

The Road to Structural Convergence in the Eurozone.

Industrial Policies in a future Eurozone Federal State

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Abstract: In this paper, we focus on and try to measure structural productive asymmetries between peripheral and central economies in the eurozone. We assess the economic effects of such asymmetries according to a post-Keynesian structuralist approach, and try to get some implications as to the design of future industrial policies at EU level. We stress that future EU industrial policies should dispose of much larger funds with respect to the present setting, and specifically target productive development in the eurozone periphery. At a European-wide level, we argue that sectoral policies must be rediscovered with respect to recent past experience, and that public EU procurements for domestically produced may be extremely useful for achieving both short-run expansionary goals, and long-run improvements in productivity dynamics.

Keywords: Center-periphery eurozone structural symmetries, EU industrial policies, post-Keynesian structuralist theory.

Introduction

Several economists describe the eurozone crisis according to three main lines. First, before the 2007-2008 financial crash, the process of monetary and financial integration has allowed most peripheral eurozone countries to benefit of considerable capital inflows (Vernengo and Perez-Caldentey, 2012). Accordingly, their economies expanded pretty fast (often faster than central economies), and housing booms took place in Ireland, Spain, and (in a lesser extent) Greece. Relevant external imbalances emerged much in the same way it historically happened in developing countries after financial liberalization (Stockhammer, 2012). Second, the worldwide financial dislocation induced by the sub-prime crisis has thrown all the eurozone in a deep recession, and forced national governments to come in to bail out close-to-bankruptcy private financial institutions, and provide relief against recession. A prevalently private sector problem has become a public concern (De Grauwe, 2010). The loss of monetary sovereignty by eurozone countries constitutes the third piece of the story, since it has increased the fear about sovereign debt default, opened space for speculative attacks and capital flights away from externally indebted peripheral countries. The austerity programs eventually adopted to restore financial soundness has

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miserably failed by setting in a vicious spiral between fiscal restrictions, further economic contractions, and deeper fiscal imbalances.

In some previous contributions, we have shown that expansionary fiscal policies implemented by a monetarily sovereign eurozone central government, and possibly funded by issuing Eurobonds, likely represent the definitive way out of the crisis (Botta, 2013a, 2013b). Indeed, expansionary fiscal policies implemented by a federal euro government may favor economic recovery in the periphery, and avoid financial instability to widespread in the entire monetary union. In these contributions, we mainly focused on the short-run anti-cyclical nature of expansionary measures. Here we move to consider how short-run and long-run goals could be jointly pursued through industrial policies that support productive investments, hence effective demand and economic recovery, in peripheral countries, and stimulate the long-run growth potential of the economy. Part of the above problems have a structural nature linked to long-lasting productive asymmetries between peripheral and central economies. Whilst austerity measures and internal devaluation cannot overcome and eradicate such asymmetries, industrial policies can attempt to.

In this paper, we take into account a wide range of policies, which run from more “traditional” industrial measures influencing industrial and productive dynamics, to public involvement in research and development (R&D) activities. Nevertheless, they rely on three main strategic actions. First, a euro-funded industrial policy should considerably increase expenditures devoted to basic research carried out through high-level education institutions. Indeed, according to Dosi, Llerena and Sylos Labini (2006), whilst these efforts are fundamental to expand the scientific knowledge on which applied innovations can be carried out, they may help to create a “business-friendly” environment, and are most welcomed by private corporations. Second, alongside basic research, public-private research centers should strengthen R&D networks in the national innovation system and care about applied applications of the above knowledge. Last, but not least, the emergence of innovative firms should be stimulated through public support, let say subsidies or fiscal incentives. In this regard, sectoral policies should be rediscovered by European institutions. Provided that innovative sectors face highly dynamic demands on international markets, sectoral policies may help the eurozone periphery to significantly improve its external balance position, and possibly achieve fast and sustainable growth paths. All in all, what we think strikingly clear is that the future eurozone industrial policy must look like very different from the current exclusive emphasis on non-distortionary supply-side horizontal policies and market-driven comparative advantages.

The paper is organized as follows. Section I provides a picture of structural asymmetries among eurozone countries. We propose a synthetic Productive Structure Similarity Index (PSSI), through which peripheral countries’ productive structures are compared with that prevailing in Germany. Section II analyses the economic consequences of the above asymmetries according to the post-Keynesian structuralist tradition. Section III discusses and concludes on how R&D/industrial policies could address such dichotomies, and provide a way out from the crisis by favoring the upgrading of peripheral countries’ production patterns.

I. Center-Periphery Structural Asymmetries in the Eurozone

When finance-induced economic booms take place in developing countries, asymmetric productive structures with respect to more developed economies likely give rise to increasing external imbalances. Of course, huge capital inflows can easily fill the external gap in times of financial euphoria, when financial markets do not care about macroeconomic fundamentals and long-run trends (Krugman, 2009). However, abrupt shocks like the 2007-2008 worldwide financial meltdown very often induce abrupt changes in the sentiments of foreign investors, huge capital flights, and painful economic corrections in the host economies.

The most recent economic facts in peripheral eurozone countries broadly follow the above sequence of events, and the tough policy measures they are currently implementing basically aim to deal with the accumulated external debt position. On the one hand, austerity packages may work to reduce imports, by cutting expenditures, depressing economic activity, and (indirectly) bring about a real exchange rate devaluation¹. On the other hand, since the exchange rate policy is out of control of national monetary institutions, internal devaluation carried out through sharp wage cuts attempts to spur exports, and possibly recovery. Whilst these measures desperately try to counteract diverging inflation and unit cost trends between peripheral and central economies², and restore the price competitiveness of peripheral goods, productive structure asymmetries (in the form of the specific types of goods produced and sold) may easily frustrate such efforts. At the end of the day, contrary to what supposed by most international organizations, whilst export response to internal devaluation may be mild, huge wage cuts may throw the economy in a deep recession and further impinge fiscal solidity³.

Which is the extent of productive asymmetries among eurozone countries, in particular between central and peripheral economies? Simonazzi, Ginzburg, and Nocella (2013) have recently provided some first evidence on structural differences between Germany and peripheral countries such as Spain, Greece and Portugal. They do so by analyzing cross-country differences in manufactured goods' exports, as synthesized by the Spearman rank correlation coefficient calculated on the revealed comparative advantage(RCA) Balassa index. In this paper, we follow the same logic, but we focus on differences in the sectoral composition of domestic manufacturing sectors rather than

¹ See Gibson and Van Seventer (2000) for a enlightening illustration of the mechanisms through which cuts in public expenditures may induce a real exchange rate devaluation in a simplified open-economy neoclassical model.

² See Dullien and Fritsche (2009), and Bibow (2012) on diverging unit cost dynamics among eurozone countries.

³ Following the one-sector open economy model proposed by Taylor (1991, chapter 7), we know that: $du/dw = -(\partial\Delta/\partial w)/(\partial\Delta/\partial u)$, with Δ being the usual open-economy equilibrium condition, $u=(X/K)$ the current capacity utilization, and w the monetary wage rate. Once assumed $(\partial\Delta/\partial u)$ to be negative according to standard stability conditions, the above differential has a negative sign (i.e. wage cuts stimulate economic activity) if $(\partial\Delta/\partial w)$ is negative. A necessary condition for this event to occur reads: $\eta/a - (1 - \pi)(1 - s_w)X/E > 0$ (with η being exports elasticity to the real exchange rate, "a" the domestic dependence on imported intermediate goods, π the profit share, s_w saving propensity out of wages, X and E domestic production and exports, respectively). Very likely, some peripheral eurozone countries like Greece and Portugal won't meet the above conditions, due to their relatively low propensity to export, and heavy reliance on domestic demand injections.

on trade statistics. More in details, we present a Productive Structure Similarity Index (PSSI), which is computed according to the following formula:

$$PSSI_{jt}^i = \frac{|M_{jt}^i - M_{Gt}^i|}{(M_{jt}^i + M_{Gt}^i)} \quad (\text{industry-level PSS Index})$$

$$PSSI_{jt} = \sum_{i=1}^n \left[\frac{(M_{jt}^i + M_{Gt}^i)}{\sum (M_{jt}^i + M_{Gt}^i)} PSSI_{jt}^i \right] \quad (\text{aggregated manufacturing sector PSS Index})$$

M_{jt}^i is the share of sector i on total manufacturing value added in country j at time t , and M_{Gt}^i represents the same figure in the case of Germany⁴. The PSS Index ranges from 0 (identical productive structures) to 1 (absolute divergence in the sectoral composition of the economy). We computed the PSSI for thirteen manufacturing sub-sectors, and for the manufacturing sector as a whole, from 1999 to 2011. We take into account all the peripheral eurozone countries (the so-called PIIGS). We include in our analysis also Czech Republic and Poland. Indeed, these countries do not participate to the monetary union. Nevertheless, according to Simonazzi, Ginzburg, and Nocella (2013), their productive structures have been significantly influenced by increasing productive connections with Germany. It might thus be interesting to compare the evolution of their productive structures with those emerging in peripheral euro countries in order to check for the emergence of two different (and diverging) production poles inside Europe. In the case of Spain, Ireland and Greece we also computed a PSS index referred to the construction sector, in order to emphasize the housing bubble (and the consequences on their productive structures) affecting those countries before the 2007-2008 crisis. Results for the overall manufacturing sector are reported in Table 1 below⁵.

The results reported in Table 1 show that small peripheral eurozone countries such as Greece, Portugal and Ireland present largely different (manufacturing sector) productive structures with respect to that prevailing in Germany. More disaggregated data tell us that most of these asymmetries come from the relative state of backwardness of the above peripheral countries in the productions of capital goods, which, on the contrary, stand out as the core of German productive specialization. This evidence may be a sign that productive development is not fully completed in the peripheral economies mentioned before, since that the emergence of a considerable capital good sector is generally seen as the most advanced step in the development process of an economy.

Productive asymmetries with respect to Germany are much less evident in the case of larger economies such as Italy and Spain. Nevertheless, our results tell us that they are slightly increasing across time, this evidence being different from the conclusions reached by Simonazzi, Ginzburg and Nocella (2013) in the case of Italy. In 2010 and 2011, in particular, the persistent recessions

⁴ We built the PSS index in the same way as the well-known intra-industry trade Grubell-Lloyd index is. Of course, arguments in the PSS index are industry shares on total manufacturing value added in the economy under consideration and in the benchmark economy (i.e. Germany), instead of export and import flows among trading partners.

⁵ More disaggregated data at industry level are provided by the author on request.

affecting peripheral economies seem to have impeded the recovery of the investment good sector, whilst Germany has recorded a significant upturn in its most typical industries. A similar analysis can be referred to France.

As expected, Austria and Czech Republic show a productive structure closely similar to that of Germany. In the case of Czech Republic, accordingly to Simonazzi, Ginzburg and Nocella (2013), this may be the result of the reorganization of Germany production industries through partial delocalization in Eastern European countries. In the same vein, Poland presents a productive structure more similar to the German one than Portugal and Greece do, even though in 2008 the level of economic development in Poland (as captured by the GDP per-capita) is less than one-half of the Greek one, and barely 60 percent of Portuguese GDP per-capita.

Finally, note the astonishing house-boom-led expansion of the construction sector in Greece, Ireland and Spain with respect to Germany.

[TABLE 1 HERE]

Different productive structures often go hand-in-hand with differences in the product composition of export flows. In Table 2, we compute the RCA Balassa index for selected European countries in four manufacturing sub-sectors: labor-intensive and resource-based sectors; low skill and low technology sectors; medium skill and technology-intensive productions; high skill and technology-intensive industries.

Accordingly to the structural features summarized in Table 1, Germany presents a persistent comparative advantage in medium-tech manufacturing sectors including most of capital goods industries. Indeed, from 1999 to 2012, German exports seem to concentrate even further in the medium/high-tech segment of manufacturing goods, whilst a process of increasing *de-specialization* is taking place in labor/resource intensive or low-tech sectors. Quite interestingly, the same processes can be detected in countries such as Poland and Czech Republic, very likely due to increasing intra-industry trade with Germany.

[TABLE 2 HERE]

Small peripheral countries such as Greece, Ireland, and Portugal present a radically different picture. Peripheral countries' export *de-specialization* in the medium-tech capital good sector is evident and striking in the case of Ireland and Greece. In Greece and Portugal, comparative advantages are still significantly localized in labor/resource intensive and low-tech sectors. In Greece and Ireland, finally, a RCA Balassa index higher than 1 is recorded in the case of high-tech industries. This perhaps surprising result largely depends on the type of manufacturing productions included in such a group. Indeed, according to UNCTAD, most chemical industries are classified as high-tech productions. It is in these sectors that Greece and Ireland score an increasing

export specialization⁶. Germany, on the contrary, is acquiring an increasing specialization in the production of highly-technological transport equipment and scientific instruments (sector codes 791 and 87 in the SITC Rev. 3 classification). Center-periphery differences that may appear somehow softened at an aggregated level of analysis thus clearly re-emerge when a more disaggregated perspective is adopted.

Larger economies such as Italy and Spain are somehow midway along a hypothetical technology road from eurozone periphery to Germany. In the case of Italy, it is evident his persisting export specialization in labor-intensive and low-tech sectors. Italy also maintain an extremely weak specialization in the mechanical industry (a traditional pillar of Italian exports), whilst (revealed) comparative dis-advantages are deep in the high-tech sector.

II. Eurozone productive asymmetries from a post-Keynesian Structuralist Perspective

Post-Keynesian Structuralist literature has traditionally devoted great emphasis to the problems arising from economic and monetary integrations between asymmetric economies. The Balance-of-Payments-constrained models (see McCombie and Thirlwall, 1994) have clearly shown that productive backwardness in the periphery can induce peripheral countries to persistently fall behind more developed economies if the trade account equilibrium is binding. Even admitting the possibility of running current account deficits and accumulating external debts, these imbalances must be short-lived. Very often, they have been conducive to exchange rate and/or financial crises that may ultimately have long-lasting negative effects on the growth performances of an economy. The economic scenario now prevailing in the periphery of the eurozone makes no exceptions, given the mounting concern about hysteretic effects of the ongoing crisis on long-run growth and employment dynamics (Fitoussi and Saraceno, 2013).

From an historical point of view, the strategic answer of most developing countries to recurrent imbalances, and the connected crises was the intervention of the public sector in the economic sphere through industrial policies aimed at supporting domestic industrialization and eliminating structural asymmetries with respect developed economies. Since the 1980s debt crisis, however, this policy regime has left the stage to the neoliberal agenda. Sectoral industrial policies have been abandoned, protectionist measures removed, and subsidy schemes to domestic firms dismantled. Markets liberalization has been implemented in order to increase competitive pressures. The remaining industrial policy initiatives have mostly taken the form of *horizontal* measures. Innovations should have taken the form of market-driven business initiatives, rather than public sector-targeted actions. New industrial policies should not have had to distort (but to strengthen) market mechanisms, should not have had any sectoral bias, and should have had care in increasing the availability of productive inputs only (i.e. stimulating people participation to the labor market

⁶ Greece specialization is relevant in the production of fertilizers, perfumes, and plastic goods (sector codes 55, 56 and 57 in the SITC Rev.3 classification). In the case of Ireland, specialization is strongly concentrated in the production of perfumes and pharmaceuticals goods (sector codes 541, 542 and 551 in the SITC Rev. 3 classification at three-digit disaggregation level).

by flexibilizing it, favoring capital accumulation by attracting foreign direct investments, neutrally supporting R&D activities). Indeed, in the neoliberal neoclassical perspective economic growth is a pure supply-side phenomenon.

The current institution design of the eurozone is totally inspired by such a philosophy. European institutions' exclusive focus on market integration, market competition, and market-driven adjustments is nothing but the complementary part of macroeconomic rules that define price stability and balanced public budgets as the only ways to achieve fast growth. However, the protracted crisis in the periphery of the eurozone, and the persistent center-periphery asymmetries recorded in the previous section cast serious doubts on the effectiveness of the above institutional building (Pianta and Lucchese, 2012). Pressures to rediscover and reconsider sectoral, and perhaps market-distorting, industrial policies are increasing (Aghion, Boulanger, and Cohen, 2011). In our view, there are at least two well-grounded reasons to strongly support such an instance. One comes from the economic theory on the nature of structural change and innovation. The other one is based on the observation of some stylized facts in the eurozone.

1) The process of structural change and production upgrading in peripheral eurozone countries imply innovation. New sectors must emerge, and new goods be produced. New and more efficient technologies must be adopted. Innovation, in turn, requires the acquisition and development of scientific knowledge, of technological and managerial capabilities. All these perhaps intangible productive inputs share the common aspect of being partially sticky and spatially localized factors (Cimoli et al., 2009). Indeed, innovations and technological knowledge have a *cumulative* and *path-dependent* nature in that their evolution hinges on past innovations and knowledge (Cimoli et al., 2009; Castellacci, 2007). Further, technological competencies involved in complex productions are crystallized in the interaction between interconnected firms and industries. Each skill represents a piece of a more complex puzzle, and it is strictly complementary to other pieces. Put the other way round, the profitability of any production process highly depends on the (perhaps close) availability of other connected activities, so that relevant coordination problems may impede new production initiatives to be viable in relatively underdeveloped economies. It is even more so in case of high-tech production. Indeed, coordination failures is one of the most relevant sources of cumulative diverging processes between developed and (relatively) underdeveloped economies (Lorentz and Llerena, 2004). They still constitute leading factors calling for public intervention in the economic sphere to foster the development process.

2) Empirical evidence on innovation performances inside the eurozone show that there isn't any sign of convergence between central and peripheral countries. Well on the contrary, technological gaps may be expected to widen even further.

According to the 2013 Innovation Union Scoreboard (European Commission, 2013), Germany is of one of the most innovative economic systems together with Finland, Denmark and Sweden. Most of the other central developed economies are defined as "innovator follower", whilst peripheral countries are classified as "moderate innovators". Ireland is the only exception, since

that it is included in the former group. The European Commission evaluates the country innovation performance by computing a eight-dimension index covering the several aspect influencing innovation processes (i.e. public and private support to R&D activities, availability of high-skilled labor, firms interaction into production networks etc...etc). A closer look to the single components of the aggregated innovation performance index reveals that center-peripheral gaps are particularly relevant as to the accumulation of human capital, the private and public financing of research activities and innovative firms, firms involvement in R&D expenditures, and the capability to create shared innovations through (productive) linkages inside the national innovation system. Such empirical evidence is not surprising. According to the cumulative nature of innovation processes outlined above, productive structure asymmetries are naturally reflected in cross-country different intensities with which private agents undertake innovative activities (Bilbao-Osorio and Rodriguez-Pose, 2004; Fillipetti and Archibugi, 2010). In light of this, public authorities in the periphery should try to (more than) compensate private sector backwardness and overcome technology lock-in phenomena by devoting privileged attention to innovation (both directly and indirectly by properly incentivizing private sector-led innovation). However, data on R&D expenditures (as a percentage of GDP) by the government sector and the high education sector seem to describe a different reality (see Figure 1). Indeed, peripheral countries are clustered in the south-west part of Figure 1 with respect to the north-east position of central economies. In the periphery, a low propensity to invest in innovative activities by the private sector is even exacerbated by insufficient efforts by national governments and high education systems.

[FIGURE 2 HERE]

The picture gets even worse, if possible, when we consider that the ongoing crisis has affected eurozone countries' innovation performance unevenly. Filippetti and Archibugi (2010) clearly stress that "countries endowed with stronger national innovation systems [read central economies] are less affected and are better able to respond, at least in relative terms, to the present recession (Filippetti and Archibugi, 2010, pag. 10)." Accordingly, the 2013 Europe Innovation Scoreboard records a strongly negative change in the innovation performance of Greece from 2008 to 2012. It is pretty easy to see that, this state of things remaining unchanged, center-periphery structural convergence is very far to come, is ever.

III. A True European Industrial Policy

Economic and technological convergence are not automatic outcomes of economic and monetary integration. Specific institutional settings and public policies are required to deal with structural asymmetries between countries (Cimoli et al., 2009). So far, the European industrial policy has largely amounted to a considerable body of rules aiming to eliminate remaining market barriers,

limit national governments' actions that may distort market mechanisms, and enforce a business-driven approach to innovation. In light of the above evidence, we argue that these measures are inappropriate and insufficient to confront with center-periphery divergence in the eurozone. This is even more so if we think that the current "economic union consists of the internal market and a *very modest* [italics is mine] set of cohesion [read regional] policies (Pelkmans, 2006, p.5)". We argue that two general principles should guide the reform of European industrial policies and the implementation of a new industrial strategy in the upcoming years:

- 1) Future European industrial policies must have a strong *regional* character. With this term, we mean that peripheral countries' productive development must become the main goal of industrial measures undertaken by European institutions, and that industrial policy must emerge as the strongest action to favor regional cohesion and center-periphery convergence. Eventually, strong emphasis on regional productive development is the main way for "europeanizing" the European productive system, instead of maintaining the existing center-periphery dichotomy. Indeed, more balanced productive and trade flows would likely rise inside the eurozone should center and peripheral countries present more technologically homogeneous productive structures, and compete on more equitable bases. According to this vision, cohesion funds, structural funds, and financial resources devoted to R&D and innovation must be seen as parts of a unique integrated policy.
- 2) Market coordination failures due to productive assets complementarities (for example, the complementarities between human capital formation and physical investments) shape structural changes in the center and in the periphery of the eurozone. As a consequence, European industrial policies must take on board *demand-side factors*, alongside supply-side ones, as relevant forces determining productive structures evolution and productivity dynamics inside Europe. For example, productive structures in the periphery may credibly upgrade only if efforts to improve labor force skills are coupled with rising regional demand for high-skill workers due to increasing productive investment and newly established high-tech productions.

Which are the concrete implications of the above principles as to the EU budget for industrial policy, the sectors expected to be most relevantly affected by the EU intervention, and the specific measures to adopt. Let us discuss some points.

As to the first point, existing budget constraints (self-imposed by EU institutions or set by financial markets) to national governments' budgets largely prevent them from implementing vigorous industrial measures. Thus, European institutions should take a much more interventionist stance, and considerably expand financial resources devoted to an integrated cohesion-technology policy. Obviously, this would entail to provide EU institutions with more conspicuous own financial resources than now is. In our view, eurobond issuances in a future European or, at least, eurozone federal entity should be designed to pursue this task, instead of focusing on member countries' public debt restructuring (see Botta (2013c) on this point). Unfortunately, following Fiorentini and

Montani (2013), the European Council seems to have recently preferred taking a different way, downsizing instead of expanding the EU budget⁷.

According to 2013 European Innovation Scoreboard, eurozone peripheral countries present deep lags as to the accumulation of human capital with respect to both central euro countries and international foreign competitors. Accordingly, EU industrial/cohesion funds to peripheral countries should first aim at overcoming this lack. They should finance a considerable increase in the expenditures on high education systems, this way expanding domestic availability of high-skill domestic labor force. Moreover, they should support basic scientific research carried out by high education institutions. On the one hand, according to Fillipetti and Archibugi (2010), the more human capital a country disposes of, the more resilient he is to economic downswings. On the other hand, huge efforts of high education institutes on basic research (instead of patentable applied research) may create a more business-friendly environment (Dosi, Llerena and Sylos Labini, 2006).

Institutions in national innovation systems are often not well integrated in peripheral countries. A further goal of EU next industrial policies in the periphery of the eurozone is to intensify innovation linkages inside local productive systems. We think about the creation of EU-funded research centers in the periphery that should involve high education institutions and private enterprises in joint innovation processes. On the one hand, these centers should focus on applied innovations, perhaps based on new basic scientific knowledge. In this sense, it is fundamental to develop their links with the university system and support researchers' mobility among research centers (from basic research to applied one, for instance) in order to facilitate knowledge dissemination. On the other hand, linkages with the private business sector are intended to ease commercially valuable applications of technological innovations. Indeed, EU-funded research centers may pursue three distinct but connected tasks. First, they may act as catalysts of production investment aiming to exploit joint public-private innovations. Second, they may act as *autonomous embedded* public institutions recollecting and sharing information on firms needs and innovation opportunities that are so important for properly implementing industrial and innovation policies (Rodrik, 2008). Third, they may track the effectiveness of R&D efforts in terms of innovations applicable to commercial uses.

Coordination failures very often prevent radical structural changes to take place in relatively poor productive structures. In this sense, the above initiatives may well turn out to be useless insofar as a better trained labor force, more qualified workers, and a higher stock of human capital and scientific knowledge do not find adequate employment opportunities in the domestic productive system. Indeed, such employment opportunities lacking, periphery-to-center brain drain phenomena would likely emerge, eventually reinforcing center-periphery asymmetries. According to the intrinsic properties of technological knowledge, we know that innovative firms

⁷ The 8th February 2013 European Council has decided to cut EU year budget to 1% of EU GDP. Further, a eight percentage points cut in cohesion and regional funds has been prospected in the framework of the 2014-2020 multi-period financial planning. Ultimately, Horizon 2020, i.e. the European Commission 2014-2020 R&D program, establishes that European funds for R&D and innovation activities will amount to 80 billion from 2014 to 2020, i.e. 0,08 percent of 2012 EU GDP yearly. It is very hard to see how these modest (to be fair) measures could effectively address the inside-Europe discrepancies noted in the paper.

would not naturally localize in backward economies. EU future industrial policies must take this into account, and question if unfettered market competition between asymmetric productive structures constitutes a sort of *unfair* competition between differently equipped competitors. Paradoxically, competitive pressures may intensify in the long run once public institutions *temporary* defend *initial* losers. In terms of our analysis, this amounts to say that EU industrial policies must envisage and admit a series of perhaps market-distorting measures incentivizing innovative firms localization in peripheral countries. Public support to innovative activities in peripheral countries may take the form of easy credit or public co-financing of productive investments⁸, tax incentives and subsidies linked to R&D expenditures. One important aspect of these measures is that they should be graduated according to the degree of embeddedness of new production activities in the domestic productive structures. For instance, public co-financing of or tax incentives to productive investment might augment in case of shared innovation activities among multiple actors that increase the density of peripheral national innovation systems. Further, such regionally-based incentives should be temporary and submitted to conditionality requirements. According to a well-known carrot-and-stick argument, public support must be conceded and (temporary) maintained provided that supported firms perform well in terms of easily checkable targets such as export shares on foreign markets and/or patented innovations.

Some final notes concern EU industrial policies considered in a wider European perspective with respect to the previous focus on regional development. Two points are worth considering in particular: the importance EU institutions should devote to sectoral industrial policies, and the relevance of public procurements for domestically produced goods. As to the first issue, even though sectoral policies have been largely disregarded by EU institutions in the previous years, they are now implicitly advocated back in the Horizon 2020 program, insofar as EU institutions identify some specific fields research and productive efforts should concentrate in. We judge this fact as a positive step in the right direction of rediscovering sectoral policies, in particular in the case of environmental-friendly productions. Indeed, rising worldwide concern about environment protection seems to suggest that the connected productive sectors would expand pretty fast in the near future. Accordingly, long-sight policies addressing technological developments in those fields may turn out to be strategically decisive to lead Europe acquiring competitive advantages in the production of, let say, energy-saving goods. As to the second point, public procurements for European goods are strongly needed for both short-run and long-run purposes. First, they may provide strong demand stimuli to favor recovery out of the present crisis. Second, EU-level public expenditures may have long-run effects, since that they may stimulate productivity dynamics. Differently from what generally supposed in mainstream models, public procurements may increase overall competitiveness given that demand-side and supply-side factors interact endogenously. Further, they may strengthen competition if providers are selected through tight Europe-wide selection processes.

⁸ Indeed, regionally-based easy credit policies may be extremely important should the ongoing credit crunch persist and credit accessibility remain much more difficult in the periphery of the eurozone than in central economies.

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Tables and Figures

Table 1- Productive Structure Similarity Index (PSSI) between selected European countries and Germany.

Country/Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Austria													
PSSI	0,18	0,17	0,18	0,18	0,18	0,17	0,17	0,16	0,16	0,15	0,14	0,18	0,17
Czech Republic													
PSSI	0,18	0,17	0,18	0,19	0,19	0,18	0,16	0,16	0,15	0,17	0,17	0,16	0,16
France													
PSSI	0,14	0,14	0,17	0,18	0,18	0,18	0,17	0,18	0,19	0,18	0,17	0,20	0,20
Greece													
PSSI (M)	0,40	0,40	0,38	0,37	0,39	0,38	0,38	0,37	0,39	0,39	0,41	0,44	0,45
PSSI (C)	0,13	0,15	0,21	0,14	0,19	0,22	0,26	0,37	0,31	0,24	0,07	0,13	0,30
Ireland													
PSSI (M)	0,49	0,44	0,48	0,49	0,46	0,46	0,44	0,45	0,46	0,47	0,48	0,52	0,53
PSSI (C)	0,10	0,16	0,22	0,22	0,27	0,36	0,43	0,46	0,40	0,26	0,21	0,41	0,46
Italy													
PSSI	0,19	0,19	0,20	0,21	0,22	0,21	0,21	0,21	0,22	0,22	0,19	0,22	0,22
Poland													
PSSI	0,29	0,29	0,30	0,29	0,28	0,28	0,28	0,26	0,29	0,29	0,24	0,29	-
Portugal													
PSSI	0,31	0,30	0,31	0,33	0,34	0,34	0,35	0,35	0,35	0,35	0,33	0,35	-
Spain													
PSSI (M)	-	0,20	0,20	0,21	0,22	0,23	0,24	0,24	0,25	0,25	0,22	0,24	0,24
PSSI (C)	-	0,32	0,38	0,42	0,46	0,50	0,54	0,55	0,54	0,53	0,50	0,42	0,37

Note: Letters “M” and “C” in parentheses stand for “manufacturing sector” and “construction sector” respectively.

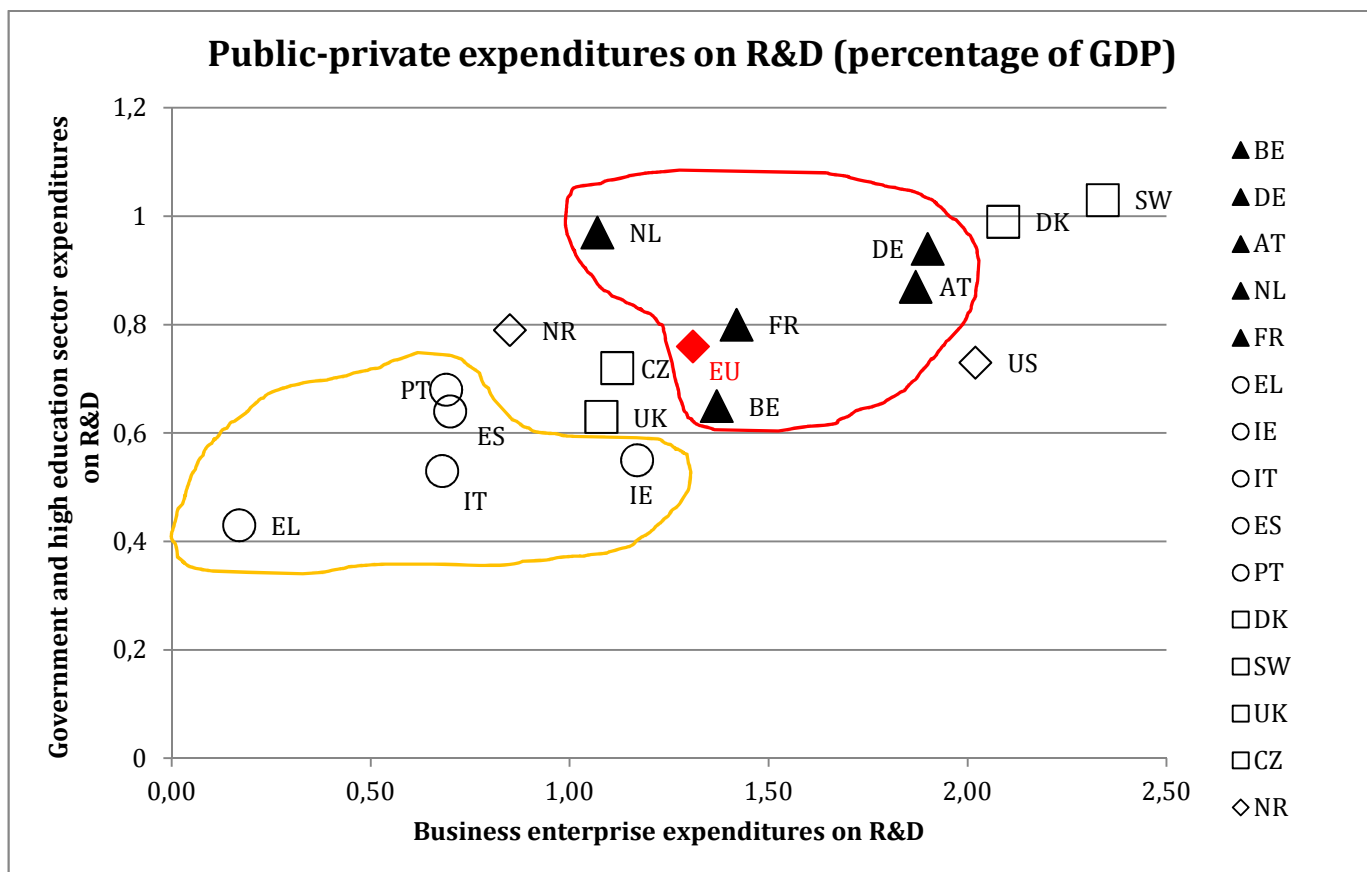
Source: Author’s calculation on the base of data from Eurostat.

Table 2 – RCA Balassa Index in selected European Countries and in selected manufacturing sub-groups

Country/Year	99	05	06	07	08	09	10	11	12
Austria									
Labor-intensive and resource-intensive	1,04	0,94	0,91	0,94	0,93	0,90	0,87	0,87	0,95
Low-skill and technology-intensive	1,66	1,51	1,45	1,48	1,49	1,67	1,61	1,62	1,64
Medium-skill and technology-intensive	1,07	1,17	1,17	1,16	1,17	1,17	1,16	1,15	1,11
High-skill and technology-intensive	0,56	0,59	0,62	0,63	0,61	0,66	0,68	0,67	0,68
Czech Republic									
Labor-intensive and resource-intensive	1,06	0,85	0,80	0,79	0,76	0,72	0,69	0,69	0,68
Low-skill and technology-intensive	1,78	1,51	1,41	1,35	1,32	1,35	1,29	1,33	1,35
Medium-skill and technology-intensive	1,13	1,36	1,39	1,40	1,43	1,55	1,54	1,52	1,49
High-skill and technology-intensive	0,50	0,43	0,42	0,42	0,42	0,42	0,42	0,41	0,42
France									
Labor-intensive and resource-intensive	0,70	0,65	0,65	0,67	0,66	0,63	0,61	0,64	0,67
Low-skill and technology-intensive	1,06	0,91	0,90	0,92	0,86	0,89	0,85	0,81	0,82
Medium-skill and technology-intensive	1,01	1,04	1,01	1,00	0,99	0,98	0,94	0,94	0,90
High-skill and technology-intensive	1,30	1,31	1,34	1,33	1,35	1,34	1,42	1,42	1,42
Germany									
Labor-intensive and resource-intensive	0,57	0,53	0,53	0,54	0,55	0,54	0,53	0,54	0,51
Low-skill and technology-intensive	1,01	0,92	0,91	0,90	0,86	0,93	0,90	0,86	0,88
Medium-skill and technology-intensive	1,23	1,32	1,29	1,29	1,31	1,33	1,35	1,35	1,32
High-skill and technology-intensive	1,09	1,01	1,03	1,02	1,02	1,01	0,99	0,97	1,01
Greece									
Labor-intensive and resource-intensive	2,57	1,80	1,70	1,62	1,56	1,46	1,46	1,35	1,53
Low-skill and technology-intensive	1,18	1,43	1,34	1,34	1,56	1,54	1,42	1,85	1,69
Medium-skill and technology-intensive	0,33	0,42	0,49	0,55	0,49	0,47	0,49	0,50	0,45
High-skill and technology-intensive	0,82	1,22	1,21	1,20	1,18	1,24	1,26	1,19	1,22
Ireland									
Labor-intensive and resource-intensive	0,23	0,14	0,14	0,14	0,12	0,08	0,11	0,10	0,11
Low-skill and technology-intensive	0,19	0,10	0,11	0,12	0,10	0,08	0,09	0,10	0,10
Medium-skill and technology-intensive	0,27	0,16	0,18	0,18	0,17	0,14	0,14	0,15	0,15
High-skill and technology-intensive	2,92	3,19	3,14	3,18	3,13	2,91	2,95	2,98	2,97
Italy									
Labor-intensive and resource-intensive	1,49	1,40	1,39	1,36	1,35	1,29	1,31	1,32	1,39
Low-skill and technology-intensive	1,21	1,27	1,27	1,31	1,25	1,40	1,32	1,30	1,30
Medium-skill and technology-intensive	0,92	0,99	1,01	1,03	1,07	1,11	1,07	1,06	1,01
High-skill and technology-intensive	0,65	0,69	0,67	0,65	0,63	0,64	0,68	0,68	0,70
Poland									
Labor-intensive and resource-intensive	1,84	1,34	1,27	1,27	1,22	1,21	1,25	1,24	1,26
Low-skill and technology-intensive	2,22	1,70	1,56	1,56	1,48	1,56	1,42	1,55	1,59
Medium-skill and technology-intensive	0,73	1,11	1,15	1,15	1,19	1,29	1,23	1,17	1,12
High-skill and technology-intensive	0,42	0,43	0,45	0,45	0,48	0,46	0,52	0,53	0,57
Portugal									
Labor-intensive and resource-intensive	2,42	2,22	2,17	2,25	2,21	2,18	2,18	2,19	2,12
Low-skill and technology-intensive	0,67	0,88	0,95	0,98	0,95	1,04	0,97	0,95	1,10
Medium-skill and technology-intensive	0,83	0,89	0,91	0,87	0,91	0,95	0,93	0,92	0,92
High-skill and technology-intensive	0,36	0,48	0,48	0,51	0,51	0,46	0,52	0,54	0,54
Spain									
Labor-intensive and resource-intensive	0,92	0,88	0,91	0,92	0,96	0,95	0,94	0,94	0,99
Low-skill and technology-intensive	1,22	1,26	1,26	1,15	1,11	1,20	1,21	1,20	1,19
Medium-skill and technology-intensive	1,23	1,20	1,20	1,21	1,21	1,26	1,19	1,21	1,14
High-skill and technology-intensive	0,69	0,80	0,78	0,81	0,80	0,79	0,86	0,82	0,87

Source: Author's calculations on data from UNCTAD

Figure 1 – Public (Government plus high education sector) and private expenditures on R&D activities in percentage of GDP, selected countries, 2011.



Note: Data on Greece (EL) refer to 2007. Data on United States (US) refer to 2009.
 Source: Author's calculations on data from Eurostat.