

## Em Análise

### Portugal: Recent Evolution in Productivity

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#### 1. Introduction

Portugal is experiencing a slowdown of productivity growth, similar to the one occurring in advanced economies. Given that aggregate productivity growth is the main source of per capita income differences across countries, it is also associated with a slower improvement of living standards.

Several explanations are presented in the economic literature: the birth rate of innovative firms able to deal with higher regulatory complexity and thrive is declining (OECD, 2015a); Insufficient investment in infrastructures, equipment, R&D and information and communication technology (ICT) in developed economies, associated with a weak aggregate demand (Sakellaris and Wilson, 2004; Jorgenson et al, 2008; Adler et al, 2017); Slower technology diffusion (Andrews et al, 2015); Non-competitive product markets and capital misallocation (Isaksson, 2007; Dias et al, 2016); Rigid labour markets and a rapid ageing population in European countries leading to skills and labour mismatches and insufficient knowledge and human capital accumulation (Bloom et al, 2012; Aiyar et al, 2016; Syverson, 2011).

In a neoclassical world, Portugal, poorer than most of the developed economies, is expected to converge in the level of productivity. That was the goal when the country became a European Community member. The aim of this text is thus to compare the recent evolution of productivity in Portugal and the most developed countries, the EU core<sup>2</sup> and G7, and to take advantage of studies on the Portuguese situation to understand why the expected convergence is not happening.

#### 2. Evolution of productivity

Aggregate productivity reflects the efficiency in producing in one country. In an aggregate production function, productivity growth can be complimentary measured through the change in labour productivity, or any other input, or in multifactor productivity.

Labour productivity (LP) measures units of output produced per unit of a labour input. LP growth reflects the gains from the use of the labour input and from multifactor productivity and capital, through its service per unit of labour. This same logic can be applied to capital or any other input. Assuming decreasing marginal returns, Portugal is expected to converge in LP with developed countries, better endowed with capital and labour. Multifactor productivity (MFP) growth reflects the increase in output that is not explained by a change in the quantity of inputs and it can be interpreted as the change in the stock of knowledge applied in production (the residual in economic growth). If everything else is equal, countries with a lower stock of knowledge will tend to imitate those with a higher stock and thus to catch-up and converge.

Both LP and MFP growth in Portugal converged with developed economies from a very low base after the transition to democracy, in 1974, until the 1990s. Improvements in the level of education, a higher rate of investment in tangibles and important reforms after EC entry help explain it. But since then productivity growth slowed and Portugal started to diverge due to insufficient investment in ICT and R&D, labour and product market rigidity and the excessive allocation of labour and capital to non-tradable industries<sup>3</sup>, partly dominated by state-owned firms or less open to competition. The evolution after the global financial crisis of 2008 is not yet clear.

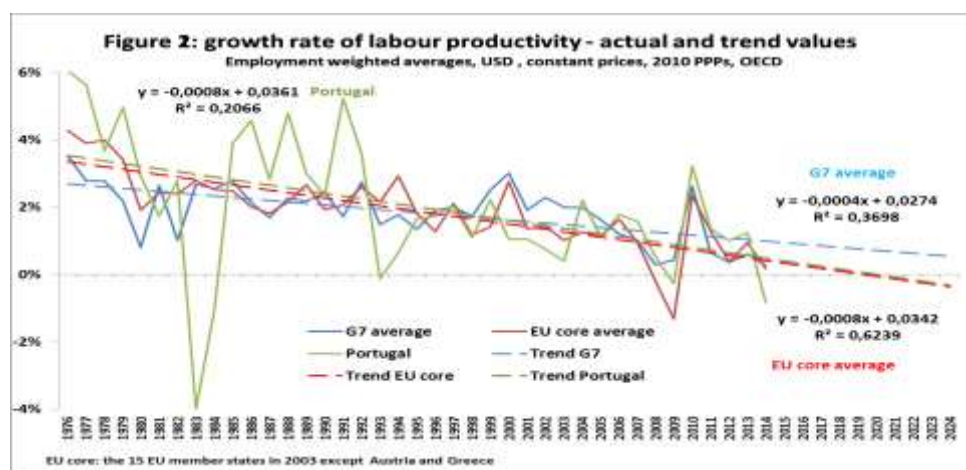
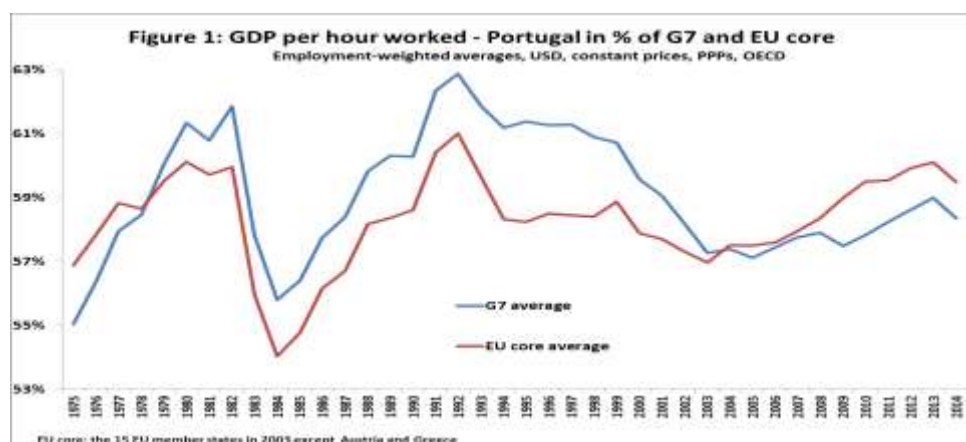
<sup>1</sup> GEE, IADE-UE. This article does not necessarily represent the views of the institutions.

<sup>2</sup> EU core includes all the member states in 2003 except Austria and Greece, for which there isn't data.

<sup>3</sup> Tradable industries when exports/sales higher than 15%. Include agriculture, mining, manufacturing, transports, tourism, consulting and other technical activities. The remaining, including the state sector, are non-tradable.

## 2.1. Labour productivity

Figures 1 and 2 below compare Portugal with employment-weighted G7, a proxy for globally developed markets, and the EU core averages, and show that LP grew faster in Portugal than in advanced countries up to mid-1990's (the break in the first half of the 1980's is explained by a balance of payments shock). From 1975 to 1995, LP yearly average growth rate was 2.8% and the average income in Portugal increased faster than in the EU core countries.



Between 1985 and 1995 (Table 1), when Portugal became member of the European Communities (EC), there was a catching-up and the LP yearly growth rate was 2.8% on average, significantly above the G7 countries (2%) and the EU core (2.2%). This higher growth is associated with the implementation of important liberalization reforms after the EC entry and improvements in human capital and a higher rate of investment that led to a higher capital-labour ratio (Freitas, 2012).

LP growth up to 1995 was also a result of better labour allocation. Employment started to move from agriculture and agro-food, textiles and other traditional industries to service sectors such as trade, utilities, construction, real estate, business services, financing or tourism, where there was higher productivity growth (Lains, 2008).

**Table 1: GDP per hour worked\* - yearly compounded growth rates**

	1970-1980	1980-1990	1985-1995	1990-2000	2000-2007	2007-2014
Portugal	3,6%	2,1%	2,8%	1,9%	1,3%	0,9%
G7	2,8%	2,2%	2,0%	2,0%	1,7%	0,7%
EU core	3,8%	2,3%	2,2%	2,0%	1,2%	0,5%

Source: OECD. \* USD Constant prices, 2010 PPPs. G7 and EU core: employment-weighted averages  
G7: Canada, France, Germany, Italy, Japan, UK and USA. EU core: 15 members in 2003 less Austria and Greece.

After 1993, however, LP growth started to progressively slowing down (figure 1), registering an annual growth rate of 1.2% up to 2014. As a consequence, LP in Portugal diverged up to 2003 with the EU core and up to 2007 with G7. Worse, Portugal was expected to grow faster in terms of LP but the underlying trend is of a tiny divergence with the EU core (seen only in the dashed lines), to whom is economically more integrated, and a stronger divergence with G7 (seen in the higher decreasing slope of Portugal's line and in the equations in figure 2).

Labour was allocated to smaller firms and non-market entities in trade and service sectors, which represented 72% of total employment. Non-structural factors such as deficient capital allocation to protected industries and to state-owned firms, distorted competition and rigid labour markets also explain the slowing down of LP (McKinsey, 2004).

Further trade liberalization with the creation of the World Trade Organization in 1995, reinforced by China's accession in 2000, the end of multi-fiber agreement and the EU enlargement to Central European countries in 2004, opened the European market for developing economies. It had two consequences for traditional exporting industries (textiles, footwear, pulp, etc.): a reduction in employment due to business closures, because lower relative wages were no longer a comparative advantage, and further improvements in LP in the remaining firms in these industries (Lains, 2008)<sup>4</sup>.

But LP gains in manufacturing were not sufficient. Overall LP divergence is evident since 1993, initially in trade and market services, and in the 2000's even LP growth in manufacturing became lower than in the EU core (Sondermann, 2012). Contrary to most developed economies, manufacturing was always a relatively small sector in Portugal in gross value added terms (GVA) because there was a direct transition of resources from agriculture to low LP growth activities such as construction, trade and market and non-market services.

A consequence of the low LP growth in Portugal, together with a higher increase in Portuguese real wages, the increasing consumption levels financed externally with Euro-related low interest rates and permanent deficits in the current account (Blanchard, 2007) was an almost unsustainable level of debt owed by families, firms and the Portuguese state that ended in a near-bankruptcy in 2011.

The relative level of LP recovered after 2007. Despite the important reforms recently introduced in the labour market and the catching-up in the level of education, it is difficult to know if this is sustainable. The stock of capital per person employed is decreasing since 2013 and recent employment growth is probably bringing back to the market some of the low skilled and less productive workers that became unemployed after 2000. If this is the case, and the latest available information up to 2017 seems to confirm it, it will negatively affect LP growth in the near future and confirm its decreasing long-term trend.

## 2.2. Multifactor productivity

Multifactor productivity (MFP) growth was also higher in Portugal than in most of the remaining developed economies between the 1970s and the beginning of the 1990's. According to Eckaus (2008), the average yearly growth rate of MFP in Portugal was 0.4 percentage points higher than the EU core of 15 countries between 1975 and 1985 and 2.1 p.p. higher between 1985 and 1990. After 1990, the rate of growth decreased but it was still above the EU15 average by 0.2 p.p. in 1990-1995. Throughout this period MFP in Portugal also grew faster than in the USA and Japan.

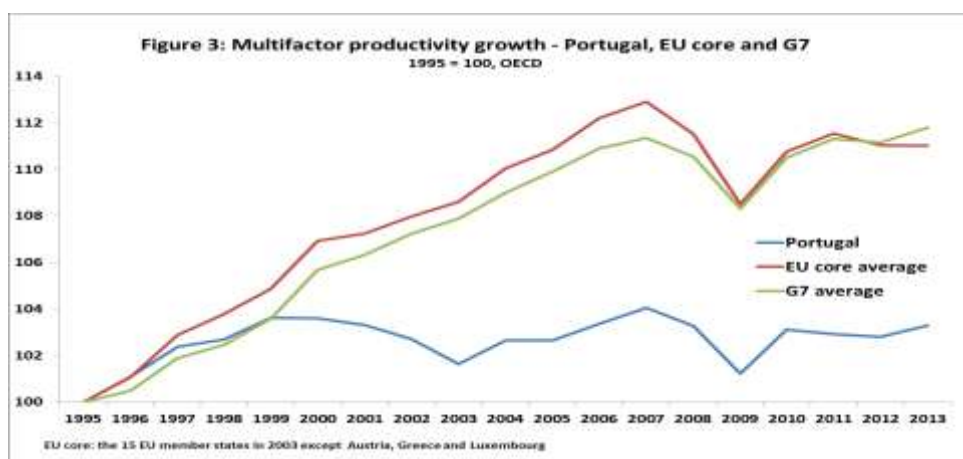
To Eckaus, the explanation for this convergence was a catch-up from a very low base, improvements in human capital due to the double of years of education for working age population, new investment from foreign sources (private and EU funds) in non-traditional sectors in Portugal such as the car industry and in Information and Communications Technology (ICT). Liberalization reforms after the entry to the EC in 1986 most probably helped.

However, MFP growth slowed in the end of the 1990s<sup>5</sup>, falling below that of the G7 and EU core countries (Figure 3 and table 2). Multifactor productivity grew by 0.2% between 1996 and 2013 (yearly average) and did even worse than LP because it stagnated since 1999. Portugal was not converging in MFP with most of the remaining advanced countries.

Balta and Mohl (2014), using a different methodology, explain the TFP-based technological gap between advanced and "laggard" economies (Portugal, Spain and Italy) within the Euro area to widen or to be persistent (depending on the industries) in the decade preceding the global financial crisis. In some non-tradable industries (utilities, construction and some services) that grew substantially in Portugal during this period there was even negative MFP growth partly due to insufficient investment in R&D and ICT, or, during the crisis, due to capital misallocation (Gopinath et al, 2017).

<sup>4</sup> Bloom et al (2015) explain the same effects in 12 European countries with Chinese import competition after its accession to the WTO.

<sup>5</sup> From this point on these are OECD numbers, while those presented in Eckaus (2008) are EC's.



**Table 2: Multifactor Productivity**  
yearly compounded growth rates

	1995-2000	2000-2010	2010-2013
Portugal	0,7%	0,0%	0,0%
EU core*	1,3%	0,4%	0,1%
G7	1,1%	0,4%	0,3%

Source: OECD.stat

\* EU core (the above EU countries and Belgium, Denmark, Finland, Ireland, Spain, the Netherlands and Sweden). Unavailable data for Greece, Austria and Luxembourg.

The insufficient investment in intangibles is consistent with the consumption-based model of economic growth in Portugal after 1995. An external inflow of money associated with low interest rates from Euro membership, together with high wage growth in non-tradable sectors, led to growing consumption levels that deteriorated the current account and to a substantial increase in external debt. Resources were misallocated to non-tradable and protected industries (wholesale and retail trade, state services and construction weighted more 10 p.p. in total GVA than in the Euro core countries), where MFP declined, and total investment was not revved up by the surge in domestic demand (Reis, 2013).

### 3. Distributional features

The productivity growth slowdown in developed countries is associated with a widening dispersion of productivity gains in each sector and with higher wage dispersion (Berlingieri et al, 2017; Andrews et al, 2015). Neo-Schumpeterian growth theory states that firms at the frontier are able to innovate and adopt new technologies and knowledge, thus keeping a higher annual rate of productivity growth. The remaining firms, however, may face a slowdown in productivity growth when there are frictions in technology and innovation diffusion through learning or catching-up.

This is observed in many markets where the effects of digital technologies and globalization led to winner take-most dynamics and is more pronounced in industries where recent product market reforms were less pro-competition, suggesting that policy decisions are limiting the diffusion process. (Andrews et al, 2016).

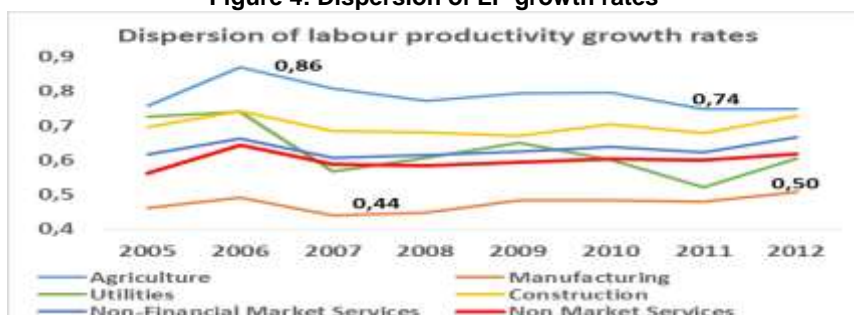
A question, then, is if this is happening in Portugal. Figure 4 and 5 are based on the OECD's Multiprod output and show the sectoral evolution of the standard deviation of LP and MFP growth rates between 2004 and 2012. In most industries a stabilization or a reduction in the dispersion can be observed. The dispersion of LP growth rates in the manufacturing sector has increased but that was not the case for MFP.

The standard deviation at a 3-digit industry also shows stability in the degree of dispersion. Exceptions include an increase in the standard deviation (pharmaceutical products, chemicals, wood and paper, rubber and plastics, electrical equipment, furniture, accommodation and food services, Legal and accounting, Advertising and market research) or a decrease (Computer, electronic and optical products, Publishing, audiovisual and broadcasting activities, IT, Electricity and gas, real estate, telecommunications).

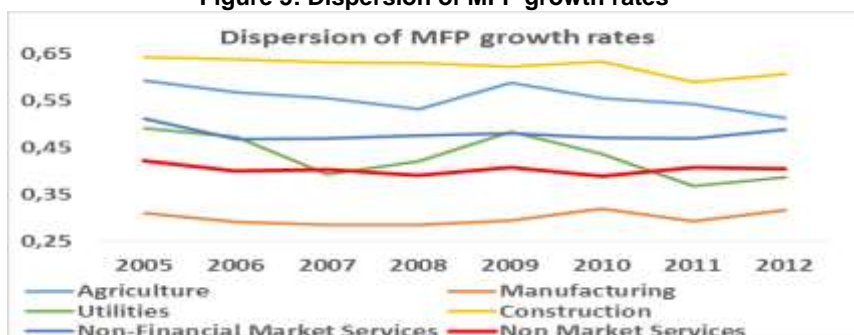
An explanation for the stability in the dispersion of productivity gains would be that, in global terms, none of the Portuguese firms are at the global frontier and the data only compares firms at the national frontier with the laggards, where productivity convergence seems to be easier (Bartelsman et al, 2008). However, many Portuguese firms are integrated in global value chains and are either leading their specific field (e.g.

Amorim for cork appliances in aerospace industry, CGC genetics or Via Verde for road tolls) or in multinationals where higher productivity levels justify the operation in Portugal.

**Figure 4: Dispersion of LP growth rates**



**Figure 5: Dispersion of MFP growth rates**



Source: based on OECD's Multiprod output<sup>6</sup>. MFP computed as a Solow residual.

Moreover, Santos et al (2017) present evidence of spillovers from recently introduced structural reforms in the business environment and product markets that impact MFP at a firm level. These spillovers are both of diffusion from the frontier through learning and innovation by laggards and of catching-up by other firms via the adoption of existing technologies or imitation of production processes.

The stability in dispersion, then, may be due to a low number of Portuguese firms connected to GVCs, namely SMEs which account for 99% of total firms. These few are benefiting for the diffusion and catching-up mechanisms but most of the Portuguese firms are not. It is consistent with the low competitive pressure in some product and service markets from the difficulty of new firms to survive in Portugal and the consequent excessive market power of incumbents. The low competitive pressure may be seen from the high mortality rate of the newborn Portuguese firms. Between 2009 and 2013 only 6% of the Portuguese firms were less than 2 years old and half of the small firms were more than 10 years old (OECD, 2017b).

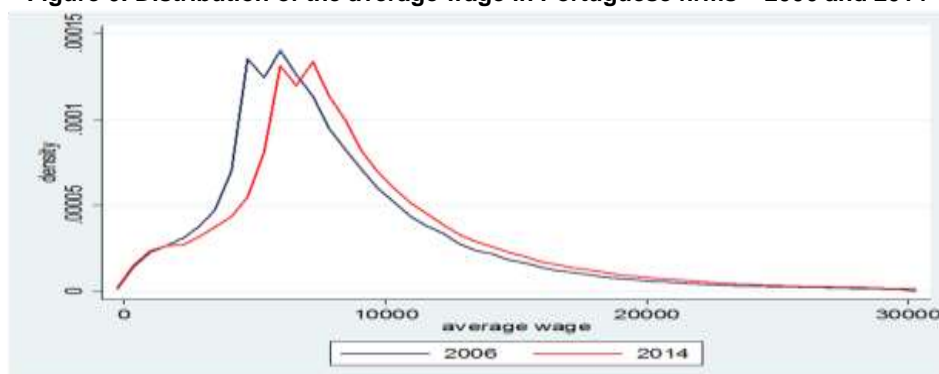
A consequence is that firms, when facing less competition, have a lower incentive to bear the temporary but “disruptive” costs of introducing productivity-enhancing new technology or changes in production practices (Foster et al, 2001, 2006; Bloom et al, 2015). This is more relevant for non-tradable industries, protected from external competition. Furthermore, it may limit the efficiency of knowledge and technology diffusion mechanisms, thus explaining why there was stability in the dispersion of productivity growth rates since 2005.

A second consequence at the OECD level was higher wage dispersion due to skill biased technology enhancements, resulting in a job polarization where middle income workers lose their jobs due to the delocalization of firms for other parts of the world, searching for a similar-skilled workforce at a lower cost.

Figure 6 shows the distribution of average wage in private firms to improve between 2006 and 2014. Table 3 presents different measures of dispersion that confirm lower wage dispersion. The ratio between the percentiles 90 and 10 slightly increased in some sectors (agriculture, market services, construction) but decreased in others (manufacturing, utilities). The increase was fully explained by the evolution in the ratio between middle and low-wage workers (50 and 10), given that there was a decrease in the dispersion between wages in the percentiles 90 and 50. Moreover, Gini coefficients decreased in all sectors except in Mining.

<sup>6</sup> Market Services: Wholesale and retail trade, transportation and storage, accommodation and food services, Publishing, audiovisual and broadcasting, telecommunications and IT; Real estate, Legal, accounting, head offices and management consultancy activities, technical, testing and analysis, advertising, market research, veterinary and administrative service activities, education, human health, repair of computers and household goods.



**Figure 6: Distribution of the average wage in Portuguese firms – 2006 and 2014**

Source: IES, firm level data

**Table 3: Dispersion measures of average wage (per worker)**

Sectors	90/10 (2006)	90/10 (2014)	90/50 (2006)	90/50 (2014)	50/10 (2006)	50/10 (2014)	Gini Coef. (2006)	Gini Coef. (2014)
<b>Agriculture</b>	4,41	4,46	1,91	1,83	2,31	2,43	0,32	0,31
<b>Mining</b>	3,62	3,79	1,86	1,80	1,95	2,10	0,29	0,30
<b>Manufacturing</b>	3,17	3,12	1,88	1,82	1,69	1,71	0,29	0,27
<b>Utilities</b>	5,82	5,12	2,40	2,35	2,43	2,18	0,42	0,40
<b>Construction</b>	3,88	4,09	1,95	1,91	1,99	2,14	0,33	0,31
<b>Market Services</b>	4,64	4,66	2,23	2,17	2,08	2,14	0,36	0,35
<b>Total</b>	4,24	4,41	2,12	2,06	2,00	2,14	0,34	0,33

Source: IES, firm level data

Therefore, it seems that distributional effects of the slowdown in productivity growth in Portugal do not match those presented by the OECD. Lower productivity growth in Portugal is neither associated with a dispersion of productivity gains between firms in the same sector nor with higher wage dispersion between high and low skilled workers due to skill biased technology enhancements. A consequence is that it is not desirable that public policies towards productivity should be limited beforehand by equality concerns, as sometimes it is argued (OECD, 2016).

The difference between the Portuguese case and the OECD thesis may arise from the economic crisis, when there was a huge increase in unemployment but wage moderation policies were highly progressive (OECD, 2017a). There was an increase in income inequality explained by higher unemployment (peaked at 17.5% in the 1st. quarter of 2013) but not due to wages given that average earnings for the total economy became more equal. The S90/S10 ratio decreased from 7.1 to 6.4 between 2006 and 2013 (Arnold and Rodrigues, 2015).

Indeed, it was low wagers, young and less-skilled workers, who were more affected by the increase in unemployment rate since 2000 and by the worsening of economic conditions that followed the 2008 financial crisis and the near-bankruptcy of 2011.

#### 4. Conclusion

A growing and deeper integration of the Portuguese economy in global markets was expected to lead to a convergence in productivity to the most developed countries. Paradoxically, this is not happening. After 40 years of democracy and economic integration Portugal still has almost a similar gap in LP and it is facing a decreasing and diverging trend in aggregate productivity growth.

Some of the productivity determinants have registered a positive evolution – investment in R&D, ICT capital growth, formal education, birth rate of new firms or increasing integration on global markets. But that seems to be not sufficient. Since the 1990s, inappropriate incentives increased resource misallocation at industry and firm levels, aggravating market inefficiencies. Economic policy was too focused on creating employment independently of their sustainability while depreciating reforms to improve resource allocation and productivity growth. Other reasons, to be explored, must explain why Portugal is not converging in terms of productivity. Nevertheless, insufficient policy evaluation helps explaining why it is taking so long to correct them.

The structural effects of recent reforms are not yet fully understood, namely if they were sufficient to enhance resource allocation, to improve competitiveness and to achieve a higher economic return from

inputs. Portuguese firms are still too small, too indebted and structurally too dependent on domestic demand. But they are the key for the Portuguese economy to become better integrated into global value chains so that the global productivity frontier is more frequently reached. It is a higher return from it that will improve living standards and make Portugal to converge.

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