creation of expansion opportunities results in an effectively optimal discount rate lower than the rate of return on capital. While such an economy would see investment expand to this lower discount rate, it is also likely that growth would be higher. While it cannot be shown that this growth would exceed the rate of return on capital and thus result in lower inequality, we can argue that the return on capital would be more closely aligned with the growth rate. Ideally if growth still exceed the options adjusted return on capital, public policy should intervene to bring about more equality or at least halt the slide into increasing inequality.

Mathematical Appendix

We assume that the effects of mitigation and adaptation policies may be decomposed into two distinct and independent components, both following a geometric Brownian motion:

$$dy_i = \alpha_i y_i dt + \sigma_i y_i dZ_i \quad i = 1, 2 \tag{1}$$

where dy_i is the stochastic increase in value created by investment in each period of each stage, dZ_i is random variable with mean $EdZ_i = 0$ and variance $E(dZ_i)^2 = dt$. The α_i represents the drift or trend term and σ_i the (instantaneous) standard deviation of y_i. The α_i represents the general trend in growth that may take place. It will be greater than zero for technological change or any other condition that may improve the prospect of growth and zero or negative otherwise. The σ_i is the standard deviation parameter measuring the instant variability of this growth as the economy is subject to various random shocks with the uncertainty of outcomes when viewed from the present becoming more uncertain the further in the future. With reference to climate change, the process underlying the first stage can be taken to represent the current phase, dominated by the primary effects of C02 accumulation, and thus by the benefits that would ensue from appropriate **mitigation policies**. The process underlying the second stage, on the other hand, upon appropriate investment is undertaken, would enable benefits to be released from both **imitation** and **adaptation** investment policies.

Undertaking investment I_1 immediately would produce an expected stream y_1 of benefits from mitigation and also secure the option to adopt investment I_2, which would in turn give access to a stream of benefits y_2 from stage 2, characterized by further mitigation as well as adaptation. Expected benefits for stage 1 (mitigation) are thus assumed to be the consequence of a known investment level I_1 for the same stage. Expected benefits for stage 2 (adaptation & mitigation), on the other hand, are also assumed to be the consequence of given investment costs, which are also known with certainty, but increase with the time of adoption at a fixed rate g, i.e., $I_2 = I_0 e^{gt}$. Thus, in each stage, the effect of a known level of investment is stochastic and its expected impact per time period equals y_i, but the second stage effect per unit of investment varies with uncertainty because the size of the investment required to produce a given level of benefits increases over time.

At the status quo, the decision maker is holding an option—the option to commit the first stage (mitigation) investment costs. Once this first stage is exercised, a new options is created to proceed to further stages of mitigation and adaptation. More specifically, we may represent the decision problem at each of the two stages as follows. In stage 2, since the option has been obtained by entering stage 1 at time τ_1, the decision maker seeks to solve the problem to gain the greatest possible expected value of her payoff:

$$V(y_2) = \sup E_y \left[\left(\int_{\tau_2}^{\infty} \left(e^{-\rho(s-\tau_2)} y_s - I_0 e^{g(s-\tau_2)} \right) ds \right) \right] \tag{2}$$

where g is a positive rate of growth and τ_2 the (stochastic) time at which the option to adapt will be exercised. Expression (4a, 4b) indicates that the costs of investing in

the second stage adaptation will be higher the farther in time is the moment at which they will be incurred.

For stage 1, on the other hand, the decision maker solves the problem to gain the greatest possible expected value of her payoff, conditioned to the future solution of stage 2:

$$V(y_1) = \sup E_y \left[e^{-\rho\tau_1} \left(\int_{\tau_1}^{\infty} e^{-\rho(s-\tau_1)} y_s ds - I_1 + V(y_2) \right) \right] \tag{3a}$$

where I_1 denotes first stage investment costs and τ_1 is the (stochastic) time at which the first stage mitigation option is exercised.

Assuming that the dynamics of the risk contained in the cash flow, dz, can be replicated by existing assets, both options in the two stages can be evaluated by applying contingent claim evaluation. As Dixit and Pindyck (1994, pp. 122–123) show, this evaluation problem has a state dependent solution, contingent on whether the value of the stochastic variable (the cash flow y_t) is above or below a critical threshold of investment adoption ($y_{ip}, i = 1, 2$)[2]:

$$V(y_2) = \frac{y_2}{\delta_2} e^{-\delta_2\tau_1} - I_0 e^{(g-\delta_2)\tau_1} \quad \text{if} \quad y_2 \geq y_{2p} \tag{3b}$$

$$V(y_2) = \left(\frac{y_2}{y_{2p}} \right)^{\beta_2} \left[\frac{y_{2p}}{\delta_2} e^{-\delta_2\tau_1} - I_0 e^{(g-\delta_2)\tau_1} \right] \quad \text{if} \quad y_2 < y_{2p} \tag{3c}$$

and

$$V(y_1) = \frac{y_1}{\delta_1} - I_1 + V(y_2) \quad \text{if} \quad y_1 \geq y_{1p} \tag{4a}$$

$$V(y_1) = \left(\frac{y_1}{y_{1p}} \right)^{\beta_1} \left[\frac{y_{1p}}{\delta_1} - I_1 + V(y_2) \right] \quad \text{if} \quad y_1 < y_{1p} \tag{4b}$$

In (3a) and (4a, 4b) β_i (i = 1, 2) is the positive root of the characteristic equation (Dixit and Pindyck 1994, p):

$$r - \beta_i \alpha_i - \frac{\beta_i}{2}(\beta_i - 1)\sigma_i^2 = 0 \tag{5}$$

[2] Assuming dy_t/y_t normally distributed implies y_t log normally distributed. Given this assumption $E(y_t) = ye^t$, that discounted at rate r gives $\int_{\Omega}\int_{0}^{\infty} y_t e^{-rs} ds d\omega = \int_{0}^{\infty} ye^{-(r-\alpha)s} ds = y/(r-\alpha)$ with $r < \rho$. See Dixit and Pindyck (1994, p. 71).

r being an appropriate rate of discount that represents the cost of delaying the investment.[3]

Note that the instantaneous variance of the process ${\sigma_i}^2$ increases monotonically as β_i decreases, it is equal to $r - 2\alpha_i$ at $\beta_i = 2$, and it goes to infinity as $\beta_i \to 1$. We characterize the area for $1 < \beta_i \leq 2$, with variance approaching infinity as β_i approaches 1, as a situation of "deep uncertainty".

In order to find the values of the thresholds y_{ip}, $i = 1, 2$ We first evaluate the value of the second stage option $V(y_2)$, which can be expressed (Dixit and Pindyck 1994 p. 122) as: $A_2 {y_2}^{\beta_2}$, by using the optimal stopping conditions (in this case they indicate the optimal stopping of the process of waiting before committing to the new phase). These conditions imply that optimal switching from waiting to adoption occurs the first time the value hits the boundary of the continuation region. This requires in turn that the following conditions are satisfied at the switching point y_{2p}:

Value Matching:

$$A_2 {y_2}^{\beta_2} = \frac{y_2}{\delta_2} - I_0 e^{g\tau_2} \tag{6}$$

Smooth Pasting:

$$\beta_2 A_2 {y_2}^{\beta_2 - 1} = \frac{1}{\delta_2} \tag{7}$$

In (6) and (7), as we have already specified, y_2 is the expected value of the value flow from the decision to invest in adaptation, I_2 is the investment outlay of the second stage, $\delta_2 = r - \alpha_2$, where r is the risk free interest rate (or any other appropriate rate of discount), and A_2 and β_2 two parameters that can be determined, respectively, solving the system (6) and (7) and applying Ito's lemma (Dixit and Pindyck, op. cit. p. 4). In expression (6), the LHS represents the option to undertake a subsequent phase of adjustment to climate change, which is non zero, and dominates the NPV on the RHS in the so called continuation region, i.e., for the values of expected benefits y_2, for which it is not worth undertaking the project. Once the adaptation phase is undertaken, on the other hand, the option is no more alive, and its value is zero. We may capture this behavior by defining the so called extended NPV or NPVE as:

$$NPVE(2) = NPV(2) - A_2 y_2^{\beta_2} \tag{8}$$

where $NPV(2) = \frac{y_2}{\delta_2} - I_2$ is the expected net present value of entering the adaptation phase. Note that for the adaptation phase, with a positive value of the option to wait,

[3] According to CAPM, the opportunity cost of capital of any investment can be determined as: $r = \rho + \vartheta r_M$, where ρ is the risk free interest rate, and ϑ the regression coefficient of the rate of return of the investment considered and the average market return r_M.

the NPVE may only be lower than NPV. Moreover, if the value of the option to wait prevails over the expected net present value, the NPVE will be negative, indicating that it would be better to defer the investment.

Proposition 1 For a two stage strategy, entry in the first stage is more attractive the higher the uncertainty of the second stage.

Proof Substituting (6) into (5) and solving for y_2, we obtain the value of the optimum switching point y_{2p}, i.e., the minimum present value of expected income necessary to prompt the entry into the development phase:

$$\frac{y_{2p}}{\delta_2} = \frac{\beta_2}{\beta_2 - 1} I_2 \tag{9}$$

and, by substituting into the option expression $A_2 y_2^{\beta_2}$, we obtain the expression for the constant:

$$A_2 = \frac{1}{\delta_2 \beta_2} \left[\frac{\beta_2}{\beta_2 - 1} I_2 \delta_2 \right]^{1-\beta_2} \tag{10}$$

Equation (9) states that at the optimum entry point, the discounted value of y_{2p} must exceed the investment costs by a factor of $\beta_2/(1-\beta_2)$ or the uncertainty 'wedge'. From the characteristic Eq. (5), it can be shown that β_2 is negatively related to σ_2: as uncertainty increases the 'wedge' also becomes larger, requiring a larger value of y_2 before the development phase is undertaken.

For the entry in the first stage, on the other hand, we have to consider the value matching condition given by the equality between the option to adopt the strategy under consideration and the difference between the option to go into the second stage and the investment in the first phase:

$$A_1 y_1^{\beta_1} = \frac{y_1}{\delta_1} - I_1 + A_2 y_2^{\beta_2} \tag{11}$$

In other words, the value of the option to enter the first stage (mainly mitigation) will equal expected net income from this stage minus the investment costs needed to enter plus the value of the option to enter the second stage (mainly adaptation).

The smooth pasting condition correspondent to the value matching in (11) is the following:

$$\beta_1 A_1 y^{\beta_1 - 1} = \frac{1}{\delta_1} \tag{12}$$

and, by substituting (10) and (12) into (11), we obtain the expression for the entry point y_{1p} of the mitigation phase:

$$\frac{V_{1p}}{\delta_1} = \frac{\beta_1}{\beta_1 - 1}\left[I_1 - \frac{1}{\delta_2\beta_2}\left[\frac{\beta_2}{\beta_2 - 1}I_2\delta_2\right]^{1-\beta_2} y_2^{\beta_2}\right] \tag{13}$$

Since $\beta_2 \geq 1$, the value of the option to proceed to the second phase effectively consists of two components: (i) a benefit component, given by the value of the stochastic variable yielding the benefits of phase two should the corresponding option be exercised and, (ii) a cost component, given by the cost of exercising the option. A condition of deep uncertainty may be characterized by uncertainty on the value of β_2. Note, however, that while this value may range from one to infinity, the corresponding range of expression (13) is:

$$\begin{aligned} &\lim_{\beta_2 \to 1} \frac{y_{1p}}{\delta_1} = \frac{\beta_1}{\beta_1 - 1}\left(I_1 - \frac{y_2}{\delta_2}\right) \text{ and} \\ &\lim_{\beta_2 \to \infty} \frac{y_{1p}}{\delta_1} = \frac{\beta_1}{\beta_1 - 1}I_1 \end{aligned} \tag{14}$$

Proposition 2 The larger the investment costs anticipated for the second stage, and the greater their rate of increase over time, the more attractive will be immediate entry in the first stage.

Proof For $y_2 < y_{2p}$, we can interpret the result in (13) by writing the entry condition as:

$$\frac{y_{1p}}{\delta_1} = \frac{\beta_1}{\beta_1 - 1}\left[I_1 - Ee^{-r\tau_2}A_2 y_{2p}^{\beta_2}\right] = \frac{\beta_1}{\beta_1 - 1}\left[I_1 - Ee^{-r\tau_2}\frac{I_2}{\beta_2 - 1}\right] \tag{15}$$

where $Ee^{-r\tau_2}$ discounts at the present the option value at the expected time to entry into the adaptation stage. For any value of y_2, the following equality holds:

$$A_2 y_2^{\beta_2} = Ee^{-r\tau_2}A_2 y_{2p}^{\beta_2} = Ee^{-r\tau_2}\left(y_{2p} - I_2\right) = Ee^{-r\tau_2}\frac{I_2}{\beta_2 - 1} \tag{16}$$

i.e., the value of the adaptation option at any time equals its expected discounted value at exercise time. From this equality, solving for the expected discount factor, we obtain:

$$Ee^{-r\tau_2} = \left(\frac{y_2}{y_{2p}}\right)^{\beta_2} \tag{17}$$

Because $A_2 y_{2p}^{\beta_2} = \frac{y_{2p}}{\beta_2\delta_2}$ by the smooth pasting condition and $y_{2p} = \frac{\beta_2\delta_2}{\beta_2 - 1}I_0 e^{gt}$, substituting into (13) we find:

$$\frac{y_{1p}}{\delta_1} = \frac{\beta_1}{\beta_1 - 1}\left[I_1 - \left(\frac{\beta_2\delta_2}{\beta_2 - 1}I_2\right)^{1-\beta_2}\frac{y_2^{\beta_2}}{\delta_2\beta_2}\right] = \frac{\beta_1}{\beta_1 - 1}\left[I_1 - \left(\frac{v_2(\beta_2 - 1)}{\beta_2}\right)^{\beta_2}\left(\frac{\beta_2\delta_2 I_2}{\beta_2 - 1}\right)\right] \tag{18}$$

where $v_2 = y_2/\delta_2 I_2$ is the benefit cost ratio of stage two investment, i.e., the expected net present value of net benefits from entering the adaptation phase divided by the correspondent value of investment costs. Expression (18) shows that, for any given value of the benefit cost ratio and of uncertainty, the entry point is *lower* the *higher* the exercise price (i.e., the investment costs) of the adaptation option. If the benefit—cost ratio of the action to undertake in the long run is greater than one, in particular, the perspective of larger investment to undertake in the future will also reduce the immediate entry point and may even cause it to become negative.

Because $A_2 y_2^{\beta_2} = Ee^{-r\tau_2}\frac{y_{2p}}{\delta_2\beta_2}$, and we can write (16) as follows:

$$\frac{y_{1p}}{\delta_1} = \frac{\beta_1}{\beta_1 - 1}\left[I_1 - \frac{Ee^{(g-r)\tau_2}I_0}{(\beta_2 - 1)}\right] \tag{19}$$

Proposition 3 The higher the uncertainty associated with the second stage, the more attractive will be immediate entry in the first stage.

Proof From (16) and (17), we derive:

$$A_2 y_2^{\beta_2} = Ee^{-r\tau_2}\frac{I_2}{\beta_2 - 1} = \left(\frac{y_2}{y_{2p}}\right)^{\beta_2}\frac{I_2}{\beta_2 - 1} \tag{20}$$

Differentiating with respect to $\beta_2(\sigma_2)$, we obtain:

$$\frac{\partial\left(A_2 y_2^{\beta_2}\right)}{\partial\beta_2} = \left(\frac{y_2}{y_{2p}}\right)^{\beta_2}\frac{I_2}{(\beta_2 - 1)^2}\left[\left(\frac{y_2}{y_{2p}}\right)\log\left(\frac{y_2}{y_{2p}}\right) - 1\right] \tag{21}$$

This derivative is less than zero for $\frac{y_2}{y_{2p}} < 1$, i.e., for all values of second stage pay off that all below the threshold to exercise the second stage investment option. As a consequence, a decrease in the value of β_2, corresponding to an increase in the variance σ_2 and in the second stage volatility will increase the value of the adaptation option in Eq. (18), reducing, in turn, the threshold value of the first stage (mitigation option) y_{1p}. Note that, even though, an increase in uncertainty tends to increase the waiting time before the second stage option is exercised, thus reducing its value in proportion to the discount factor $Ee^{-r\tau_2}$, this effect is always overcome by the increase in the expected value of the payoff : $\frac{I_2}{\beta_2 - 1}$ at the exercise point.

Proposition 4 If the cost of second stage investment increases over time at a rate higher than the discount rate, an increase in the second stage uncertainty will make more attractive to invest earlier in both mitigation and adaptation.

Proof The second term in square parenthesis on the right hand side of (19) and (20) is the expected net present value from implementing the second stage adaptation/mitigation strategy, as it is given by the product of the expected discount factor $E\,e^{-r\tau_2}$ (which equals 1 at the time of the exercise of the second stage option) by the net benefit $\frac{y_{2p}}{\delta_2} - I_2 = \frac{I_0 e^{gt_d}}{\beta_2 - 1}$. Thus, if $g > r$, the higher the rate g at which the second stage investment costs increase with time, the lower the return required to adopt the first stage investment in mitigation. Note that two different effects will characterize the second stage option: on one hand, a higher basic investment required in the second stage will imply a lower threshold cost for adaptation, thus making less attractive this prospect. In expressions (19), this effect manifests itself as a lengthening of the expected time of exercise of the adaptation option, which reduces the expected benefit of acquiring it through first stage mitigation. On the other hand, if delaying adaptation makes its costs grow over time at a rate greater than the discount rate, i.e., $g > r$, the expected benefits from acquiring the adaptation option will increase with a reduction in the investment in mitigation and this effect will tend to dominate, the greater the difference $g - r$. As we have seen above, the expected discount factor depends on the benefit cost ratio and, for any given level of this ratio, investment costs simply measure project size. If the extended NPV from the long term, and more highly uncertain adaptation stage, exceeds the value of the investment in the first stage, in particular, expression (19) indicates that it may be worth entering the project even with zero or negative net benefit prospects in the first stage.

Proposition 5 The higher the uncertainty associated with the second stage, the greater will be the extended net present value (ENPV) of engaging in (first stage) mitigation.

Proof The ENPV can be defined as the expected NPV plus the options created and minus the options destroyed. In our case, the value of the option created is given by (20), while the value of the option that would be destroyed by immediate investment in mitigation is:

$$A_1 y_1^{\beta_1} = E e^{-r\tau_1}\left(\frac{y_{1p}}{\delta_1} - I_1\right) = E e^{-r\tau_1}\left\{\frac{1}{\beta_1 - 1}\left[I_1 - \frac{\beta_1 E e^{(g-r)\tau_2} I_0}{(\beta_2 - 1)}\right]\right\} \tag{22}$$

Thus, the ENPV of the first stage is:

$$ENPV_1 = \frac{y_1}{\delta_1} - I_1 - E e^{-r\tau_1}\left\{\frac{1}{\beta_1 - 1}\left[I_1 - \frac{\beta_1 E e^{-r\tau_2} I_2}{(\beta_2 - 1)}\right]\right\} + E e^{-r\tau_2}\frac{I_2}{\beta_2 - 1} \tag{23}$$

We have already seen that the value of the second stage option increases with uncertainty. This directly creates option value in the ENPV and reduces the option

value destroyed by first stage entry, since it makes the value of the first stage waiting option (the term in parenthesis) decline with an increase in uncertainty.

Proposition 6 A sufficient condition for the existence of a finite threshold of adoption at any one time in the case of an infinite sequence of options is that uncertainty is sufficiently large.

Proof Assuming an infinite sequence of options, from Eqs. (18) and (19), by using mathematical induction, we can write the recursive form:

$$\frac{y_{tp}}{\delta_t} = \frac{\beta_t}{\beta_t - 1}\left[I_t - \left(\frac{Ee^{-r\tau_{t+1}}}{\beta_{t+1} - 1}\right)\left(\frac{y_{t+1.p}}{\delta_{t+1}\beta_{t+1}}\right)\right] \tag{24}$$

where in analogy to the notation used so far, t denotes the stage of the process and the suffix τ_t the time of entry in the option of stage t. Expression (24) suggests that in the case of a sequence of options, consideration of the next development option should, in some sense, "suffice" to calculate the entry point at each stage.

Substituting the explicit value of the option at each stage, expression (24) implies[4]:

$$\begin{aligned}\frac{y_{tp}}{\delta_t} &= \frac{\beta_t}{\beta_t - 1}\left[I_t - \sum_{i=1}^{T-t}(-1)^{i+1}\frac{Ee^{-r\tau_{t+i}}I_{t+i}}{\prod_k^i(\beta_{t+k} - 1)}\right] \\ &= \beta_t\left[E\sum_{i=0}^{T-t}(-1)^i\exp\left[-\left(r\tau_{t+i} + \sum_{k=0}^{i}\log(\beta_{t+k} - 1)\right]I_{t+i}\right]\right.\end{aligned} \tag{25}$$

where the alternant signs are due to the fact that in each stage the waiting option is a cost, while the forward (expansion) option is a benefit. In order to prove proposition 6, we investigate the properties of the series in (18) for $T \to \infty$. According to the Leibnitz criterion, a series with alternating signs $\langle a_\tau \rangle, \tau = 1, 2, 3, ...T$ *absolutely converges* if and only if $a_\tau \geq a_{\tau+1}$ (i.e., its terms decline monotonically as the series progresses) and $a_T \to 0$ as $T \to \infty$ (i.e., its terms tend to zero as the series becomes arbitrarily large). These two conditions will be satisfied for the series in (18), provided that

[4] The full expression for T periods is:

$$\frac{y_{1p}}{\delta_1} = \frac{\beta_1}{\beta_1 - 1}\left[I_1 - \left(\frac{\beta_2\delta_2}{\beta_2 - 1}\left(I_2 - \left(\frac{\beta_3\delta_3}{\beta_3 - 1}\left(I_3 - \ldots\ldots\frac{\beta_T\delta_T}{\beta_T - 1}I_T.\right)^{1-\beta_T}\right)\frac{y_T^{\beta_T}}{\delta_T\beta_T}\right)^{1-\beta_{T-1}}\ldots\ldots\ldots\right)^{1-\beta_2}\frac{V_2^{\beta_2}}{\delta_2\beta_2}\right]$$

$$\frac{Ee^{-r\tau_{\tau+i-1}}\left(Ee^{-r(\tau_{\tau+i}-\tau_{\tau+i-1})}I_{t+i}-(\beta_{t+i}-1)I_{t+i-1}\right)}{\prod_{k}^{i}(\beta_{t+k}-1)}\leq 0 \tag{26}$$

and

$$\exp\left[-\sum_{k=0}^{i}\left(r\tau_{\tau+k}+\log(\beta_{t+k}-1)\right)\right]I_{t+i}\to 0 \text{ as } i\to\propto \tag{27}$$

Expression (27) implies:

$$\frac{Ee^{-r(\tau_{t+i}-\tau_{t+i-1})}I_{t+i}}{(\beta_{t+i}-1)}\leq I_{t+i-1} \text{ for. } i=1.2.... \tag{28}$$

Indicating with g_{t+i} the rate of growth of investment between t + i−1 and t + I, condition (28) can be expressed as follows:

$$Ee^{(g_{t+1-i}-r)(\tau_{t+i}-\tau_{t+i-1})}\leq \beta_{t+i}-1 \tag{29}$$

which in turn implies:

$$r\geq g_{t+1-i}\frac{\log(\beta_{t+i}-1)}{\tau_{t+i}-\tau_{t+i-1}} \tag{30}$$

Note that the logarithm on the RHS of expression (20) will be zero or negative when forward uncertainty (i.e., uncertainty characterizing the option to be exercised in the future) is sufficiently large or $\beta_{t+i}\leq 2$. In this case, the series in (25) will always converge, if the discount rate is positive and could converge also if it were negative, provided that its absolute value were not too large.

Proposition 7 In the case of a finite sequence of options, both increase in uncertainty and investment costs will increase the value of the future reducing or even reversing the effects of the discount rate. In the case of an infinite sequence, the threshold will depend only on current estimates of uncertainty and investment costs.

Proof Consider the specific value of the limit of the series in expression (25). To determine it in the special case of continuity, note that we can write (25) in the equivalent form:

$$\frac{y_{tp}}{\delta_t} = \frac{\beta_t}{\beta_t - 1}\left[I_t - E\sum_{i=1}^{T-t}\left(\exp\left[-\left(r\tau_{t+i} + \sum_{k=1}^{i}\log\left(\beta_{t+k} - 1\right)\right]I_{t+i}\right.\right.\right.$$
$$\left.\left.\left.-\exp\left[-\left(r\tau_{t+i-1} + \sum_{k=1}^{i-1}\log\left(\beta_{t+k} - 1\right)\right)\right]I_{t+i-1}\right)\right. \tag{31}$$

If the stages of growth are sufficiently close to another (i.e., if the waiting time before exercising each subsequent option is arbitrarily small), expression (31) can be written, for $t = 0$, in the time continuous form:

$$\frac{y_{tp}}{\delta_t} = \frac{\beta(t)}{\beta(t) - 1}I(t)\left[1 - E\int_t^T de^{-\int_0^t (r - g(u) - h(u))du}\right] \tag{32}$$

In (31) $I_t \to I(t) = I(t)e^{g(t)}$, $(\beta_t - 1) \to (\beta(t) - 1) = (\beta(t) - 1)e^{-h(t)}$, where $g(t)$ is the rate of growth of investment and $h(t) = -\log(\beta(t) - 1)$ a measure of the rate of increase of uncertainty so that $\prod_{k=t}^{T}\frac{1}{(\beta_k - 1)} = e^{-\int_t^T \log\left(\beta_{t+k} - 1\right)du} = e^{-\int_t^T h(u)du}$, in the continuum. Solving the integral on the RHS of (31), we find:

$$\frac{y_{tp}}{\delta_t} = \frac{\beta(t)}{\beta(t) - 1}I(t)\left[1 - Ee^{-\int_t^T (r - h(u) - g(u))du}\right] \to \frac{\beta(t)}{\beta(t) - 1}I(t) \text{ as } T \to \propto \tag{33}$$

If $r - h(u) \geq g(u)$

Thus, in general, as shown in the table below, the degree of increase in uncertainty over time will reduce or may even overwhelm the rate of discount in valuing the future. However, in the case of an infinite sequence of options, convergence is insured only if the rate of discount, corrected for the increase in uncertainty, is less than the rate of growth of investment and in this case, only the waiting option matters.

$r > g + h$		$r < g + h$		$r = g + h$	
Infinite sequence	Finite sequence	Infinite sequence	Finite sequence	Infinite sequence	Finite sequence
Only next option matters	Uncertainty and investment growth reduce discounting effect	Only waiting option matters	Discounting is reversed	Only waiting option matters	Only waiting option matters

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Fault Lines in the International Monetary System: Risks for Economic Recovery and Sustainable Growth

Fabrizio Saccomanni

Abstract This paper explores the causes of the tensions that are affecting the international monetary system, in the current situation of the world economy. International monetary spillovers, financial cycles and exchange rate disturbances are posing policy challenges that have been addressed with divergent strategies by the main industrial and emerging countries. There is the risk that this generates trade protectionism and fragmentation with negative implication for world economic growth.

1 Introduction

In this paper I will review the current policy debate on the working of the international monetary system (IMS). My analysis would follow the lines that Tommaso Padoa-Schioppa and I indicated 20 years ago in a paper we wrote to celebrate the 50th anniversary of Bretton Woods (Padoa-Schioppa and Saccomanni 1994). We argued that the Bretton Woods system had gradually been replaced by a "market-led international monetary system" in which global financial markets determined the creation and the distribution of international liquidity and the level of exchange rates. We believed that it was essential for national and international monetary authorities to fully understand the unwritten rules and conventions of the market-led system in order to ensure the stability of the world economy. In subsequent work (Saccomanni 2008), I concluded that a key factor in the recurrent bouts of international financial instability had been the interaction between the monetary policies (both current and expected) of the major advanced countries and the working of global financial markets. Moreover, I argued that a central role in determining the intensity and the implications of this interaction had been played by the behaviour of exchange rates of these same countries. In this conceptual framework, monetary spillovers, financial cycles and exchange rate disturbances, issues

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that dominate the current policy debate, are in fact steps of a sequence that has become by now a standard feature of episodes of financial instability. In the end, I will review what are the implications for policy-makers, both at national and international levels, of this state of affairs, which is clearly sub-optimal from an economic, social and, eventually, political point of view.

2 Monetary Spillovers

In its 84th Annual Report last year the BIS forcefully made the point that international financial markets have been "under the spell of monetary policy" showing a keen sensitivity to the impact of monetary policies, actual or expected. It did not used to be that way. There were indeed many episodes in the past in which markets where taken by surprise, most famously in 1994, when the unexpected increase in the policy interest rate by the Federal Reserve led to the collapse of the market for government and corporate bonds world-wide, paving the way for the "Tequila crisis" in Mexico. The current spell originates from the conventional and unconventional monetary policies adopted by the major advanced economies since 2008. Policy rates have remained at very low levels for an unprecedentedly long time; long-term interest rates have fallen to historical lows; credit spreads have been compressed across asset classes, including Emerging Market Economies' (EME) debt securities and high yield corporate bonds. This has led to a dramatic increase in global liquidity and, in the context of uncertain growth prospects for advanced economies, to large capital inflows to EMEs. The composition of these flows has seen a decline in bank lending and an increase in portfolio flows, which tend to be more volatile. Especially for countries with relatively underdeveloped and shallow financial markets, large capital inflows may feed credit and asset price bubbles. Moreover, by causing the exchange rate to appreciate, inflows may create external imbalances. Contrasting the impact of such inflows may be costly and not necessarily effective. However these trends can be quickly reversed if markets become convinced that a change in the monetary policy stance of major countries is imminent.

It is in this context that the so-called "taper tantrum" developed in May–June 2013, at a first hint that the Fed's stance might become less accommodating with economic recovery taking hold in the United States. Tensions in financial and foreign exchange markets of EMEs were very acute, but did not last for long. The fears that an actual tightening of the US monetary policy would have a significant impact on a global scale have so far turned out to be exaggerated. Bond yields in the US have gradually declined back almost to the levels recorded before the tantrum, in spite of the fact that in the meantime the Fed's tapering has been completed. Several factors may have played a role in moderating market reactions: a more effective communication by the Fed regarding the gradual process of terminating the QE and the need to be patient about the possible increase of the Federal funds rate; a market perception that the global equilibrium level of interest rates had

declined given the prospects for slower growth in Europe, Japan and in EMEs; the expectation of offsetting QE strategies in Japan and in the Eurozone.

Does this mean that there is no reason to worry anymore about the risk of monetary spillovers? I think that such conclusion would be premature. The global scenario is characterized by a high degree of uncertainty regarding the economic situation and policy stance in key areas of the world, which is reflected in a high volatility in financial and currency markets. Among the main factors, the following are cause for concern: the slowdown of economic activity in EMEs, which is highlighting persistent structural weaknesses and imbalances; the rapid fall in oil and commodity prices and the consequent deterioration of the external position of exporting countries; different expectations about the actual impact of the recent QE initiatives in the Eurozone and the future shape of further QQE program in Japan. Moreover, the decline in US bond yields could mean that either the markets are currently underestimating the Fed's future policy tightening, or that term premia have moved back into negative territory; in either case, an abrupt market correction cannot be excluded. In these circumstances, a clear sign of change in the Fed's stance may trigger a reassessment of investors' strategies. If these changes are abrupt, the resulting asset price and exchange rate corrections in specific emerging markets could induce a generalised risk aversion and have broader contagion effects.

3 Financial Cycles (i.e., Boom & Bust)

A monetary spillover could also be at the root of a financial cycle. The issue has been fully analysed by the BIS both in its last Annual Report and in various contributions by its economists, under the leadership of Hyun Song Shin and Claudio Borio. I think it is useful in this connection to recall the BIS definition of a national financial cycle as "the self-reinforcing interactions between perceptions of value and risk, risk-taking and financing constraints which translate into financial booms and busts". The concept sounds a bit abstract but the BIS has developed a rigorous methodological approach to measure the phenomenon. To define and measure a global financial cycle is of course much more complicated, but several important attempts have been made. A global cycle can be based on movements of different quantity and/or price variables; or, it can be driven by shifts in global investors' risk aversion, as proxied, for example, by the VIX (which is a combined measure of uncertainty and risk aversion); in turn, changes in risk aversion have an impact on both quantity or price variables.

The literature on financial cycles is rapidly expanding and empirical tests confirm their existence. Rey (2013), focusing on quantity variables, finds that most types of net capital inflows are positively correlated with one another and across different geographical regions and that there is a negative correlation of net capital inflows with the VIX, even at a geographically disaggregated level. Obstfeld (2014), focusing on price variables, shows that: long-term interest rates are

significantly affected by US long-term interest rates and also by the VIX; moreover, the existence of different exchange rate regimes does not alter the impact of US long-term rates on other countries' long-term interest rates. Shin (2013) has developed a measure of global liquidity which "displays a highly procyclical pattern, tracking the upswing before the global financial crisis, the sharp decline with the onset of the global financial crisis and then the subsequent recovery afterwards". Moreover, the global liquidity aggregate reflects also the movements of the exchange rate of the US dollar vis-à-vis other currencies and "the reinforcing interaction of the exchange rate and the local currency aggregates".

Based on this evidence, Borio (2014) has argued that the Achilles heel of the current IMS is that it amplifies the "excessive financial elasticity" of domestic monetary and financial regimes, i.e., "their inability to prevent the build-up of financial imbalances in the form of unsustainable credit and asset price booms that overstretch balance sheets, thereby leading to serious systemic banking crises and macroeconomic dislocations". This definition seems to me quite appropriate also to describe events that took place in the EU before, during and after the global crisis landed on our side of the Atlantic.

These developments in the research on the functioning of global financial markets confirm that procyclicality is a fundamental feature of their behaviour. But what is the main cause of procyclicality? As I have argued in the past (Saccomanni 2008), although global financial intermediaries operate in a highly competitive environment, they have uniform credit allocation strategies, risk management models and reaction functions to macroeconomic developments and credit events. Thus, competition and uniformity of strategies combine, in periods of financial euphoria, when the search for yield is the dominant factor, to generate underpricing of risk, overestimation of market liquidity, information asymmetries and herd behaviour; in periods of financial panic, when the search for safe assets is predominant, they combine to produce generalised risk aversion, overestimation of counterparty risk, together with, again, information asymmetries and herd behaviour.

4 Currency Wars

Monetary policy changes in a key country have an obvious impact on the exchange rate of its currency vis-à-vis other currencies. At the same time, exchange rate movements can have an impact on investors' strategies and contribute to amplify the impact of monetary spillovers and to trigger a financial cycle. Whether or not these interactions constitute hostile initiatives in the context of a "currency war" is not very relevant for an assessment of the viability of the current IMS (for an alternative view, see Eichengreen 2013). The fact is that, when interest rates are near or at the zero-lower-bound, the exchange rate becomes the main transmission channel of monetary policy. So when major countries embark on quantitative easing strategies, their impact is likely to be felt on a broad spectrum of EMEs.

Indeed, exchange rate movements tend to be, or are expected to be, quite large and their international repercussions could be quite significant. Moreover, there is a growing consensus that flexible exchange rates act as a shock absorber only in a limited way, and may also contribute to spread spillovers further (Rawdanowicz et al. 2014). Governor Rajan has eloquently endorsed this view: "Indeed in the recent episode of emerging market volatility after the Fed started discussing taper in May 2013, countries that allowed the real exchange rate to appreciate the most during the prior period of quantitative easing suffered the greatest adverse impact to financial conditions" (Rajan 2014). This may be due, inter alia, to the fact that foreign exchange is increasingly traded as a financial asset per se, with little relation to the real flow of commercial or direct investment transactions between the currencies paired in the exchange rate. Exchange rate movements therefore may not necessarily reflect changes in the underlying fundamentals of countries and in their competitive positions.

The "currency war" outcry has not been voiced only by the monetary authorities of EMEs. In the United States there is another school of thought that maintains that a war is indeed being waged by a group of "currency manipulators"—mostly, but not exclusively in Asia—who intervene heavily in foreign exchange markets to prevent the appreciation of their currencies vis-à-vis the US dollar and the euro. Bergsten (2014), a constant advocate of reform of the international exchange rate regime, has recently proposed to introduce reforms in the IMF and the WTO to prevent and sanction competitive undervaluation of currencies and put an end to currency wars. On a different case, Gros (2015) has argued that the attempt of the Swiss monetary authorities to contain the impact of speculative capital inflows by pegging the exchange rate of the Swiss franc to the euro was in fact an "overlooked European currency war" and that Switzerland had done more to 'manipulate' its currency than China".

5 Fault Lines in the IMS

The monetary-financial-exchange rate interactions that I have tried to describe are in fact the manifestations of the shortcomings of the current IMS. And indeed some sort of a debate on reforming the system, restoring international monetary order, or promoting international monetary coordination has begun, involving both central bankers and academic economists (see, in particular, Farhi et al. 2011; Taylor 2013; Mohan and Kapur 2014; Rajan 2014; Coeuré 2014). The overall impression, however, is that there is deep divergence of views and that little progress is being made towards some form of consensus on what should be done to fix the system. Basically, we are still seeing the confrontation of two old schools of thought: the house-in-order approach, based on sound domestic macroeconomic policies plus floating exchange rates, and a more cooperative, pro-active, approach to the management of international financial disturbances. This is the main fault line in the current IMS.

Just before the "taper tantrum" started, in February 2013, the Finance Ministers and Central Bank Governors of the G-7 countries stated their position on these issues: "We reaffirm that our fiscal and monetary policies have been and will remain oriented towards meeting our respective domestic objectives using domestic instruments and that we will not target exchange rates. We are agreed that excessive volatility and disorderly movements in exchange rates can have adverse implications for economic and financial stability. We will continue to consult closely on exchange markets and cooperate as appropriate". It was in substance a reiteration of the traditional house-in-order approach, but in more blunt terms than in the past and with a surprising insistence on the domestic nature of the policy making process. There was a recognition that "volatility"—a nice euphemism—of exchange rates may create disturbances, but no promise of any coordinated action beyond "close consultation". The statement reflected to a large extent the position of the US authorities, in view of the dominant role of the dollar in currency markets and the influence of the Fed's policy on global monetary conditions. But it is fair to say that it reflected also the position of the European Central Bank (Coeuré 2014), although the views of European governments were more differentiated.

This attitude softened somewhat after the "taper tantrum". Bill Dudley reconfirmed the Fed's opposition to monetary policy coordination, but recognised that: "our attempts in the spring of 2013 to provide guidance about the potential timing and pace of tapering confused market participants" and indicated that: "we have taken a number of steps in recent years to increase transparency and improve our communications" (Dudley 2014); Stan Fischer argued that: "because the dollar features so prominently in international transactions, we must be mindful that our markets extend beyond our borders and take precautions, as we have done before, to provide liquidity when necessary" (Fischer 2014).

House-in-order, greater transparency, better communication, a promise of liquidity: is that enough to stabilise the IMS? There are, of course, different opinions. I have in mind, for example, Julia Leung's very frank and illuminating book she has just published (Leung 2015). Based on her long experience in the Hong Kong Monetary Authority and Government, Leung outlines the following key aspects of what she calls "an Asian framework", taking for granted that "competitive monetary easing is a fact of life". The Asian framework would include features that are by now uncontroversial, namely that "financial stability should be part of central banks' mandate" and that "monetary policy must be supplemented with macroprudential tools to deal with asset bubbles". However, Leung also feels strongly that "currency intervention is the norm to cope with excessive currency appreciation or depreciation pressure", that "building up foreign reserves has become a significant instrument of self-insurance" and that "capital controls are an essential part of a comprehensive set of tools to maintain stability". I believe that these considerations are broadly shared by the main Emerging Market Economies (EMEs).

A comparison of the G7 and the EME's approaches highlights the crucial dilemma confronting policy-makers when dealing with financial cycles, which Rey (2013) described as follows: "independent monetary policies are possible if,

and only if, the capital account is managed, directly or indirectly, regardless of the exchange rate regime". If international monetary policy coordination is precluded by political considerations and/or the domestic orientation of central bank mandates, then the issue is how to devise an efficient and effective strategy to manage the capital account. It is obvious, at least to me, that this goes beyond the regulatory measures to strengthen the capital base and the liquidity position of banks and financial intermediaries. This process is well underway within the Basel and FSB fora, and it is being implemented in both advanced and emerging economies. But, as Governor Zeti Akhtar Aziz eloquently put it: "Our efforts will not be sufficient to prevent the next mega tidal wave" (Aziz 2014), incidentally because shadow banking activity continues to grow unabated. Management of the capital account will inevitably involve the introduction of restrictions on capital movements and/or the adoption of a comprehensive set of macroprudential measures; it will imply also the conduct of frequent currency market intervention and the accumulation of massive precautionary foreign exchange reserves. But it must be clear that in the end the process may lead to a drift towards financial protectionism. Even macroprudential policies may involve forms of geographical ring-fencing that may hamper the efficient management of cross-border banks and financial intermediaries.

Is this what the world economy really needs? To roll-back financial integration and to promote financial fragmentation? And what for? To preserve temporarily the independence of national policies until the next crisis, when all countries will be forced to cooperate under the pressure of events? It seems to be a very shortsighted approach and it might hamper the growth prospects of the world economy. Rather, I do not see why it should not be possible to improve our ability to prevent and mitigate financial crises by combining the necessary but insufficient house-in-order approach with a realistic reform that would strengthen the instruments and the procedures to manage international financial instability within the institutions that have been created over the years for that very purpose.

Here is where a reform of the IMS comes into the picture. There are, at least, four areas where reform efforts could significantly strengthen the current IMS. All areas present difficult political constraints, but a lot of preparatory work has been conducted on each of them and there is no need to start from scratch. A first priority would be to implement the reforms of IMF governance and quotas agreed by the IMFC but still awaiting the formal ratification by the US Congress. As this is considered not possible at the present political juncture in the US, the IMF should find alternative ways to achieve the rebalancing of votes and voices in favor of EMEs. The need to move in this direction finds support also among influential American observers (Bergsten and Truman 2014) who feel that IMF reforms should not be blocked because the US refrained from exercising the leadership role it enjoys under the IMF Articles of Agreement. Approval of the reforms will enhance the credibility and the legitimacy of the IMF as the key institution of the IMS.

Another important step in the same direction would be the inclusion of the Chinese RMB in the SDR in the context of the basket review scheduled for 2015. Although the RMB is not a fully convertible currency in the terms envisaged by the

IMF Articles, its use as a medium of exchange and as a reserve currency has significantly increased in Asia and in major financial centers (Leung 2015). It should be possible to reach a consensus on this reform, which would also enhance the credibility of the SDR by making it more representative of the changed conditions in the world currency markets. Whether this step would lead to a new reserve currency regime, as advocated by the Governor of the People's Bank of China (Zhou 2009), remains to be seen. But I see no harm in trying.

A reform of a more general significance would entail the expansion of the global safety nets to an extent sufficient to discourage an excessive accumulation of reserves, which can have a negative impact on economic activity and foreign trade. There is considerable support for this reform from a broad range of officials and economists (see, among others: Farhi et al. 2011; Rajan 2014; Leung 2015). The reform would involve primarily IMF facilities, but should also envisage a greater role for regional arrangements: significant progress has been achieved in the EU in building the instruments and procedures to deal with systemic crises and the risk of contagion. A full institutionalisation and expansion of the Asian safety net established under the Chiang Mai Initiative should be considered.

However, the most necessary and yet more difficult reform is in the area of international policy cooperation. Here again, an important body of background information and analysis has been assembled since the outbreak of the crisis by the G20, the IMF, the World Bank, the BIS and the OECD. But, with a few exceptions, results of these efforts have been modest so far, to say the least. As noted in the last Annual Report of the BIS, "cooperation is continuously tested; it advances and retreats", and, I may add, it retreats from where it would have been more useful. Sometimes the communication from international cooperation fora tends to broadcast, perhaps not intentionally, a message of the opposite sign, like "it's every man for himself, now".

This is not acceptable and I fully share the view of the BIS that in a highly integrated global economy "the need for collective action—cooperation—is inescapable. (. . .) At a minimum, there is a need for national authorities to take into account the effects of their actions on other economies and the corresponding feedbacks on their own jurisdictions". This assessment should be facilitated if national policy frameworks incorporated financial cycles systematically, as argued very convincingly—at least to me—by Jaime Caruana (2014). This would imply that "policies—monetary, fiscal and prudential—should respond more deliberately to financial booms, by building up buffers, and respond less aggressively and persistently to busts, by drawing the buffers down. This calls for longer policy horizons than those currently in place—recall that the financial cycle is much longer than the business cycle. And it calls for governance arrangements that effectively insulate policymakers from the huge political economy pressure that induce asymmetric policies: no one objects during the boom; everyone demand support during bust".

An analytical framework for what I would call "cooperation for the XXI century" is therefore already available and it could at least be tested and form the basis for ad-hoc multilateral discussions among the Ministers and Governors of the

major countries within the G-20, the IMF and the BIS. It is with some surprise, then, that I read that the member governments of the International Monetary and Financial Committee (2014) last October called for: "...deeper analysis of risks, spillovers, and the external sector; enhanced and better integrated financial and macroeconomic surveillance; integration of bilateral and multilateral surveillance; and the provision of evenhanded, tailored and well-communicated policy advice", as if nothing had been done in these areas by the competent institutions. The question therefore seems to more political than technical and, to quote a perceptive lecture of a former Governor of the Reserve Bank of India, Y.V. Reddy, the real problem is that "short-term motivations at the national level seem to run counter to the longer-term interests of the global economy. There are unmistakable signs of diminishing returns from the G20 (...)" (Reddy 2012).

This is a pity because I believe that governments and monetary authorities have the ability to orient the expectations of global financial markets towards stability objectives, provided they are ready to use all available policy instruments for that purpose. In contrast with what is being increasingly done at a national level, with forward guidance on interest rates, major countries do not take advantage of the good advice provided by the institutions of international cooperation: they could use it to give guidance to economic agents and market participants as to the likely impact of the stance of their macroeconomic policies on market parameters that are relevant for the working of global financial cycles. Ideally, as I have argued elsewhere (Saccomanni 2014), the output of an enhanced form of international cooperation would be a "multilateral forward guidance" covering both interest rates and exchange rates in such a way as to minimize the risk of destabilising spillovers and financial cycles.

6 Conclusion

Let me conclude with quotations from two central bankers that I greatly admire, Paul Volcker and Tommaso Padoa-Schioppa.

Twenty years ago, in an important lecture on exchange rate stability, Paul Volcker (1995) stated: "My sense is that we will find success easier than feared by so many—that the market will more often than not respond constructively to a firm and intelligent lead by governments and that exchange rate stability will reinforce prospects for growth. One thing is for sure: without trying, we will never know". Please note the carefully chosen adjectives: *firm* and *intelligent* lead by governments.

Padoa-Schioppa (2010), in a masterly Per Jacobsson Lecture delivered a few months before his untimely death in 2010, examined the troubled relationship between governments and markets which has deeply influenced the evolution of the IMS since the end of World War I. He made the point that the function of governments is to provide public goods, that is goods that markets cannot produce spontaneously. He went on to say that: "Humans sharing common interests

constitute groups of different sizes on a scale that goes from the condominium to the population of the world. Goods like a garden, the judiciary system, navigation on the Rhine, or the biosphere are 'public' for different jurisdictions such as a town, a country, a continent, or the planet. It follows that also the government—as the provider of public goods—needs to be structured at different levels in order to operate in different jurisdictions and to refer to different constituencies. Government must be, therefore, plural and multilevel".

It is sad to note that our Governments still hesitate to provide a "firm and intelligent lead" to markets. Moreover Our Leaders, despite their frequent claim that "global challenges require global solutions", have not yet succeeded in establishing an effective government function at a global level, for the production of the public good of international financial stability.

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