The productivity puzzle: why improving labour productivity is critical for Europe

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Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker.

Paul Krugman, The Age of Diminishing Expectations (1994)

1. Introduction

Productivity has puzzled economists and policymakers for some time. Despite the huge computer-led transformation, that has changed the way people work and live, productivity growth has declined in Europe in the last twenty-five years. As economic growth remains anemic, especially in a context of adverse demographics, and ageing population, attention has been turned on how to improve productivity growth. For countries that are members of Europe's economic and monetary union (EMU) productivity, especially labour productivity, is critical to intra-EMU competitiveness and adjustments, as well as to both short-medium and long term growth.

Productivity is commonly defined as a ratio between the volume of output and the volume of inputs. While several measures of productivity are available, broadly speaking they all measure how efficiently production factors, such as labour and capital, are used within the economy. In a basic framework, using a simple set of assumptions about firms' production process, growth accounting breaks down economic output as:

$$Y = Af(WK, EL)$$

Where Y is the total economic output produced by the all the firms within the economy using K (capital) and L (labour). W and E are measures of capital and labours' degree of utilisation. A is a measure of technological efficiency, also called total factor productivity (TFP). By rearranging the above function, following the notation used by Barnett et al (2014), it is possible to obtain one of the most common productivity indicators, namely labour productivity:

$$\frac{Y}{L} = Af(\frac{K}{L}, Util)$$

Labour productivity, the output per unit of employment, can be decomposed into three main components; the capital per labour unit (*capital deepening, K/L*), the degree of utilisation of capital and labour within the economy (*Util*), and technological efficiency (*A*). TFP summarises the current state of technology and omitted factors such as institutions, resource endowments, climate, and

human capital. Within the neo-classical framework it is considered the main driver of long term economic growth[1].

Neoclassical growth accounting models as the aforementioned do not - neither directly nor indirectly - include human capital among the production factors. Over the past two decades, however, the stock of knowledge and skills has led economists and policy makers to question this assumption. Furthermore a slowdown in productivity growth after sustained gains in the post-World War II years shifted the focus on human capital, which was found – albeit not unequivocally – to be directly and positively correlated with productivity growth[2].

Extending traditional growth models to incorporate human capital pose a number of challenges, both empirically and theoretically. Human capital is usually defined as "*any stock of knowledge or characteristics the worker has (either innate or acquired) that contributes to his or her productivity*" (*Acemoglu, 2013*)[3]. While most of economists and policy makers agree on this definition, the same cannot be said about how to measure it; years of schooling have been one of the most used indexes within the economic growth literature: yet, there are overwhelming evidences that the latter is an imperfect proxy for human capital. Things are no better from a theoretical point of view.

Virtually all theoretical economists agree on the fact that human capital has to be embodied in growth accounting models; however, such agreement ends when the discussion moves towards *how* to incorporate it. We can broadly summarize the debate over human capital into two different approaches:

- *The Lucas/Becker view* According to Becker (1962) and Lucas (1988), the stock of human capital is directly related to the production output. Human capital increases workers' productivity in all tasks, and as such we can think about it as a unidimensional factor of production (H) that is a function of the output (Y) similarly to labour (L) and capital (K).

- *The Nelson/Phelps model* According to Nelson & Phelps (1966), human capital does not directly impact the output levels but rather increases the rate of absorption of new technologies, hence TFP is a function of A.

In this paper we argue that these two approaches are not mutually exclusive. Human capital can enhance labour productivity both directly and through an accelerated absorption of technology. Drawing on evidence from Europe we look at countries, such as Italy, where low or negative TFP growth has had an impact on labour productivity and ultimately on GDP growth. We also look at countries, like the UK, where relatively strong TFP growth has not translated in strong labour productivity growth. We argue that inflows of skilled migrant labour force and labour market flexibility offset any potential productivity gain in a demand constrained economy. This support our

[1] Total (Multi) factor productivity is not directly observable so it usually estimated, by rearranging the two aforementioned formulas as a residual.

[2] As de la Fuente (2011) argues, while some evidences pointed out that human capital might not be correlated with productivity growth, such *negative* results can be explained by estimation techniques and technical problems that *have more to do with the difficulty of measuring human capital correctly* rather than with the actual direction and significance of the aforementioned relation.

[3] A similar and known definition is the one used by Helpman (2004) which labels human capital as *the stock of education and training embodied in the labour force*

claim that, within the European Union, where labour moves freely, we need to take into account the impact of migration flows, as opposed to a given stock of labour, on productivity growth.

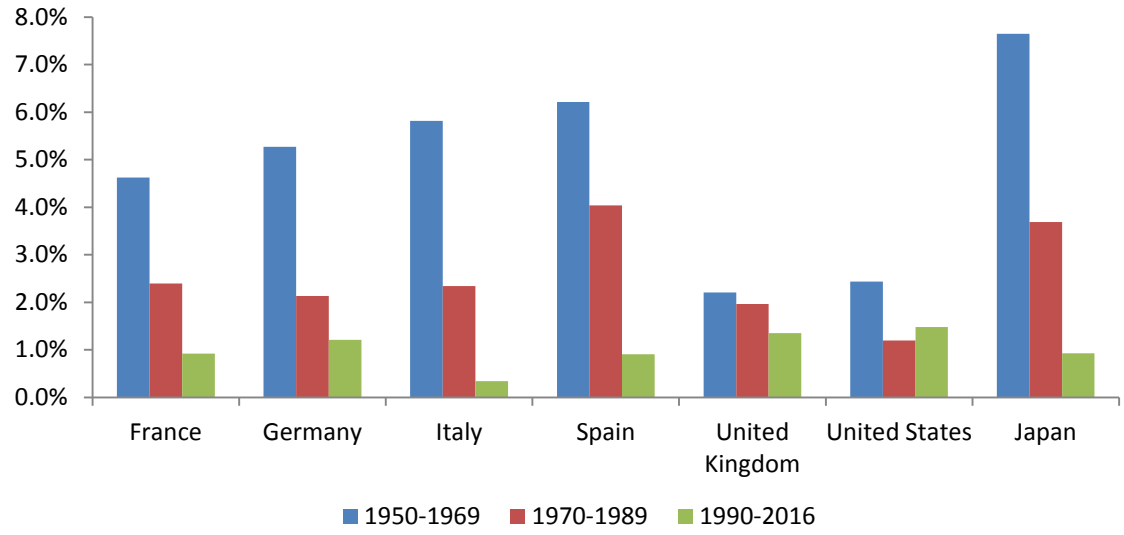
The rest of the paper is organised as follows. We first consider labour and total factor productivity in historical perspective, documenting how in the long run the presumed ICT-driven revolution has been actually neglectable in terms of productivity growth. We then explore divergences in productivity stocks at the regional level in Europe and document the divide between southern Europe and western/northern Europe. We finally turn to two countries, the UK and Italy, which have followed two divergent paths. While they both have experienced low labour productivity growth, since 2013 the UK has outpaced the rest of Europe with regards to GDP growth and total employment growth. Italy's economy, on the other hand, has continued to underperform. We will refer to this two phenomenon as "The British Productivity Puzzle" and "The Italian Lost Decades". We conclude by arguing that if no bold adjustments are undertaken such unbalances are not sustainable in the long term, and we suggest how policies should be structured in order to improve labour productivity.

2. Productivity Growth - a Historical Perspective

In the two and a half decades after the Second World War, Western Europe, especially, and North America experienced one of fastest periods of growth in recent history; economies that were devastated by the conflict were rebuilt in few years, achieving pre-war wealth levels in relatively short time.

One of the main drivers of such surge in per capita income levels was the growth in productivity. In the 1950-1969 period both labour productivity (Figure 1) and technological changes (Figure 2) surged; the weighted total labour productivity growth rate of the four largest western European economies was slightly above than 5% while Japanese output per worker grew at the total rate of 7.6%.

Figure 1: Labour Productivity Average Growth Rates (1950-2016)



Labour Productivity Average Growth Rates (1950-2016).

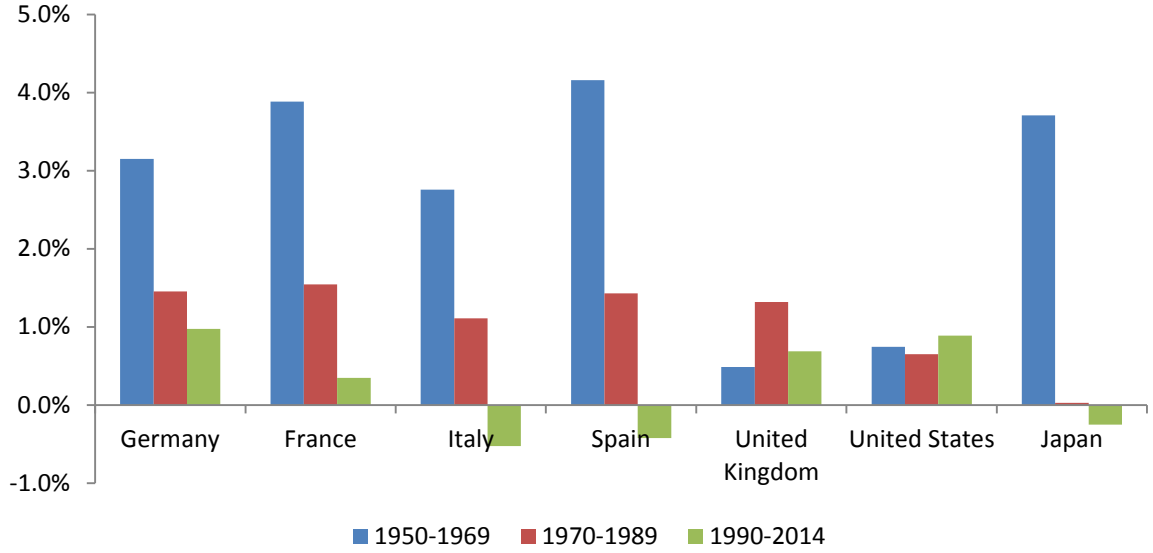
Source: Total Economy Database (TED).

In this context, the United Kingdom and the United States seem to trail behind in terms of labour productivity growth. Nonetheless, the United States' relatively low productivity levels are consistent with the convergence hypothesis (Sachs, 1959). Broadly speaking, countries closer to the technological frontier experience lower productivity growth rates while less-developed countries can tap from this *open storehouse* and *catch-up* with frontier-countries. The United States, the country that exited the conflict with the highest income levels, did not perform as well as other countries that had to rebuild their entire labour, physical and human capital stock.

The same only partially applies to the United Kingdom. Weak labour productivity growth and poor TFP documented during the 1950-1969 years can be mainly linked to the so-called post-war consensus, which consisted in strong labour union and high taxes to maintain what would have been later regarded as an ineffective welfare system (Broadberry & Crafts 1996).

In the years from the early 1970s to the fall of the Berlin Wall in 1989 continental European economies experienced a drop both in their labour productivity growth rate and in their TFP growth rate when compared to the post-war years. This trend seems consistent with the convergence hypothesis.

Figure 2: Total Factor Productivity Average Growth Rates (1950-2014)



Total Factor Productivity Average Growth Rates (1950-2014).

Source: Total Economy Database (TED).

More interesting, in terms of deviation from what theories projected, is the trend of both labour productivity and TFP in the last 25 years. When Robert Solow, one of the pioneers of the growth accounting model, first expressed in 1987 what has now became known as the *Solow Computer Paradox* – i.e. that computers and new technologies would have a limited impact on productivity growth – several economists and commentators dismissed his claim as myopic. According to technological enthusiasts, the world was on the verge of a revolution "*at least as monumental as the internal combustion engine or electric motor*" (*Fortune,* June 8, 1998, pp. 86–87). Despite the initial criticism, Solow's argument has proved to be not too off the mark.

As Figures 1 and 2 show, all countries in the sample experienced low labour productivity growth rates and very low – if not negative – TFP average rates of increase in the years 1990-2014. Broadly speaking the Information Technology and Communication (ICT) revolution had (almost) no impact on the way technology affects output growth. The only exception to such patterns seems to be represented by the upward trend in the United States average TFP growth rates.

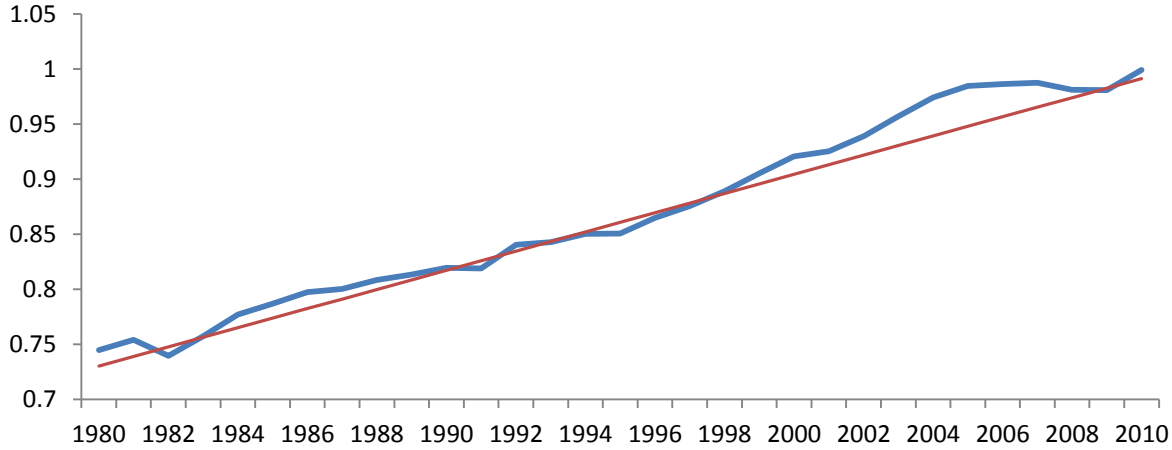
Indeed, breaking down the 1990-2014 sample into two sub-periods, we notice a TFP growth revival in the US from 1999 onwards (Figure 3). However, as Gordon (2000) argues, once the ICT hardware sector is filtered out, the '*New Economy's effects on productivity growth are surprisingly absent, and capital deepening has been remarkably unproductive'*. Of the same idea is Greg Ip, who argues that '*transformative innovation really is happening on the internet. It's just not happening elsewhere'*.[4]

As we discussed in the previous section, throughout this period both policymakers and economists focused their attention on human capital as a way to enhance long-term growth. Such a different perspective was also caused – in addition to the aforementioned factors - by underlying changes in how people move cross-border. Until the 1990s the mobility of skilled workforce within advanced countries was, economically speaking, negligible; the brain drain phenomenon was confined to

[4] Grep Ip, Wall Street Journal, August 12, 2015

developing countries only. Such circumstances, however, quickly changed between the end of the 20th century and the beginning of the 21st century; especially within the European Union, the free movement principle meant highly skilled workers started to follow capital flows, moving from the southern European countries towards northern European cities. (Boeri et al. 2012, Becker et al 2004).

Figure 3: USA - Total Factor Productivity Resurgence?



Total Factor Productivity at Current National Prices, United States (1980-2010) with Linear Trend (1980-1989).

Sources: DataStream, University of Groningen and our calculation.

We do believe that stronger cross-border movements of labour - or migrations - need to be included in any analysis that tries to assess productivity growth levels. This is particularly true for the 28 countries that currently form the European Union given the *free movement* of labour may exacerbate divergent productivity growth rates.

3. Productivity Growth in Europe: too low for sustainability

If the US has a productivity problem, so has Europe. Between 1995 and 2007 EU-15 labour productivity grew by an average annual rate of 1.3% compared to the 2.1% in the United States. Such evidences are particularly worrisome; while both economies share the challenges from deepening trade and financial globalization, the European Union faces a more adverse demographic outlook than the US economy.

Even if, as few economists argue, a rapidly ageing population is not inherently an issue, concerns with the increasing dependency ratio of the most advanced European economies remain.[5] Broadly speaking, within a closed system that does not allow for immigration an increase in the dependency ratio must be offset through productivity growth so to reach a sustainable equilibrium. Conversely, within an open system with migration flows of young and skilled workers, the need to improve productivity is less pressing.

The European Union correctly tried to address such issues by putting on its policy agenda the need of improving both labour and total factor productivity. Unfortunately this resulted into a hyper ambitious and ill-thought plan – the Lisbon Strategy – that the European Council launched in 2000 to turn the EU into "*the most dynamic and competitive knowledge-based economy in the world by 2010 capable of sustainable economic growth with more and better jobs and greater social cohesion and respect for the environment*"[6]. Predictably, the Lisbon Strategy did not achieve its objectives and was then replaced by a more feasible ten-year growth strategy ('*Europe 2020*') focused on sustainable growth.

Moreover, not only labour productivity and TFP growth did not significantly picked up as a result of the Lisbon Strategy, but, as we discuss in the next section, differentials in growth rates among the five larges European economies became apparent. In the next section we assess the dimension of such differences and, more importantly, their impact on the European Union as an economic and political project[7].

3.1. Before the Crisis

Well before the financial crisis erupted, unwinding all the problems behind Europe's economic and monetary union, some economists had raised warnings about the risks that differential productivity growth within the Eurozone could pose (Beachil & Pough, 1998).

Such theories predict that, in the long run, the constraints implicit in fixed exchange rates – within EMU national currencies are pegged to the euro at a fixed exchange rate – combined with productivity growth differentials can seriously affect intra-EMU competitiveness and create an intractable adjustment problem: countries with relatively higher domestic prices (including wages) need to either improve labour productivity growth or cut wages (or a combination of both).

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[5] As van Ours et al (2007) argue *the productivity effects of ageing depend on the extent to which age-induced changes in cognitive and non-cognitive abilities are relevant for work performance.* Broadly speaking, while being usually positively correlated with ageing, albeit in a quadratic form, the relation between productivity and ageing is largely shaped by the work structure.

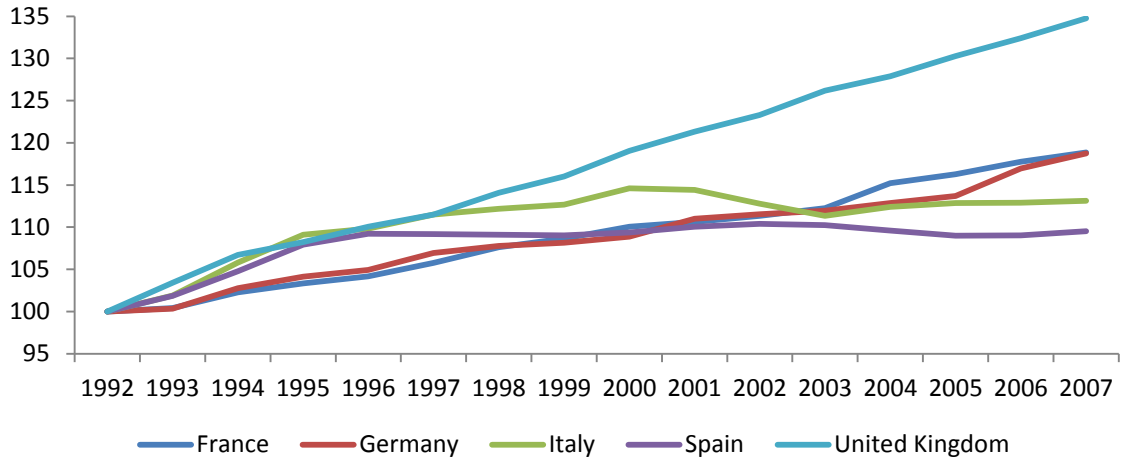
[6] European Commission (2010), Commission Staff Working Document, 'Lisbon Strategy evaluation document' http://ec.europa.eu/archives/growthandjobs_2009/pdf/lisbon_strategy_evaluation_en.pdf (accessed 07 Nov. 2016)

[7] France, Germany, Italy, Spain and the United Kingdom represent more than the 70% of the EU-28 GDP.

According to the 'optimum currency area' theory (Mundell, 1961) such circumstances can be sustained only in case of an unconstrained labour mobility so that adjustments in the labour market help real exchange rates to adjust.

Figure 4 shows consistently higher labour productivity growth rates in the UK over the period 1992-1997 compared to Germany, France, Italy and Spain. Following Beachil & Pough (1998) the UK decision of not joining the Eurozone looked then well-grounded. On the other hand, France, Germany, Italy and Spain registered similar, if not sometimes identical, output per labour growth levels, supporting their choice of participating to EMU.

Figure 4: European Labour Productivity Growth (1992-2007)

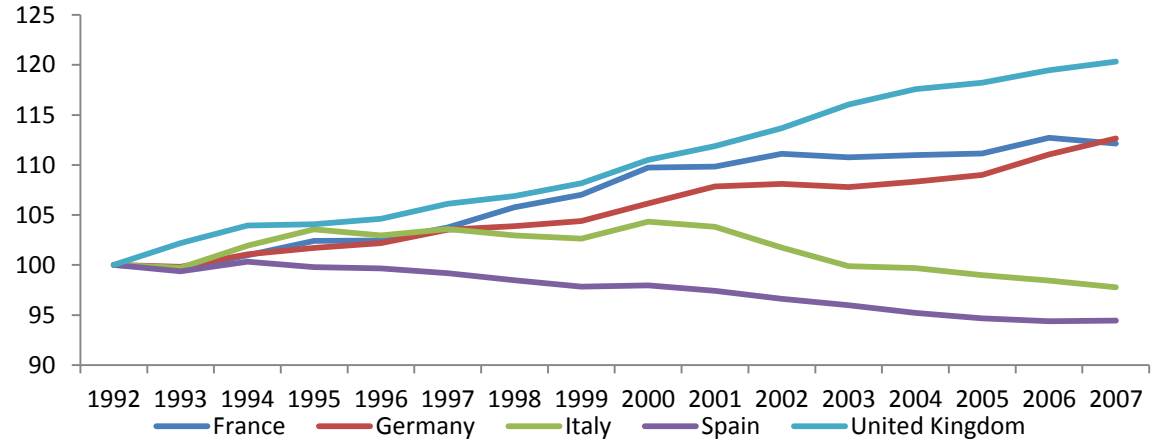


Labour Productivity (1992-2007). Panel of selected European Countries. 1992=100.

Source: Total Economy Database (TED).

However, if we focus on TFP growth rates the aforementioned similarities disappear; as showed in Figure 5, starting in 1992 (Spain) and 2000 (Italy) the two largest southern European economies experienced a slow but constant downward trends in their TFP levels, while France, Germany and the United Kingdom experienced the opposite.

Figure 5: Total Factor Productivity (1992-2007)



Total Factor Productivity (1992-2007). Panel of selected European Countries. 1992=100.

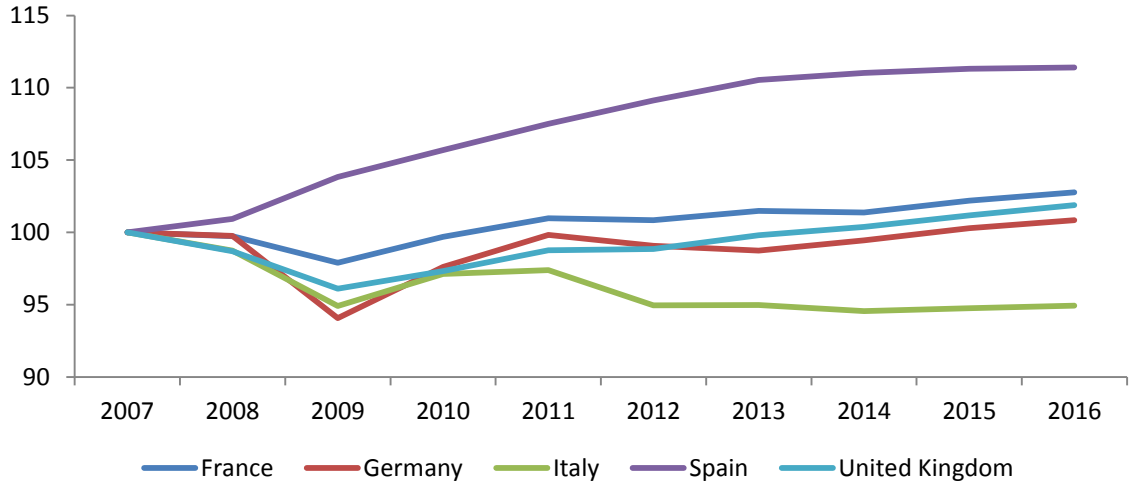
Source: Total Economy Database (TED).

While TFP differentials might not be important in the short term, they are - as we argued in Section 1 - key determinants for long term prosperity. Persistently large between-country trend deviations might eventually lead to imbalances, which could in turn become unsustainable without fiscal or monetary adjustments.

3.2. After the Crisis

When the global financial crisis erupted in 2008, followed by the sovereign debt crisis (2010-2012), along with the well documented divergences in fiscal positions and labour markets flexibility there were also differences in labour productivity and TFP among the EU largest economies. These differences, as highlighted in the previous section, were especially significant and contributed to draw a line between southern Europe and northern Europe.

Figure 6: European Labour Productivity Growth (2007-2016)



Labour Productivity (2007-2016). Panel of selected European Countries. 2007=100.

Source: Total Economy Database (TED).

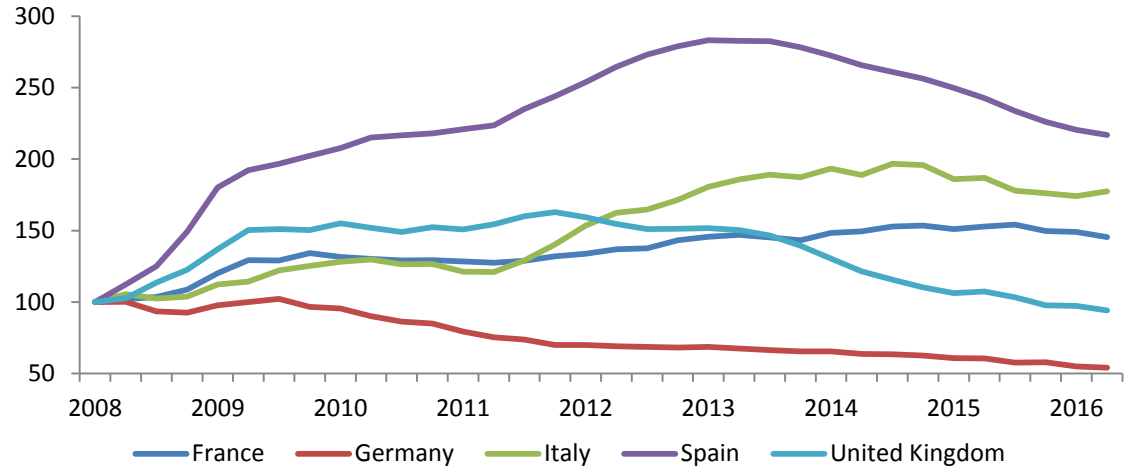
At glance, such regional-based differential have however not outlived the crisis (Figure 6). Indeed, while the Italian economy continued its downward pre-crisis trends the Spanish economy experienced an impressive upward trend in its labour productivity levels. Unfortunately, such performance does not reflect genuine productivity gains but is rather driven by underlying issues within the labour market.

Recall from Section 1 that labours productivity is defined at macro (country) level as the ratio between the output of an economy and the labour employed within that same economy; as such, if the denominator decreases the ratio will increase. This is exactly what happened in Spain where the unemployment rate strongly increased in the aftermath of the global financial crisis and further spiked at the time of the sovereign debt crisis (Figure 7). In the second quarter of 2016, despite strong real GDP growth, Spain's unemployment rate is still 117 percentage points above its pre-crisis level.

Labour productivity growth in Spain is then largely shaped, albeit not exclusively, by the adverse conditions in the labour market. While there some reasons to believe that part of such growth is

permanent, once the employment rate drop is filtered out the Spanish output per worker is aligned with the one of the others southern European economies (Hospido & Moreno-Galbis 2015)[8].

Figure 7: Unemployment Rates (2008-2016)

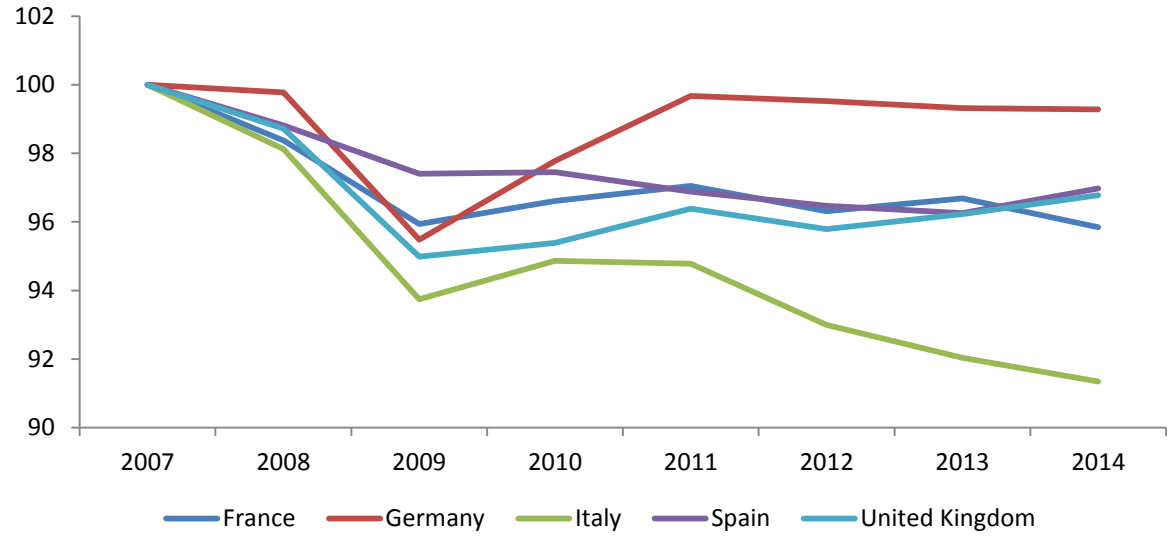


Unemployment Rates (2008-2016). Panel of selected European Countries. 2008=100.

Source: OECD.

Figure 8 displays the trajectories of the five countries in our sample with regards to TFP levels. Even taking into account that TFP in these countries is not yet back to pre-crisis level, Italy's dismal performance stands out.

Figure 8: European TFP Growth (2007-2014)



Total Factor Productivity (2007-2014). Panel of selected European Countries. 2007=100.

Source: Total Economy Database (TED).

As a matter of fact, the analysis conducted so far delivers a picture of a two-speed Europe with regards to both labour and total factor productivity growth. Western and northern Europe – with the

[8] Similar trend can be found in Portugal (not showed), where much of labour productivity resurgence was driven by declining employment.

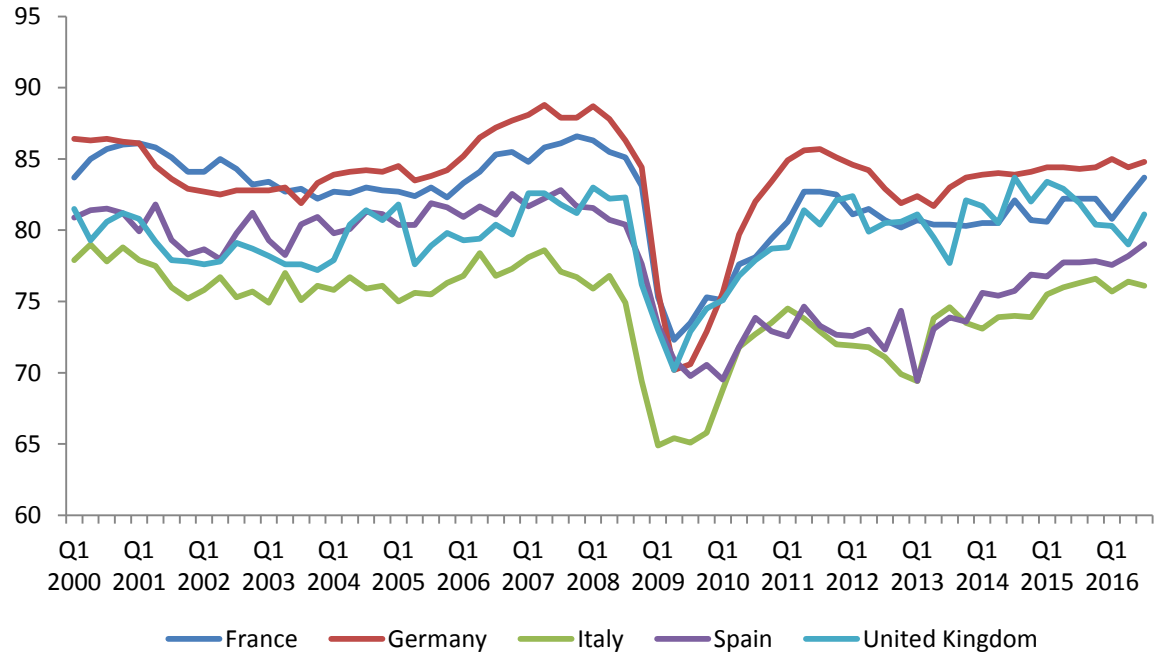
only exception of the immediate post-crisis period and once the post crisis unemployment surge is filtered out –show an overall upward trend, in contrast with the pattern prevailing in southern Europe.

Bearing this in mind, and taking into account that four of these countries are members of EMU – the exception being the UK – such divergent trends are most likely to lead, as argued, to adjustment problem; this, in turn, add further instability to an union already adversely affected by high public debt levels and deflationary pressures.

What such adjustments should involve is, however, less clear. A simple adjustment through converge does not seem feasible, and neither anticipated, in the short term. We argue that in the short and medium term there are substantially three ways to restore labour productivity convergence. The latter are derived from the equation outlined in Section 1, in which labour productivity is defined as direct function of the utilization of production factors (1), the capital deployed within an economy (2), its technological level and the aggregate human capital (the Lucas/Becker view) (3).

With respect to the utilisation of labour and capital, Figure 9 suggests a potential bottleneck in terms of spare capacity as factor utilisation has (almost) recovered to its pre-crisis levels. The crisis seems to have exhausted its cyclical effects and the remaining (little) spare capacity seems to be connected with more structural factors (Barnett et al., 2014).

Figure 9: Capacity Utilization Survey (2000-2016)



Survey measures of capacity utilisation (2000-2016). Panel of selected European Countries. 2007=100.

Source: DataStream.

Higher capacity utilisation may be achieved through demand side shocks. Yet, monetary policies have already hit the liquidity trap. Demand side shocks can also be achieved by more conventional measures such as fiscal policies – through tax cuts and/or public spending. While such policies would be socially and economically desirable, the aforementioned weak starting position at the beginning

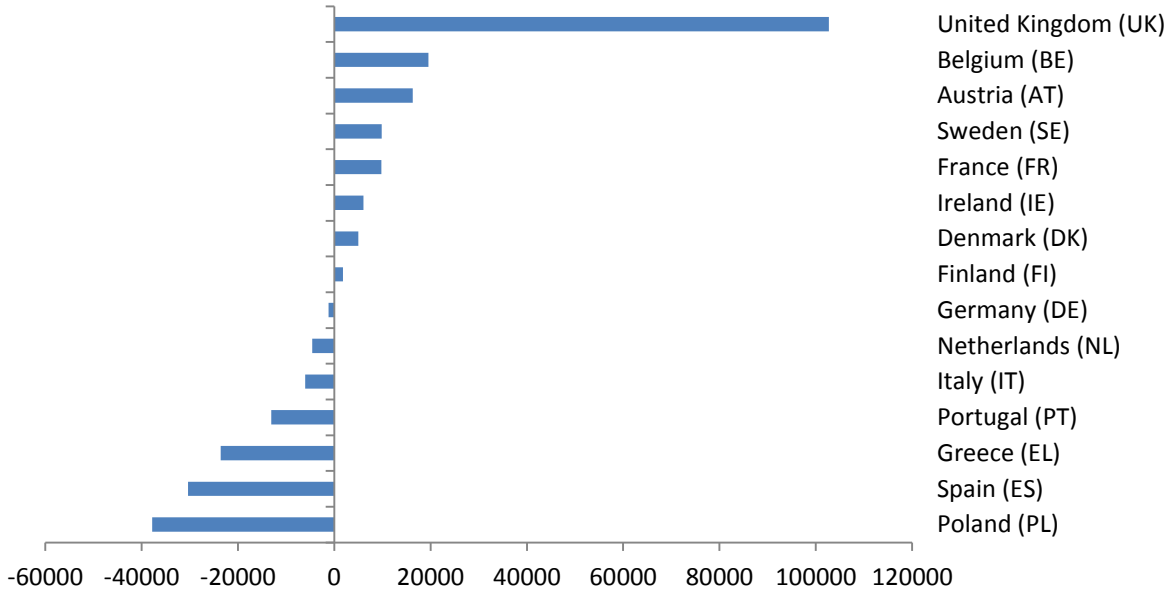
of the crisis of the southern European countries, both in terms of aggregate debt and fiscal deficit, make their application complex, if not impossible. All the southern European countries present high debt to GDP ratios and are compelled by the Fiscal Stability Pact to reduce it by increasing their primary surpluses or lowering eventual primary deficits.

Fiscal constraints, in turn, affect the second possible short run adjustment strategy, namely an increase in the aggregate level of investments. As just argued public investments, as rules stand, does not seems feasible, while, at the same time, economies in southern Europe have difficulties in attracting private investments, both domestically and from abroad. Such countries, with the only exception of Portugal, score relatively badly on a number of indicators such as *ease of doing business,* a measure strictly correlated with private investments levels.[9]

A possible solution would be a direct intervention by the European Union, both *via* guarantees on private investments and *via* forthright infrastructural investments within southern European countries. Possibly, this would help achieve both demand sides shocks, hence increasing factor utilisation levels, and an increase in the investment levels that might lead to a short-run convergence in the labour productivity levels.

Another short run solution involves the increase of human capital within à Lucas/Becker type of framework. As already argued, there is indeed evidence that investment in education is directly and positively correlated with labour productivity growth. This would raise productivity levels in the short run and also in the long run thanks to a higher absorption of new technologies according to the Nelson/Phelps model. Yet, as Figure 10 shows, migration patterns of highly skilled workers point towards the opposite direction than the one required for achieving convergence; highly skilled professionals, following capital flows, are moving from the south of Europe towards western and northern European countries.

Figure 10: Intra-European Regulated Profession Mobility (1997-2015)



Aggregate Intra-European Regulated Profession Mobility. Selected Countries (1997-2015).

[9] http://data.worldbank.org/indicator/IC.BUS.EASE.XQ?year_high_desc=false

Source: European Commission, Regulated Profession Database.

As we shall see in the next two sections (3.2.1 and 3.2.2), such mobility of highly skilled and above-average educated it is crucial to explain both what is now known as the *British productivity puzzle* and what we define as the *Italian lost decade.*

However, it is most likely that mild reforms will produce neglectable effects, or even no effects in terms of labour productivity growth. The main reason being the fact that some north European countries already pursued and achieved such reforms before the eruption of the crisis, meaning that the scope of the adjustment should be even larger than what is socially desirable of feasible.

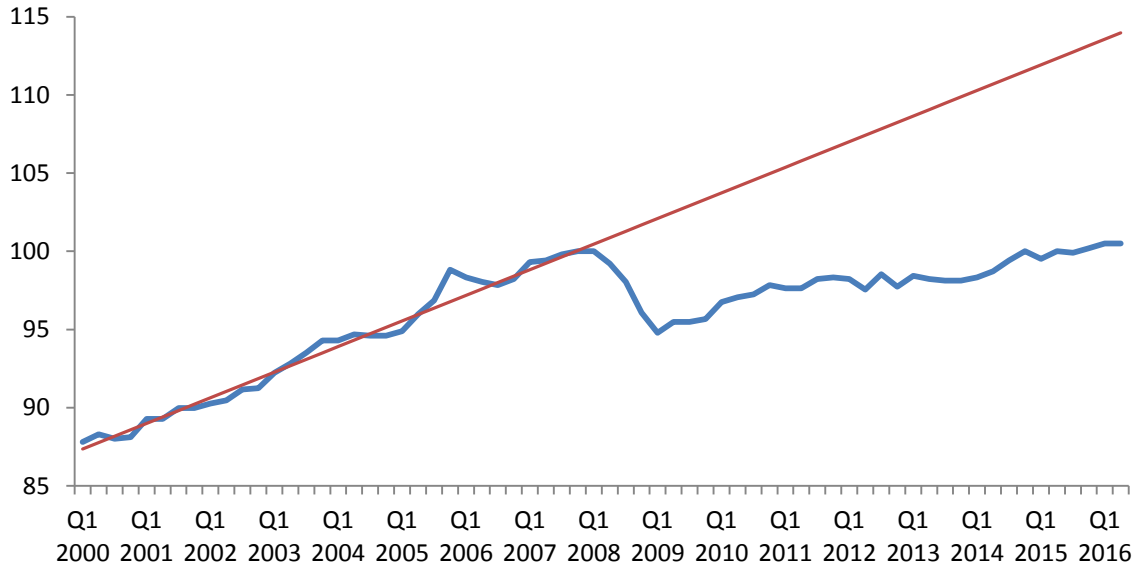
Another way of achieving a reduction in real wages would be through higher level of inflation. Yet, as discussed, demand side shocks are difficult to achieve and the Statute of the European System of Central Banks (ESCB) does not allow country-specific intervention, unless such actions aim at lowering the risks of a fragmentation of the eurozone and the unravelling of the single currency[10].

Finally, even if the European Central Bank (ECB) would succeed in justifying persistent difference in labour productivity among European regions as potential source of instability for the eurozone, raising inflation in such regions would not be easily achieved since, as aforementioned, the ECB already touched the zero lower bound.

3.1.1 The British Productivity Puzzle

UK labour productivity has been persistently weak since the onset of the financial crisis. As shown in Figure 11, despite its recent recovery, the output per worker within the British economy is still lagging 12.5 percentage points below the pre-crisis projected level.

Figure 11: UK Labour Productivity (2000-2016)



Labour Productivity, United Kingdom (2000-2016). 2008=100. Linear Trend (2000-2004).

Source: ONS and our calculation.

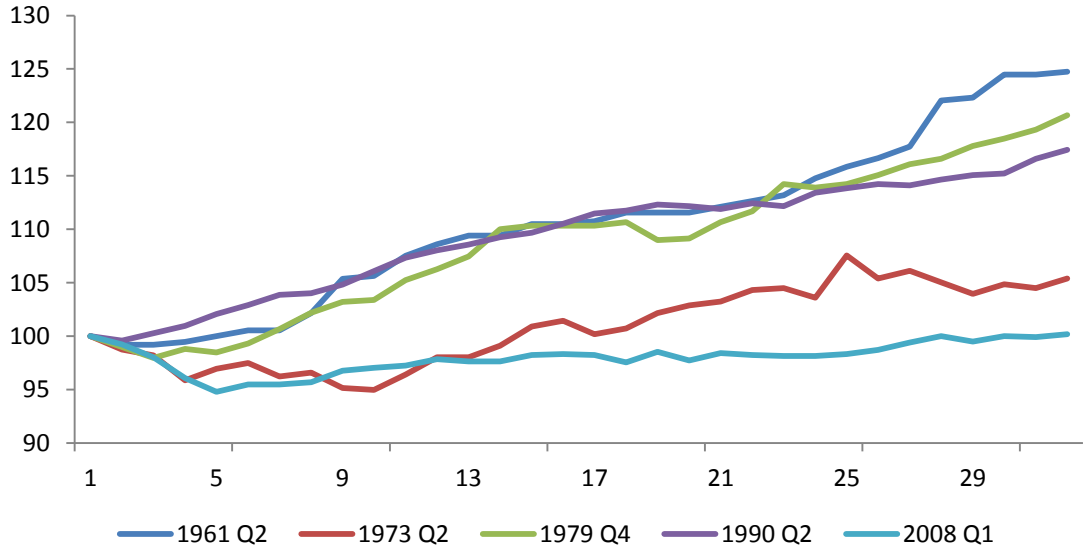
[10] ECB Press Conference, 6 September 2012, https://www.ecb.europa.eu/press/pressconf/2012/html/is120906.en.html (accessed 7 Nov. 2016)

Reinhart & Rogoff (2008, 2009) document how after each economic crisis labour productivity tends to lag behind its pre-crisis trend; furthermore, such behavior is particularly exacerbated when it comes to financial crisis. Low output per worker levels should then not be extremely worrisome. Yet, as Figure 12 shows, labour productivity loss in the ongoing of the 2008 financial crisis has been considerably worse than previous crises that afflicted the UK, both financial and non-financial. In the aftermath of the oil crisis the UK economy took 15 quarters to restore its pre-crisis output per worker levels, while after the great recession the British labour productivity needed 30 quarters to achieve pre-crisis levels.

While output per worker has proven weak, GDP and employment recovered faster and stronger than labour productivity (Figure 13). Between 2010 and 2015, real GDP growth in the UK averaged 2%, slightly above the G7 average. Real GDP growth in the eurozone, in contrast, averaged 0.9%. Total employment showed a similar upward trend, with a yearly growth rate slight below the 2 percentage points (Subacchi & van der Noord, 2016). Such discrepancy between these economic indicators has been addressed by economists and commentators as the *British Productivity Puzzle*.

Following Barnett et al. (2014) and Hughes and Saleheen (2012) we argue that there are several concurring explanation to such puzzle. Among them, cyclical factors, namely the drop in the utilisation of production factors previously highlighted (Figure 9), still play a role

Figure 12: UK Labour Productivity after recessions



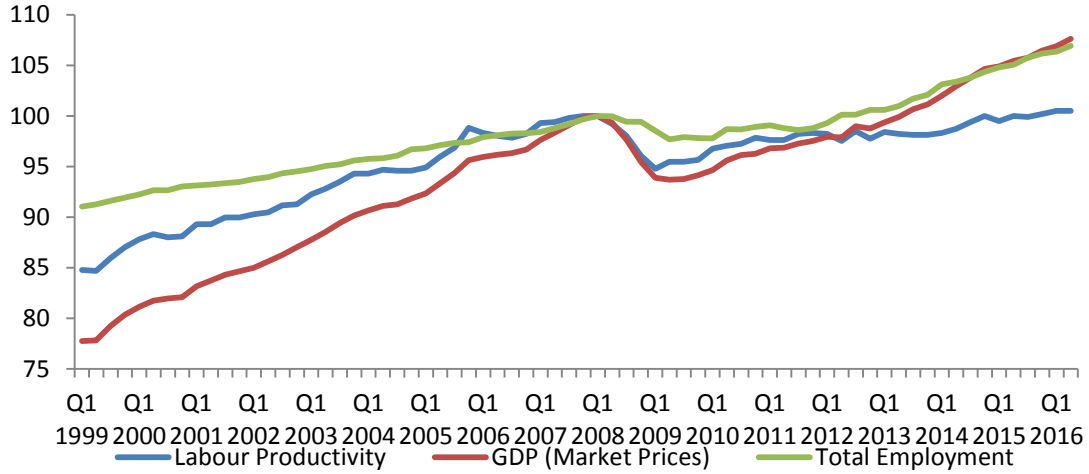
Labour Productivity after recession episodes, United Kingdom. Quarter in which each crisis started = 100.

Sources: ONS and our calculations.

Indeed, while capacity utilisation surveys indicate how there is limited spare capacity within the British economy, there are reasons not to take such surveys at face value. Such surveys are qualitative analysis in which firms are asked to compare their current level of production factors utilisation relatively to normal levels (Barnett et al. 2014). But these normal levels are uncertain and, as Bush (2008) pointed out, *change over the medium- to long-run.*

As well as cyclical factors, also structural factors - such as skewed resource allocation, low investment in tangible and intangible capital and higher firms' survival rates - need to be taken into account to explain Britain's productivity puzzle.

Figure 13: The British Productivity Puzzle

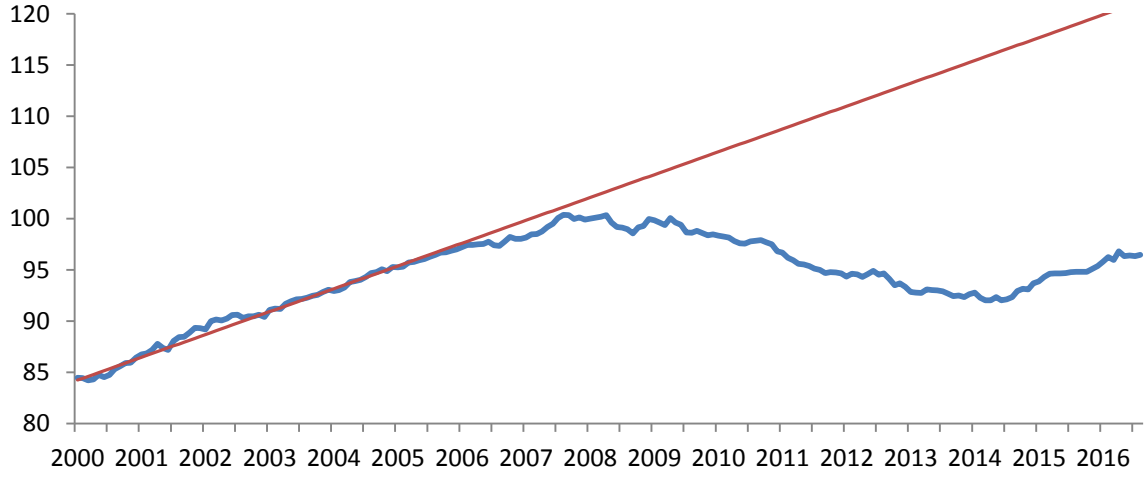


Labour Productivity, GDP at Market Prices and Total Employment, United Kingdom (1999-2016). Q1 2008=100.

Sources: ONS, Datastream and our calculations.

While all these factors are likely to play a role, the missing piece to solve the productivity puzzle lies in the link between output per worker, low real wages and the unprecedented high supply of skilled workers in the United Kingdom. As Figure 14 shows, real earnings fell sharply in the ongoing of the financial crisis; to date they are still 22% below their projected trend, showing few, or none, signs of recovery.

Figure 14: Real Average Weekly Earnings



Real Average Weekly Earnings, United Kingdom. (2000-2016). 2008=100 with 2000-2004 trend.

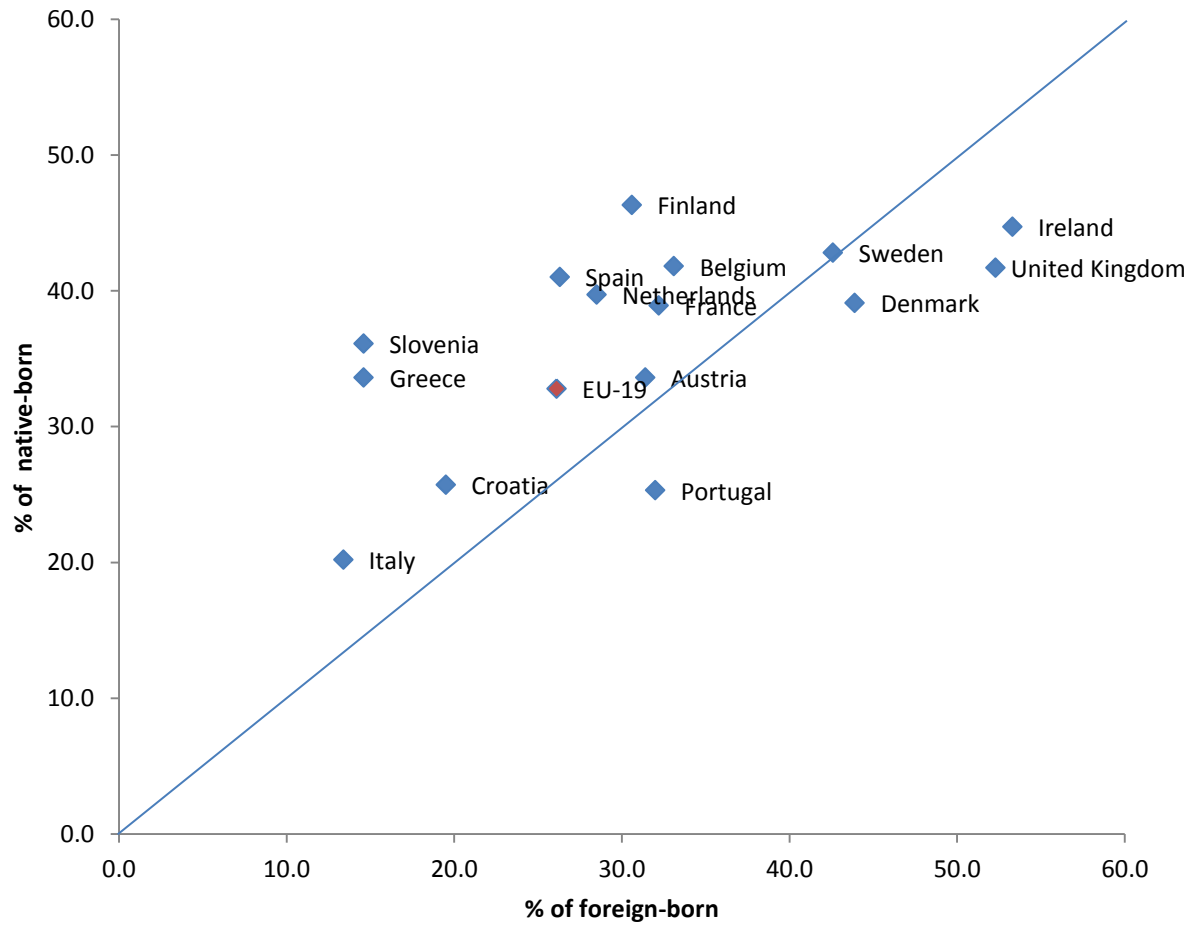
Sources: ONS and our calculation.

One of the reasons behind such negative pattern has been identified in the labour reforms that Whitehall passed in the past few decades; limited union's bargaining power and a more flexible market made it possible for British firms to retain their employees throughout the financial crisis.

More importantly, throughout the crisis firms had access to a significant pool of graduate foreign workers (Figure 15) and professionals (as showed earlier in Figure 10). The United Kingdom benefited from more than 100,000 regulated professionals since 1997 and, as of 2013, was one of the few advanced economies within Europe to have a higher share of foreign graduates relatively to the native-born population.

During the great recession firms consequently found profitable to operate through a capital substitution mechanism, meaning that they had incentives to increase labour contribution at a relatively higher rate with respect to capital levels. Such approach has been driven by two underlying factors. The first one is the already cited drop in average weekly real earnings – and this was possible thanks to good labour supply which makes labour relatively cheaper than, ceteris paribus, capital. The second factor relates to the fact that investments are relatively more costly, due to the deleveraging operations that British banks are still undertaking after the crisis erupted (Pessoa and Van Reenen, 2013). Such endogenous mechanism thus involves an increase in labour, which in turn – being such labour highly skilled – brings output gains which then make desirable for firm to increase its working force. As Martin and Rowthorn (2012) argue, such circumstances are typical of a demand-constrained lower wage economy, which increase labour hoarding therefor depressing labour productivity growth rates.

Figure 15: Rates of Tertiary Education (25-54 Years Old)



Rates of Tertiary education, Selected European Countries (2013). Share of native born population with a degree (vertical axis) and share of foreign born population with a degree (horizontal axis). Age 25-54.

Sources: Eurostat and our calculation.

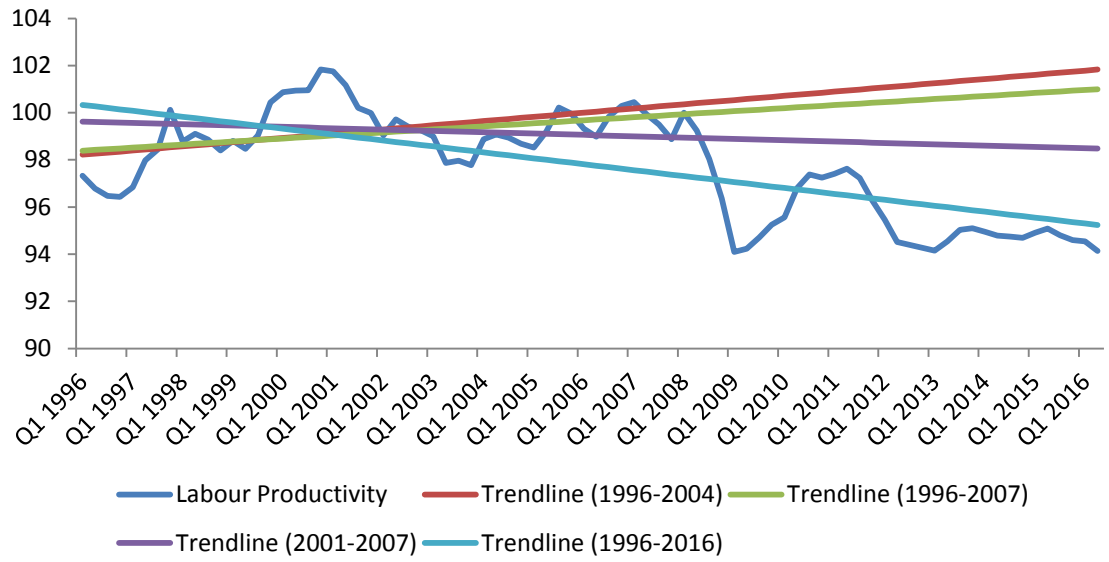
Broadly speaking, while the labour productivity data might point towards a loss of efficiency of the British economy, the aforementioned documented unique characteristics of the English labour market makes output per worker a poorly-informative statistics; in a framework where firms have incentives in hoarding labour rather than investing in physical and human capital, labour productivity, being the ratio between output and labour, reflects not only the efficiency of the British workers: it captures - among other things as explained in section 1 - the unprecedented supply of skilled labour.

Ultimately, what looks like an adverse puzzle for United Kingdom results in a loss for other countries that see their highly skilled labour supply to shrink, further exacerbating the growth differentials and increasing the likelihood of a *hard adjustment.*

3.2.1. The Italian Lost Decades

During the last two decades Italy has recorded remarkably low – if not negative – labour productivity growth. As Figure 16 shows, no matter for which period between the 1996 and the 2016 the trend is computed, the trajectory of the output per worker in Italy is substantially flat – if not negative.

Figure 16: Labour Productivity (1996-2016)



Labour Productivity, Italy (1996-2016), Q1 2008=100 and linear trend.

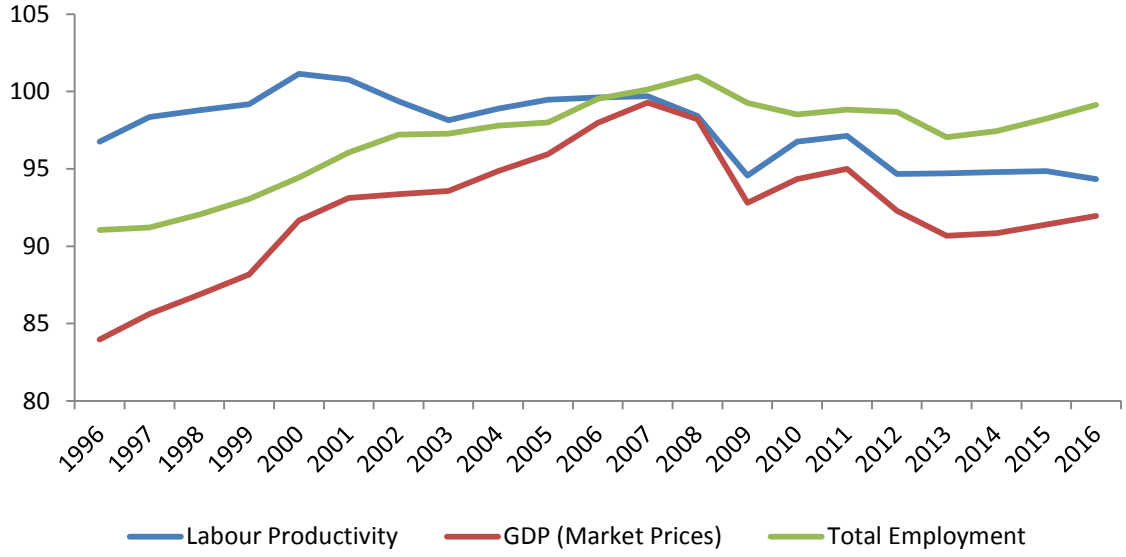
Sources: OECD and our calculations.

This suggests that weak labour productivity growth is not a recent flaw of the Italian economy; indeed, already in 2002, the then Governor of the Bank of Italy, Antonio Fazio, in his concluding remarks contained into the *Report to the annual General Meeting*, urged *immediate policy responses to stop the loss of competitiveness suffered by the Italian system.*[11]

[11] Bank of Italy Annual Report (2002), 'the Governor's Concluding Remarks for 2001', https://www.bancaditalia.it/pubblicazioni/relazione-annuale/2001/index.html(accessed 09/11/2016)

Similar consideration can be applied to both GDP levels and to the workforce employed within the economy (Figure 17). As of 2016, Italy recorded the same GDP at market prices as in 1999 and while the crisis might help to explain part of this lost decades, much of this dismal performance should be attributed to low pre-crisis growth rates. The impact of the *great recession* on the Italian GDP levels and unemployment rates was indeed relatively mild, meaning that the post-crisis deviation from the pre-crisis trend as not been as accentuated as in other advanced economies.

Figure 17: the Italian Lost Decade(s)



Average Annual Labour Productivity, GDP at Market Prices and Total Employment (1996-2016). 2008=100.

Sources: ISTAT, OECD and our calculation.

We argue that such generally held evidences underlie structural issues rather than cyclical problems. Following Manasse (2013) we claim that the roots of the current recession can indeed be found in the past*, a lost decade of missed reforms in product, labour and credit markets*. The latter characterized a stagnant economy in which average real earnings were (are) *completely decoupled from productivity and demand conditions*.

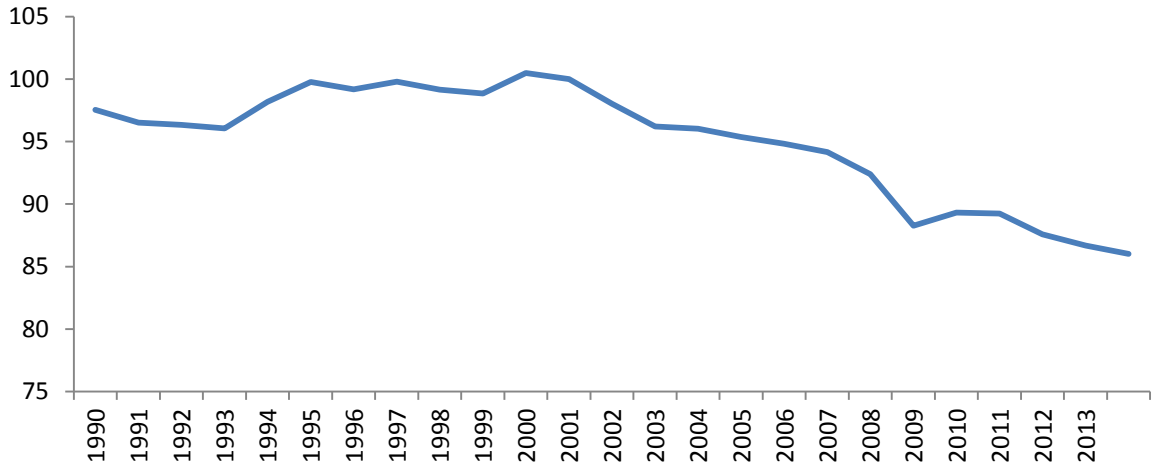
As Manasse & Manfredi (2014) show, during the period 2000-2014 despite few (attempted) labour market reforms, Italian real salaries *have grown more in those sectors in which productivity has increased les;* the latter indicates that what we believe to be incomplete reforms only succeeded in distorting incentives rather than promoting a more efficient and flexible allocation of the workforce.

The *Job Act* in 2015 resulted into a dual labour market in Italy where young – and relatively more educated – workers are part of a flexible and low-welfare labour market while older – and relatively less educated – employees are rooted in a rigid and welfare-intensive market. Ultimately, such dual market distorts both workers and firms' incentives, resulting in an inefficient allocation of labour capital.

Nonetheless, while not few issues might be tied with labour market flawed reforms, the Italian labour productivity has been also severely hampered by extremely low TFP growth rates. As we show in Figure 18, Italian TFP levels are below the ones previously achieved in 1990. This is consistent with what documented by Becker et al. (2003): *since the mid-1990's the share of college*

graduates among emigrants from Italy has become larger than that share among residents of Italy. Such highly skilled labour force is *replaced* by migration flows from extra-European countries which generally carry a less educated workforce than the average Italian (Figure 15).

Figure 18: Total Factor Productivity (1990-2014)



Total Factor Productivity, Italy (1990-2014), 2001=100.

Source: OECD.

This in turn negatively impact labour productivity both in the short run, due to the reduction of the levels of human capital in the economy, and in the long-run, given the lower capacity to absorb new technologies of the economy, hence hampering TFP growth levels.

Unfortunately, following what just said and what argued in Section 3.2, adjustments are far from being easy to achieve. The labour reform passed between 2014 and 2015 known as *jobs act* created a dual labour market in which incentives are distorted (Fana et al., 2015); investments in human capital are halted by high debt levels and the high debt service that the latter carry with; finally, an adjustment through real wages does not look possible due to low inflation levels, the already cited unsuccessful labour reform and general labour market conditions that makes Italian wage *stickier* than the one of western and northern European countries.

Conclusions

In 2000 the European Council launched the Lisbon Strategy with the goal to turn the EU into "*the most dynamic and competitive knowledge-based economy in the world by 2010".* As expected, such hyper ambitious and ill-thought plan did not succeed. More importantly, not only total factor productivity levels did not increased but, as we discussed in the paper, European countries experienced regional-based productivity growth differentials. While in northern countries productivity levels increased, southern countries experienced flat or even negative labour and TFP growth rates once the cyclical effects of the crisis are filtered out.

Achieving higher labour and TFP growth rates is important for all European countries in order to restore a path of sustainable and extended growth. Achieving convergent levels of such growth rates is even more important for the short-medium term stability of the European Union and the Eurozone. Yet, whether such target is achievable, and how, it is not clear.

In this paper we argue that flows of skilled workers from southern countries, that in recent years have experienced a brain drain, and northern countries, have exacerbated labour productivity differentials. We first documented how less human capital carry an immediate loss in labour productivity level in à la Lucas/Becker framework and partially compromised future converge, being the rate of absorption of new technology, the key component behind long term prosperity, a function of human capital within the Nelson/Phelps model.

Looking at the United Kingdom and Italy we have highlighted two different dynamics among productivity growth, labour supply and output growth. We argue that Britain's productivity puzzle can be explained– among other factors – by low real wages relatively to southern eurozone countries. Italy's 'brain drain' and negative TFP have affected labour productivity and output growth in recent years. Broadly speaking, what is a gain for the Great Britain is a loss for Italy in what looks like a zero-sum game. Whether such pattern will endure a *hard Brexit* is matter for debate and future analysis.

References

Acemoglu, D., & Autor, D. (2011). Lectures in labour economics. Manuscript. http://economics. mit. edu/files/4689.

Barnett, A., Batten, S., Chiu, A., Franklin, J., & Sebastia-Barriel, M. (2014). The UK productivity puzzle. Bank of England Quarterly Bulletin, Q2

Beachill, B., & Pugh, G. (1998). Monetary Cooperation in Europe and the Problem of Differential Productivity Growth: an argument for a 'two-speed' Europe. International Review of Applied Economics, 12(3), 445-457.

Becker, G. S. (1962). Investment in human capital: A theoretical analysis. The journal of political economy, 9-49.

Becker, S. O., Ichino, A., & Peri, G. (2004). How Large is the" brain Drain" from Italy?. Giornale degli Economisti e Annali di Economia, 1-32.

Boeri, T. (Ed.). (2012). Brain drain and brain gain: The global competition to attract high-skilled migrants. Oxford University Press.

Broadberry, S. N., & Crafts, N. F. (1996). British economic policy and industrial performance in the early post-war period. Business History, 38(4), 65-91.

Bush, O. (2008). Answering practices survey of CBI Industrial Trends Survey respondents, CBI Working Papers.

de La Fuente, A. (2011). Human capital and productivity. Nordic Economic Policy Review, 2(2), 103-132.

Fana, M., Guarascio, D., & Cirillo, V. (2015). Labour market reforms in Italy: evaluating the effects of the Jobs Act (No. 2015/31). Laboratory of Economics and Management (LEM), Sant'Anna School of Advanced Studies, Pisa, Italy.

Gordon, R. J. (2000). Does the "New Economy" Measure Up to the Great Inventions of the Past?. Journal of economic Perspectives, 14(4), 49-74.

Helpman, E. (2004). The Mystery of Economic Growth. Harvard University Press.

Hospido, L., & Moreno-Galbis, E. (2015). The Spanish productivity puzzle in the Great Recession.

Hughes, A., & Saleheen, J. (2012). UK labour productivity since the onset of the crisis—an international and historical perspective. Bank of England Quarterly Bulletin, Q2.

Ilmakunnas, P., Skirbekk, V., van Ours, J., & Weiss, M. (2007, May). Ageing and productivity. In Ninth European Conference of the Fondazione Rodolfo DeBenedetti,"Health, Longevity and Productivity," Limone sul Garda, Italy, May(Vol. 26).

Lucas, R. E. (1988). On the mechanics of economic development. Journal of monetary economics, 22(1), 3-42.

Manasse, P. (2013). The roots of the Italian stagnation. CEPR Policy Insight, 15(66), 2013.

Manasse, P., & Manfredi, T. (2014). Wages, productivity, and employment in Italy: Tales from a distorted labour market. Vox EU. April, 19.

Martin, B., & Rowthorn, R. (2012). Is the British economy supply constrained II? A renewed critique of productivity pessimism. Centre for Business Research, University of Cambridge.

Mundell, R. A. (1961). A theory of optimum currency areas. The American Economic Review, 51(4), 657-665.

Nelson, R. R., & Phelps, E. S. (1966). Investment in humans, technological diffusion, and economic growth. The American economic review, 56(1/2), 69-75.

Pessoa, J. P., & Van Reenen, J. (2013). Wage growth and productivity growth: the myth and reality of'decoupling' (No. 401). Centre for Economic Performance, LSE.

Reinhart, C. M., & Rogoff, K. S. (2008). Is the 2007 US sub-prime financial crisis so different? An international historical comparison (No. w13761). National Bureau of Economic Research.

Reinhart, C. M., & Rogoff, K. S. (2009). The aftermath of financial crises (No. w14656). National Bureau of Economic Research.

Reinhart, C. M., & Rogoff, K. S. (2011). From financial crash to debt crisis. The American Economic Review, 101(5), 1676-1706.

Sachs, J. D., & Warner, A. M. (1995). Economic convergence and economic policies (No. w5039). National Bureau of Economic Research.

Subacchi, P. & van den Noord, P. (2016). Increasingly Apart Post-Crisis Growth Trajectories in the UK and Eurozone. Chatham House Working Papers Series.