Labor costs, KIBS, and export performance: a comparative analysis of Germany and Mediterranean economies

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Labor costs, KIBS, and export performance: a comparative analysis of Germany and Mediterranean economies

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Abstract: After the onset of the Eurozone crisis, Mediterranean economies (Greece, Italy, Portugal, and Spain) followed the example set by Germany, implementing structural reforms with the aim of restraining labor costs and transitioning to an export-led growth. Using input-output tables, this paper analyzes the role of labor costs and non-price factors in the export performance of the manufacturing sector in Mediterranean economies and Germany. To do so, we estimate an export model taking subsystems as units of analysis, which allows us to consider how the productive linkages between manufacturing and services affect export growth. Our results show that the effect of labor costs on export performance turns out to be negligible in these five economies, while non-price factors stand out as the main drivers of export growth. In addition, we find that the development of stronger linkages between knowledge-intensive business services (KIBS) and manufacturing provides a substantial stimulus for non-price competitiveness.

Keywords: Knowledge-intensive business services; subsystem approach; competitiveness; Unit labor costs

1. Introduction

Since the onset of the Eurozone crisis, Mediterranean economies (i.e. Italy, Portugal, Spain, and Greece) have come under heavy pressure to implement austerity and structural reforms in the labor market in order to pursue a more balanced export-led growth.

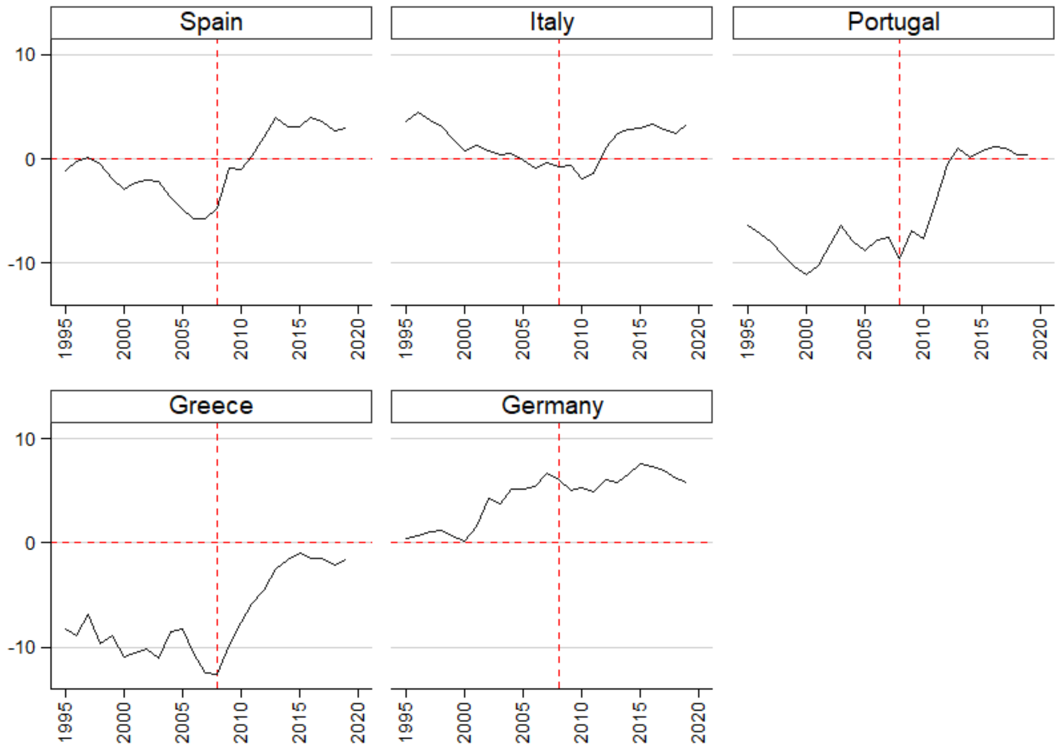
Comparative political economy (CPE) usually considers Mediterranean economies as a single model of capitalism, known as a mixed market economy (Molina & Rhodes, 2007; Hall & Gingerich, 2009; Hein et al., 2020). A main feature of this model is that non-tradable and tradable sectors are not coordinated in wage bargaining, which induces uncontrolled wage growth and inflationary pressure that undermine export-competitiveness. This is in stark contrast to the wage-setting system of coordinated economies like Germany, where export-oriented manufacturing industries set the pace for wage hikes in the rest of the economy with the aim of preserving cost-competitiveness (Traxler & Brandl, 2013). Moreover, many CPE scholars emphasize the centrality of labor-cost competitiveness as a major driver of both exports and growth (Carlin & Soskice, 2014; Johnston & Reagan, 2016; Höpner & Lutter, 2018; Baccaro & Tolber, 2021).

The CPE narrative of the crisis points out that the driving causes behind the crisis were the current account imbalances resulting from two connected factors: on the one hand, the divergence in price competitiveness between coordinated northern economies and uncoordinated Mediterranean countries, driven by trends in growth of unit labor costs (Bayoumi et al., 2011; Chen et al., 2012);

on the other hand, the adoption of a single currency that facilitated lower real interest rates for these peripheral highly inflationary economies. In a context of high domestic demand growth and large rates of return in the domestic construction sector, foreign capital inflows skyrocketed and fueled both public and private indebtedness (Lane, 2013).

The sudden halt of capital inflows eroded the underpinnings of the Mediterranean debt-led growth pattern (Kohler & Stockhammer, 2021). Shortly after, these economies started receiving strong external pressure to both implement fiscal austerity and liberalize their labor markets to rebalance their growth models by regaining cost-competitiveness. To do so, they combined a generalized decentralization of wage bargaining and deregulation of employment protection legislation for open-ended contracts with other specific measures such as the regulation of temporary employment or the reform of unemployment protection (Bulfone & Tassinari, 2020). Wage devaluation policies were rapidly applied in Spain, Portugal, and Greece, while this took longer in Italy. According to this view, these measures corrected trade imbalances, with Spain, Italy and Portugal achieving commercial surpluses, thus apparently transitioning from a debt-led to an export-led growth model (Figure 1).

Figure 1. Evolution of the trade balance (%GDP)



Source: AMECO, own calculations

In coherence with the abovementioned narrative of the crisis, Germany's economic policies have been set as the example to follow. This economy has been displaying an extreme export-led growth pattern since the late 1990s, which has been based, on the one hand, on the traditionally robust export performance of the German manufacturing sector – which exports highly sophisticated goods (Storm & Naastepad, 2015) – and, on the other hand, on a strong wage devaluation that has structurally depressed domestic demand and imports.

However, the view of wage devaluation policies to pursue export-led growth has been criticized because it forgets that the differentials in export-competitiveness between northern and Mediterranean Europe are also grounded in technological factors and not only labor costs or prices (Simonazzi et al., 2013; Felipe & Kumar, 2014). Northern economies like Germany are specialized in the production of high-technology goods, with a high income elasticity of export demand, while Mediterranean economies are more biased towards low-technology sectors, which – at least in theory – produce goods with low income elasticity. Thus, the differences in productive structures and industrial policies might play a more important role than costs differentials (Kohler & Stockhammer, 2021). However, in spite of these structural differences, labor cost and price elasticities found by the literature for Mediterranean economies do not differ much from German ones (e.g. Naastepad & Storm, 2007; Onaran & Obst, 2016; Villanueva et al., 2020).

Another important critique of labor market reforms is that to consider commercial surpluses as an indicator of competitiveness is wrong, since they are heavily affected by domestic demand dynamics: that is, wage restraint has impacts on both exports and imports, with only the former effect being a sign of competitiveness (Villanueva et al., 2020). In this vein, many countries that improved their trade balance after the crisis did so thanks to a brutal reduction in imports and not an important export boom (Kohler & Stockhammer, 2021). Indeed, this event is consistent with the previous observation: the influence of unit labor costs and export prices on exports might be very small even for Mediterranean economies.

Moreover, it should be highlighted that European export-led and debt-led growth models are interconnected. During the pre-crisis period, Germany took advantage of the Mediterranean growth pattern by exporting goods and services. Afterwards, the external savings obtained from current account surpluses flowed to Mediterranean economies, thus fueling their financial bubbles (Stockhammer, 2011b).

Although export-led growth does not seem to be an efficient alternative for Mediterranean economies (Perez & Matsaganis, 2019), the role of cost-competitiveness in driving the export performance of these countries remains unclear. While previous empirical works suggest that the impact of labor costs on exports is low for sophisticated exporting countries like Germany (Storm & Naastepad, 2015; Herrero & Rial, 2022), evidence for Mediterranean ones is rather inconclusive: some works claim that cost-competitiveness is a significant driver of exports for them (e.g. Felipe & Kumar, 2014), while others hold that their effect is negligible (e.g. Villanueva et al., 2020).

To fill this gap in the literature, this paper investigates the effect of labor costs on export performance in the four Mediterranean economies and compares them with Germany, the benchmark economy for good economic performance and labor market reforms. To do so, we focus on the manufacturing sector (tradable commodities are predominantly manufactured goods) and use a subsystem approach to the input–output analysis (Pasinetti, 1973; De Juan & Febrero, 2000; Montresor & Vittucci Marzetti, 2011; Ciriaci & Palma, 2016; Antonioli et al., 2020). Thus, we consider all domestic activities that directly or indirectly contribute to the production of final manufactured commodities. In this way, it is possible to research the evolution of labor costs throughout the whole domestic value chain, thus considering the existing channels through which both manufacturing and service activities could have contributed to export growth. This is an important issue to analyze because some researchers hold that one of the drivers of the commercial success in Germany was the unequal process of wage devaluation, which was much more intense in services and contributed decisively to increasing manufacturing competitiveness thanks to the supply of cheaper inputs (Hassel, 2014; Baccaro & Benassi, 2017).

Additionally, we consider that other non-price factors might be behind the evolution of exports of European economies. Particularly, we take advantage of the employed subsystem methodology to research the effect of the growing integration of knowledge-intensive business services (KIBS) in competitive strategies for manufacturing. These advanced services are both knowledge suppliers and innovation drivers, and they support manufacturers competing in international markets through the improvement of the goods they produce. They are, therefore, a principal driver of non-price competitiveness (Ciriaci et al., 2015; Herrero & Rial, 2022).

This paper's contributions are fourfold. The first one is that the debate on cost-competitiveness is addressed by changing the unit of analysis from the entire economy (e.g. Höpner & Lutter, 2018) or the manufacturing sector (e.g. Carlin et al., 2001) to domestic value chains. The second one is linked to the first contribution: services are usually identified as activities that are sheltered from international competition (Baumol, 1967; Traxler & Brandl, 2013), but we consider them as exposed because they are integrated into export-oriented manufacturing industries. The third contribution is a comparative empirical analysis of the effects of KIBS on manufacturing competitiveness in five economies with heterogeneous levels of export sophistication. Four, the paper might contribute to the political economy debate on European growth models from the supply-side view.

The paper starts with a description of the subsystem methodology. Afterwards, we analyze the productive structure of the five economies and pay special attention to the evolution of KIBS employment in manufacturing subsystems. The third and fourth sections explore the evolution of the vertically integrated nominal unit labor cost (nULC) for manufacturing both on an aggregate level and while separating the service portion from the rest of the subsystem, in order to detect where labor cost restraint took place. Then, we estimate an export model and calculate the contributions to export growth made by the variables of interest. Lastly, the paper concludes with some reflections.

2. Methodology

The comparative analysis of manufacturing cost-competitiveness is based on a subsystem approach to the input–output analysis (Pasinetti, 1973; De Juan & Febrero, 2000; Montresor & Vittucci Marzetti, 2011). A vertically integrated sector (VIS) or subsystem represents all the domestic activities that directly or indirectly satisfy the final demand of a particular good or service. Thus, the method considers that a final commodity is a composite good that requires inputs from other industries to be manufactured. As a result, it can be said that any subsystem is a completely independent production unit that includes every domestic input (and the production inputs of these inputs) required to meet the final demand.

Vertical integration is a useful methodology to capture productive interlinkages among industries and to study the labor cost structure of final commodities. It contrasts with the traditional approach to economic analysis, which implicitly assumes that each industry of the domestic economy is an autonomous unit that does not require inputs from other industries to produce goods or services. Thus, the traditional approach classifies commodities according to the industry that produces them; that is, it represents the production structure horizontally (not vertically) (Di Bernardino & Onesti, 2020).

To break down the economy into vertically integrated sectors, the input–output matrix is reorganized through the following equations:

$$B = (\hat{q})^{-1}(I - A)^{-1}\hat{y} \tag{1}$$

$$C = \hat{h}B \tag{2}$$

The operator B (Equation (1)) reclassifies any variable from a sector base to a subsystem one. The circumflex symbol indicates diagonalization. $\hat{q}$ is the diagonalized vector of production. The generic element q_i measures the total output at current prices of branch i. $(I - A)^{-1}$ stands for the Leontief inverse matrix and the generic element b_{ij} represents the output of branch *i* directly or indirectly required to produce a unit of final output of branch j. Lastly, $\hat{y}$ is the diagonalized vector of final demand, and its generic element y_i represents the contribution of branch *i* destined for final uses. Each row i of B adds up to one and shows the proportion of the activity of each branch *i* that is devoted to each subsystem *j* (Montresor & Vittucci Marzetti, 2011).

Then, the C matrix is derived (Equation (2)). As can be seen, the operator B is used to remap our variables of interest (i.e., employment, labor compensation, and real value added), from industries to subsystems. $\hat{h}$ is the diagonalized vector of the abovementioned variables of interest. Each column *j* in matrix C indicates the amount of the variable *h* referred to each branch *i* that is directly or indirectly used by subsystem *j* to produce its final output. Thus, the sum across all the elements of column *j* yields the value of the variable for subsystem *j*. On the other hand, each row i shows the amount of the variable h referred to branch i that is directly or indirectly used by each subsystem j. As a result, the sum across all the elements of row i yields the value of the variable for branch i.

These operations are repeated for each country and year of the period 2000–2014 (the largest possible with the available data). We use the second release of the WIOD Database, which offers data for 56 economic activities, classified according to the ISIC revision 4 (see Timmer et al., 2015, for further details). We consider 18 manufacturing sectors for the analysis.

3. The structure of the manufacturing subsystem

Before exploring the evolution of cost-competitiveness in the five economies, this section presents the productive structures of their manufacturing subsystems. A strand of literature points out that differences in growth and export performance are driven by uneven productive structures (Simonazzi et al., 2013; Gräbner et al., 2020). According to these works, the more advanced the structure of the economy, the less price-elastic are its exports.

It is worth highlighting that the subsystem approach considers that all activities involved in the production of a manufactured good are considered as a part of the manufacturing subsystem. This is quite important since division of labor has advanced over time and services have been increasingly integrated with manufacturing (Falk & Peng, 2013; Lind, 2014; Di Bernardino & Onesti, 2020). For instance, with the aim of gaining flexibility and reducing labor costs, many manufacturing firms have outsourced some activities that were previously performed within their boundaries, such as the canteen or the cleaning service, the customer service, or even some marketing or consultancy activities. As a result, the size of the manufacturing sector becomes larger when these activities are taken into account (Montresor & Vittucci Marzetti, 2011; Di Bernardino & Onesti, 2020, 2021).

Table 1 shows the size of the manufacturing sector according to the subsystem approach. Germany exhibits the largest share of manufacturing in both total production and employment, thanks to the evolution of high-technology subsystems. Actually, when looking at value added, this country has been able to contain the process of deindustrialization that most advanced economies are going through (Peneder & Streicher, 2018), thanks to the evolution of the abovementioned subsystems (which even increased their employment share). Italy's manufacturing share is close to the German levels, although the productive structure is much more biased towards low-technology sectors. Moreover, Italy is the country most affected by deindustrialization in our sample when considering value added. Table 1 also displays the profound employment deindustrialization suffered by Spain. The manufacturing subsystem in this country is similar in size to that in Portugal, although the share of the high-technology sector is larger. Lastly, Greece is the least industrialized economy, and low-technology subsystems are the most important ones. Therefore, although Germany is presented as the export-led example that Mediterranean economies should follow, the structural features of the five countries are very distinct.

Table 1. Share of the manufacturing subsystem in the economy (2000–2014)

		Total manufacturing		HT&MHT manufacturing		LT&MLT manufacturing	
		VA	Employment	VA	Employment	VA	Employment
Spain	Avg.	18.62%	18.59%	7.52%	6.58%	11.10%	12.01%
	Δ change (pp)	-3.83	-5.80	-1.55	-2.46	-2.28	-3.34
Italy	Avg.	25.77%	27.32%	10.72%	10.14%	15.05%	17.17%
	Δ change (pp)	-5.55	-4.93	-1.28	-0.80	-4.28	-4.14
Portugal	Avg.	18.66%	23.67%	4.49%	3.96%	14.17%	19.71%
	Δ change (pp)	-1.89	-2.39	-1.06	-0.47	-0.82	-1.93
Greece	Avg.	13.97%	15.43%	2.28%	2.02%	11.69%	13.41%
	Δ change (pp)	1.44	-0.13	-0.47	-0.06	1.91	-0.07
Germany	Avg.	31.74%	27.95%	19.63%	15.09%	12.12%	12.86%
	Δ change (pp)	0.66	-0.26	1.43	0.35	-0.77	-0.60

* Note: high technology (HT), medium-high technology (MHT), medium-low technology (MLT), and low technology.

Source: WIOD, own calculations

The subsystem approach is a powerful methodology to capture structural changes and the shifting boundaries between markets as well as to explore the productive structure of manufacturing subsystems. As previously argued, in modern economies, an important part of the service sector is connected with the industry. In fact, the evolution of service employment in manufacturing subsystems is frequently used as a proxy for outsourcing (Vittucci Marzetti, 2007; Sarra et al., 2018). More recently, some papers have pointed out that certain services, known as KIBS, are important drivers of manufacturing competitiveness, since they help manufacturing firms to innovate (Ciriaci et al., 2015; Herrero & Rial, 2022). KIBS comprise activities like consultancy or engineering and supply knowledge and assessment to other companies. Thus, their linkages with manufacturing go far beyond cost-saving issues and are positively associated with the technology content of subsystems (Ciriaci & Parma, 2016) and thus with the level of development of the economy.

With the aim of measuring the connections between services and manufacturing, the following operation is performed with matrix C:

$$Services_j = c_{g,j} + \cdots + c_{u,j} = \sum_{i=g}^{u} c_{i,j} \quad (3)$$

In Equation 3, all service activities (from g to u) are added up within a generic manufacturing subsystem j. This operation is usually performed for either value-added or employment.

Table 2. Vertical integration of services and KIBS into manufacturing subsystems, employment (average share and change, 2000–2014)

		Spain		Italy		Portugal		Greece		Germany	
		Services	KIBS	Services	KIBS	Services	KIBS	Services	KIBS	Services	KIBS
Total manufacturing	Avg (%)	34.92	8.53	33.72	11.27	18.58	6.30	36.48	5.46	32.82	13.24
	Growth (pp)	5.58	8.20	-1.69	3.15	4.58	2.91	9.35	3.46	4.47	3.82
HT & MHT VIS	Avg (%)	40.75	10.77	38.34	14.28	31.11	13.34	43.77	9.29	37.08	15.55
	Growth (pp)	5.78	10.48	-1.17	3.94	6.64	5.19	1.35	4.84	4.78	3.80
Mach. & equipment n.e.c.	Avg (%)	30.74	8.40	34.20	12.62	21.40	7.39	25.83	5.04	29.64	13.13
	Growth (pp)	11.74	10.46	-2.10	2.48	0.96	1.96	3.42	2.40	5.20	4.88
Electrical equipment	Avg (%)	36.63	10.56	35.45	12.34	26.56	10.17	41.49	7.40	33.37	14.17
	Growth (pp)	8.69	11.80	-2.69	3.07	12.39	6.15	8.63	4.51	0.09	2.57
Other transport eq.	Avg (%)	36.30	10.43	40.74	18.05	18.60	6.34	28.81	9.78	34.18	15.74
	Growth (pp)	9.43	10.70	8.06	9.23	3.39	2.42	-9.31	-1.40	11.43	8.99
Elect & optical prod	Avg (%)	38.10	12.42	37.53	14.62	45.72	27.78	36.68	8.62	39.97	15.31
	Growth (pp)	-3.31	7.74	-6.33	0.42	7.71	11.41	4.59	5.14	-2.23	0.86
Motor vehicles	Avg (%)	41.15	10.27	40.19	16.13	27.38	12.12	35.45	4.32	40.63	15.23
	Growth (pp)	1.83	9.68	2.59	8.41	5.03	5.05	-4.75	1.32	7.90	3.99
Basic pharma prod	Avg (%)	46.98	13.82	48.14	16.77	47.69	17.44	52.72	14.46	44.41	22.19
	Growth (pp)	1.20	10.23	6.01	8.99	5.36	5.79	-2.37	7.11	3.12	1.87
Chemicals	Avg (%)	49.97	11.88	47.26	14.21	37.90	11.78	56.14	8.40	44.92	21.62
	Growth (pp)	9.78	12.14	-11.25	-3.83	9.18	5.86	-3.19	3.88	5.19	2.98
MLT & LT VIS	Avg (%)	32.49	7.55	32.64	10.07	15.78	4.83	35.35	4.94	30.90	11.87
	Growth (pp)	5.88	7.31	-2.59	2.51	4.35	2.51	10.50	3.31	3.95	3.97
Fabricated metal products	Avg (%)	24.64	5.88	26.47	10.33	14.54	5.28	30.80	7.17	20.81	8.77
	Growth (pp)	6.55	5.74	-0.29	2.45	3.80	2.47	3.24	3.44	3.88	4.16
Printing & repr. media	Avg (%)	30.00	10.59	26.38	11.60	14.64	5.86	32.17	4.66	21.19	11.47
	Growth (pp)	12.41	11.22	-1.60	1.85	3.62	2.72	-16.48	-0.35	5.61	3.87
Furniture; other manuf.	Avg (%)	27.20	5.97	29.56	9.32	13.03	4.25	22.75	3.96	25.98	8.78
	Growth (pp)	10.86	5.28	-4.15	1.00	2.91	1.87	-3.81	1.00	3.44	3.19
Rubber & plastic products	Avg (%)	33.10	8.20	34.30	11.86	25.31	9.04	45.15	5.63	28.72	13.13
	Growth (pp)	4.71	7.93	0.66	3.81	6.59	4.65	5.28	3.51	3.40	4.21
Wood	Avg (%)	27.71	5.26	25.03	7.25	15.74	5.37	26.09	3.08	29.41	10.45
	Growth (pp)	10.49	5.86	-4.13	1.26	3.88	2.24	-2.80	0.16	8.35	4.61
Rep. & inst. mach & equip	Avg (%)	21.32	6.54	24.03	9.82	24.24	10.06	19.81	4.76	29.45	13.47
	Growth (pp)	5.30	5.40	0.21	2.70	1.10	2.94	12.13	4.80	4.09	5.14
Textiles	Avg (%)	32.05	6.37	32.60	10.32	12.93	3.37	27.99	4.10	32.02	8.79
	Growth (pp)	4.88	5.29	-4.05	2.43	1.62	1.03	2.11	2.44	2.42	3.71
Paper	Avg (%)	37.43	10.13	38.10	12.73	35.65	12.05	46.37	5.51	33.66	13.73
	Growth (pp)	3.95	8.35	-0.03	3.58	6.61	4.85	3.02	2.73	3.73	4.31
Food, Bev & Tobacco	Avg (%)	34.88	8.06	36.61	9.62	15.97	4.48	32.38	4.66	35.13	13.52
	Growth (pp)	3.77	7.51	-6.99	1.35	3.56	1.87	5.67	2.65	4.68	3.85
Other non-met. min. prod.	Avg (%)	34.84	9.61	32.65	11.13	24.40	9.39	39.37	6.25	36.47	15.57
	Growth (pp)	8.42	8.38	1.27	3.30	6.18	4.25	-3.84	1.82	3.61	3.90
Basic metals	Avg (%)	39.00	8.45	38.26	13.13	28.77	9.35	49.93	7.80	37.89	14.27
	Growth (pp)	9.51	8.91	7.54	7.35	4.76	2.67	2.04	3.45	3.84	4.13

Note: high technology (HT), medium-high technology (MHT), medium-low technology (MLT), and low technology.
Source: WIOD, own calculations

Table 2 illustrates the results as a share of vertically integrated employment. It can be appreciated that the share of service employment is above 30% (except in Portugal) and has increased in all countries except Italy. Not only is the structure of manufacturing in the Mediterranean countries distinct from the German one, but there is also important heterogeneity among them. For instance, Italy, Spain, and Greece present similar levels of service employment in manufacturing subsystems. However, the employment share has decreased in the first of these countries, while it has grown in the last two economies. In Portugal, this variable presents a much lower value, probably because outsourcing practices have been less widespread.

Furthermore, the integration of KIBS in manufacturing production has advanced during the period, and technologically advanced subsystems rely more on inputs from KIBS than the low-technology ones (Antonioli et al., 2020). Regarding the specific features of each country, it is important to note that German manufacturing subsystems exhibit stronger linkages with KIBS, a feature that could be associated with the sophistication of Germany's exports.

KIBS participation in Mediterranean countries is heterogeneous. Italian manufacturing emerges as the most advanced among them, since all the subsystems exhibit similar values to the German ones. Spain displays values close to 8.5%, but the most striking fact of this economy is the rapid growth of the KIBS share, which is a sign of manufacturing modernization. In Portugal, there is a big difference between KIBS integration in high-technology subsystems (values similar to Italy) and in the low-technology ones (the lowest among the five countries). Greek manufacturing lags behind in its economic development and presents the lowest KIBS share.

All in all, it becomes clear that comparing Mediterranean economies with Germany might be problematic due to the differences in economic development. Furthermore, although they present some similar institutional features, the four Mediterranean productive structures are very distinct.

4. The evolution of vertically integrated nULC

Labor cost competitiveness is frequently captured by the nominal unit labor cost (nULC), which is the relationship between the nominal mean wage and real productivity. Since this paper relies on a subsystem methodology, we calculate vertically integrated nULC (Equation (4)):

$$nULC_j = \left(W_j' / L_j' \right) \Big/ \left(rVA_j' / L_j' \right) \tag{4}$$

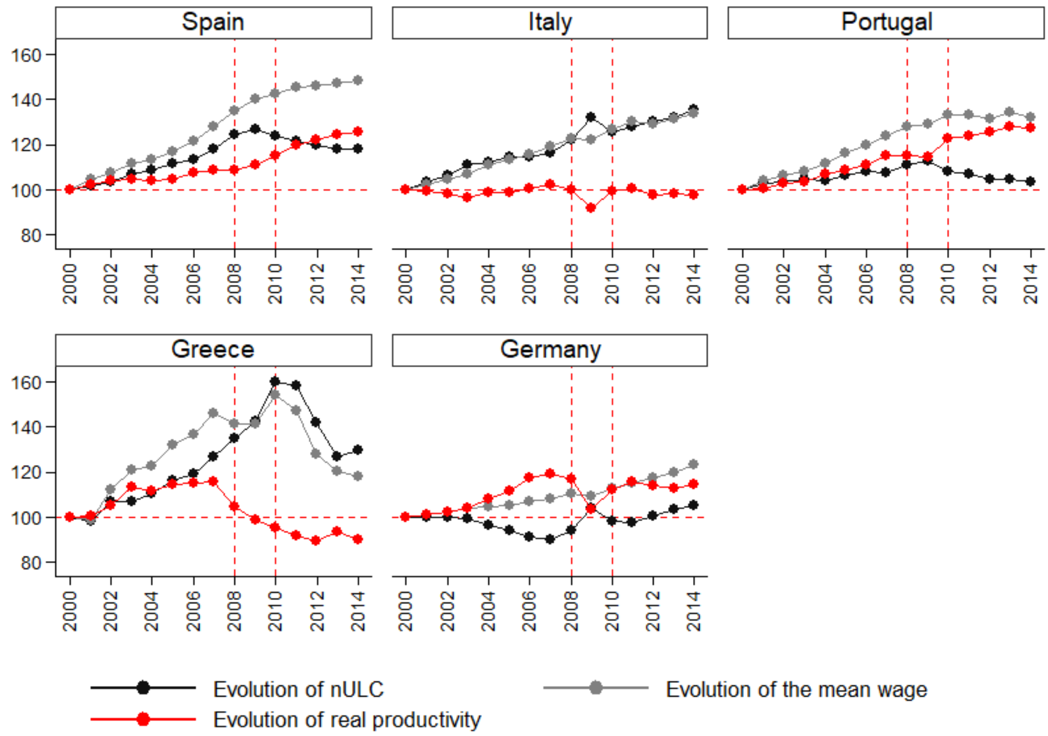
where *W* is the labor compensation, *L* stands for the number of persons employed, and *rVA* is the real value added of the subsystem *j*. The apostrophe symbol indicates that the variable has been vertically integrated. As can be appreciated, gains in cost-competitiveness can be achieved through either moderation of the mean wage growth or an increase in productivity growth.

Figure 2 displays the evolution of vertically integrated nULC and its components in the entire manufacturing subsystem. The evolution of these variables for each subsystem is reported in the Appendix (Table A). It can be appreciated that Germany managed to slow down the growth of manufacturing nULC. During the pre-crisis period, slow wage growth was the main driver of this trend, while after 2008 both productivity and wage growth played a similar role.

The profound process of decentralization of wage bargaining and progressive deregulation of the labor market were the basis of wage developments. This process, which has been well documented in other works (Hassel, 2014; Eichhorst, 2015; Oberfichtner & Schnabel, 2019;

Herrero, 2021), consisted of an incremental path of institutional deregulation that predominantly affected the margins of the economy. Thus, this dualized economy is composed of, on the one hand, an institutional core around the manufacturing sector, where social partners, sectoral bargaining, and work councils are still strong and keep significant bargaining power. Thanks to that, working conditions have been well preserved. On the other hand, the margins of the institutional model are identified with services, particularly the low-level ones. In these industries, unions and work councils are weak (where they still exist) and workers have been heavily affected by the erosion of sectoral bargaining and a rise in atypical employment.

Figure 2. Evolution of nULC, mean wage, and real productivity of manufacturing subsystems



Source: WIOD, own calculations

Furthermore, the German manufacturing sector undertook a profound production reorganization process in which companies offshored and outsourced the most labor-intensive and lowest value-added parts of their production lines with the aim of saving labor costs and gaining flexibility to respond to changes in aggregate demand. While manufacturing workers were the most affected by offshoring, service workers' labor conditions were particularly hit by outsourcing, since they were transferred from the highly institutionalized and productive part of the economy to the more deregulated and less productive part of it (Doellgast & Greer, 2007). In this way, services boosted manufacturing competitiveness directly by supplying cheaper inputs and indirectly by reducing the prices of services consumed by manufacturing workers (thus increasing their real income) (Hassel, 2014). As can be seen in the figure, there is a slight rebalancing in wage growth after the worst years of the crisis.

Regarding productivity, Germany presented quite moderate yearly growth rates (1.08%) for the entire period. Although productivity growth was above the rate seen in Italy and Greece, it was below the performance of Portugal and Spain.

A different picture is found when looking at the four Mediterranean countries, and some heterogeneity is observed among them. nULC grew rapidly until 2008 and then dropped after 2010 in Spain, Portugal, and Greece, while it continued to grow in Italy. Before the crisis, the nominal mean wage in the four countries grew much more than in Germany (yearly growth between 2.6 and 4.6%); however, it is worth noting that in both Spain and Portugal corporate profits were growing even faster, whereas in Italy and Greece they were growing at a similar pace (Pérez & Matsaganis, 2018). Therefore, no functional income redistribution in favor of workers took place. Afterwards, the management of the recession involved the adoption of structural reforms in Spain, Portugal, and Greece, with the aim of both rendering the labor market more flexible and decentralizing the wage bargaining to the firm-level. These reforms, along with the sharp growth in unemployment, weakened the bargaining power of workers, thus slowing down wage growth in Spain (1.0% per year since 2011), Portugal (–0.2%) and particularly Greece (–6.4%). In Italy, wages grew at 1.3% per year.

The specific features of these countries' wage-setting systems explain both the commonalities and differences in the abovementioned trends. The common core of labor market reforms (deregulation of open-ended contracts and decentralization of collective bargaining to the firm-level) could be explained by shared economic constraints imposed by European institutions and foreign lenders, while the variation in labor market measures can be traced back to the social class composition of the electoral basis of each government[1] (Bulfone & Tassinari, 2020). Additionally, the pre-existing levels of state intervention in the labor relations arena help to explain the magnitude of the wage devaluation in each country: the more extensive the active intervention by the state in the labor market, the faster and sharper the wage restraint (Afonso, 2019). Since social partners rely more on the public sector to reach agreements and regulate the labor market in Greece, Portugal, and (to a lesser extent) Spain, the policy instruments of the state are more effective for achieving wage devaluation. However, in Italy, social partners are much more autonomous, and the role played by the government in regulating labor relations is much more residual. This explains why the major reform was implemented in 2015, at least three years later than in the other three countries (Pérez & Matsaganis, 2019).

Moreover, it is worth highlighting two additional institutional factors. Naturally, the first is the external pressure exerted by European institutions and the IMF, which drastically constrained the policy options of national actors (structural reforms in exchange for bailout packages) (Armingeon & Baccaro, 2012; Johntson & Reagan, 2016). Since Italy did not receive any financial rescue, it can be said that the external pressure experienced was less extreme than in the other three economies. The second factor is that the national parliaments in Greece, Portugal, and Spain were less fragmented, while in Italy the political scenario was much more polarized, thereby hampering the government decision-making process.

Trends in productivity in Mediterranean economies are characterized by four developments. The first is the weak and countercyclical evolution of Spain's productivity. Due to its labor-intensive productive structure, productivity growth accelerated after the onset of the crisis because job losses were larger than the slump in production (Maroto-Sánchez & Cuadrado-Roura, 2013). The second is the downward path followed by Italy's productivity during the entire period, which has been associated with an increase in the extent of resource misallocation since 1995 (Calligaris et al., 2018). The third is the trend followed by productivity in Portugal, which is radically different.

[1] Core measures were accompanied by compensatory measures such as the re-regulation of temporary employment in Spain, Portugal, and Greece, whereas in Italy temporary employment was deregulated although unemployment protection and active labor market policies were expanded (Bulfone & Tassinari, 2020).

It has been growing at a remarkable pace, above the German one (although its productivity levels are much lower). The fourth is the declining productivity exhibited by Greece after the onset of the crisis due to the drop in both domestic and external demand and the harsh erosion of the productive structure.

All in all, we find that wage restraint is the main driver of the evolution of nULC. However, trends in productivity also help explain why Italy's cost competitiveness weakened and why Germany's nULC values are not only a matter of wage devaluation policies but also one of product sophistication and process efficiency.

5. nULC growth throughout subsystems

A particular feature of the German growth model is that wage growth in services is usually lower than in manufacturing. According to Hassel (2014), during the period 1970–2007, Germany and Austria were the only two European economies in which this wage growth pattern was registered. This is a striking fact, since services are usually considered as branches sheltered from international competition, while manufacturing is an exposed sector which should control growth in wage costs.

This model of dual wage growth has been considered as a core driver of the German exporting success (Dustmann et al., 2014). The reasons for this trend are, on the one hand, the features of the traditional wage-setting system, by which the core manufacturing sectors set the pace for wage growth in the rest of the economy (the so-called pattern bargaining model). On the other hand, the abovementioned process of institutional dualization resulted in sharper wage restraint in service industries, especially in low-level ones.

Some scholars have stated that this particularity has been a centerpiece of the export boom of the German economy from 2000 onwards. Since services supply inputs to manufacturing, wage restraint in them positively impacts on the price of manufacturing final goods (Baccaro & Benassi, 2017). Furthermore, low wages in final services imply higher real income for manufacturing workers, so the slowdown in nominal wage growth that also took place in manufacturing (although in a less sharp manner) did not imply a loss of economic status for these workers, thus making manufacturing unions more willing to cooperate in labor market reforms (Palier & Thelen, 2010; Hassel, 2014).

On the contrary, political economy literature points out that, in Mediterranean economies, the manufacturing sector does not lead wage negotiations, thus provoking uncoordinated wage growth, high domestic inflation, and cost-competitiveness problems (Molina & Rhodes, 2007).

The subsystem methodology makes it possible to empirically measure the contributions of the different portions of the value change to nULC growth. To do so, we calculate the mean wage and productivity for the service part of each manufacturing subsystem and compute the relationship between the mean wage in services and the total vertically integrated productivity:

$$nULC_{sj} = \left(W'_{sj} \middle/ L'_{sj} \right) \middle/ \left(rVA'_j \middle/ L'_j \right) \tag{5}$$

Following the research strategy of previous works (Herrero & Rial, 2022), the mean wage per worker of service inputs is divided by the total productivity of the subsystem j in Equation (5), and not by its own productivity. This is because if a service job (e.g. a cleaning service) is outsourced from a manufacturing firm to a supplier, the associated wage costs for the supply chain will be lower (due to institutional factors), although the employee's productivity will remain exactly the same (he or she is performing exactly the same job). Thus, this strategy controls the cost-saving effects of outsourcing and the overall "benefits" of the wage restraint in services for manufacturing labor-cost competitiveness.

Table 3 reports the results of Equation (5) in yearly growth rates for each subsystem and country. It shows that the wage restraint in services integrated into manufacturing subsystems is not an exclusive feature of Germany, because Spain and Portugal perform similarly. In fact, in Germany 13 out of 18 manufacturing subsystems show this wage growth pattern, while in Spain and Portugal, respectively, 16 and 17 manufacturing subsystems display this sort of performance. In sum, a sharper wage restraint in services connected to manufacturing is more widespread in these two Mediterranean countries. It should be pointed out that in all high-technology German subsystems, wages in the manufacturing part have grown at a higher pace than in the services part, whereas in Spain and Portugal the chemical subsystem is the only one in which this pattern is not present. Therefore, the expected results of the German growth pattern – nULC moderation and diverging wage growth – are also found in Portugal and – especially the second feature – in Spain. Portugal displays an outstanding performance, actually: the average growth of nULC in technologically advanced subsystems is negative.

Reported in the Appendix are the results of nULC growth for the pre-crisis (2000–2008, Table A2) and post-crisis periods (2009–2014, Table A3) for the two portions of the manufacturing subsystems. It can be appreciated that the wage devaluation processes of Spain and Portugal were concentrated in service supplier firms, while the manufacturing portion of the subsystem experienced a less deep wage restraint. Therefore, these two economies followed the German wage devaluation style. On the contrary, Italy and Greece slowed down nULC growth in the manufacturing portion in a more intensive way. Furthermore, as can be seen in Table A4 in the Appendix, the aggregate nULC evolution is explained by trends in productivity growth. Germany managed to slow down wages and could moderate nULC growth, despite the low growth rates of productivity at constant prices. However, although Spain and Portugal lacked this ability to implement wage restraint, the evolution of manufacturing subsystems' nULC was driven by a much higher productivity growth.[2] The Portuguese performance was, however, superior due to the above-explained countercyclical pattern of Spain.

The nULC values of Italy and Greece display very different trends. In Italy, nULC has grown above 2% in both high- and low-technology subsystems. This evolution is mainly explained not by an above-average wage growth (it is quite similar to that in Spain or Portugal) but by the extremely weak growth of productivity, which was negative during the sample period. Furthermore, only 10 out of 18 manufacturing subsystems services contributed to containing nULC growth. In a similar vein, Greece presents high nULC growth rates due to negative productivity growth, which is particularly sclerotic in technologically advanced subsystems. In this country, both productivity and wages display markedly divergent trends when comparing the pre-crisis and post-crisis subperiods, particularly the former variable (Table A1, Appendix).

[2] It should be kept in mind that service activities present inferior productivity levels and growth rates compared to manufacturing ones (Baumol, 1967; Fernández & Palazuelos, 2012); therefore, productivity growth in manufacturing subsystems is usually lower than in manufacturing industries when using the traditional approach.

Table 3. *Growth of total vertically integrated nominal ULC in the service portion and the rest of the subsystem, 2000–2014*

	Spain			Italy			Portugal			Greece			Germany		
	Total	Services	Rest	Total	Services	Rest	Total	Services	Rest	Total	Services	Rest	Total	Services	Rest
Total manufacturing	1.31	0.74	1.68	2.46	2.49	2.48	0.45	-0.16	0.63	2.15	3.15	1.49	0.53	0.45	0.70
HT&MHT manufacturing	0.75	0.05	1.17	2.18	2.17	2.18	-0.18	-0.80	0.07	2.81	3.54	2.27	0.23	-0.21	0.59
Elect & optical prod	-1.18	-2.26	-0.80	2.82	2.26	2.96	-2.09	-2.61	-1.52	4.27	5.26	3.38	-2.97	-3.70	-2.75
Basic pharma prod	0.60	-0.02	1.00	0.48	0.88	0.55	-0.93	-1.16	-0.65	2.29	3.24	1.30	-0.32	-0.49	-0.09
Motor vehicles	1.30	0.55	1.70	1.96	2.41	1.71	-0.43	-0.93	-0.24	3.32	3.91	2.99	-0.24	-0.57	0.25
Other transport eq.	0.80	-0.88	1.69	3.33	3.50	3.38	0.02	-1.42	0.36	1.93	2.91	1.67	0.77	-0.24	1.56
Chemicals	1.12	1.42	1.29	2.35	2.18	2.20	1.47	1.56	1.43	0.88	1.66	-0.04	1.14	1.02	1.47
Mach. & equipment n.e.c.	1.25	0.72	1.63	2.26	2.03	2.32	1.05	0.47	1.21	0.82	1.26	0.67	1.62	1.43	1.83
Electrical equipment	1.33	0.80	1.72	2.08	1.94	2.13	-0.38	-1.48	-0.08	6.15	6.53	5.92	1.64	1.08	1.84
LT&MLT manufacturing	1.67	1.18	2.01	2.63	2.69	2.68	0.85	0.25	0.99	1.73	2.91	0.99	0.54	0.67	0.57
Printing & repr. media	1.97	1.03	2.37	1.56	1.98	1.41	0.26	-0.32	0.30	4.94	5.82	4.58	-1.29	-0.03	-1.59
Rubber & plastic products	1.41	1.09	1.59	1.85	1.60	1.97	0.58	0.01	0.67	3.86	5.33	2.28	0.06	0.06	0.12
Paper	1.49	0.93	1.83	1.67	1.46	1.79	0.36	0.12	0.48	2.17	2.04	2.26	0.17	0.35	0.19
Fabricated metal products	2.36	1.87	2.54	2.55	2.18	2.67	0.55	-0.01	0.59	2.80	3.41	2.49	0.57	0.51	0.64
Other non-met. min. prod.	1.76	1.32	2.06	2.17	2.20	2.16	0.63	-0.21	0.82	1.65	2.83	0.95	0.58	0.71	0.60
Textiles	1.00	0.06	1.37	2.11	2.06	2.25	0.79	0.17	0.84	2.17	2.73	1.83	0.59	0.44	0.68
Wood	2.15	1.08	2.42	2.87	3.14	2.88	0.18	-0.59	0.22	-2.75	3.35	-7.23	0.76	1.19	0.72
Rep. & inst. mach & equip	-0.36	0.46	-0.40	2.96	2.71	3.03	0.57	0.30	0.64	-6.48	-4.95	-7.03	0.76	0.47	0.98
Furniture; other manuf.	1.69	0.39	2.05	3.11	2.97	3.25	0.47	-0.39	0.51	1.68	3.71	0.89	0.84	0.81	0.91
Basic metals	1.47	1.06	1.86	1.68	1.91	1.66	1.32	0.63	1.57	1.40	1.59	1.28	1.23	1.18	1.36
Food, Bev & Tobacco	1.60	1.32	1.66	2.36	2.68	2.34	0.21	-0.20	0.11	3.82	2.99	4.03	1.69	1.68	1.68

* Notes: nULCs of services and the rest of the subsystem are computed as denoted in Equation (4); growth rates of subsystems groups are non-weighted averages. Subsystems are classified by technological intensity according to the OECD taxonomy (Galindo-Rueda & Verger, 2016): high technology (HT), medium-high technology (MHT), medium-low technology (MLT), and low technology.

Source: WIOD, own calculations

All in all, in both Italy and Greece, manufacturing subsystem nULC performances might be classified as dysfunctional, particularly due to their productivity evolution. Nonetheless, the average performances of the Spanish and especially the Portuguese subsystem are not so far from the German one. Although Germany successfully controlled wage growth, and services overall helped to contain labor costs throughout the value chain of industrial goods, manufacturing productivity growth was rather weak. Spain and Portugal were able to replicate the abovementioned dual growth pattern, and the latter economy achieved remarkable productivity growth during the pre- and post-crisis periods that drove the evolution of nULC.

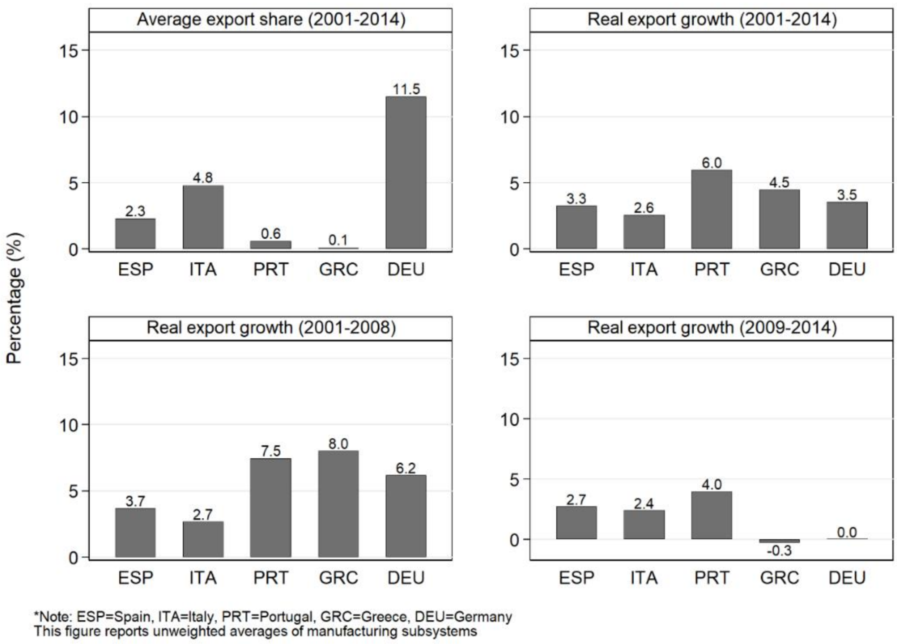
6. The nexus between labor cost competitiveness and export performance

In the remainder of this paper, we aim to establish a causal relationship between labor cost competitiveness and export growth in these five economies.

Before introducing our econometric analysis, we briefly discuss some descriptive evidence about export performance in Germany and the Mediterranean economies.

Figure 3 shows the average export shares and the yearly growth rates of real exports over different periods for total manufacturing. With respect to the export shares, there is a sizeable gap between Germany and the Mediterranean economies, which can be attributed to the greater sophistication of German manufacturing production.[3] This gap, however, does not imply that Germany exhibited faster export growth than any of the Mediterranean economies. Even though German exports grew at a remarkable rate before the crisis, they were significantly outperformed by Greece and Portugal. Likewise, after 2008 the German economy was especially hit by the slowdown in world trade, recording stagnant export growth and lagging behind Portugal, Spain, and Italy, where the slowdown had a more moderate impact.

Figure 3. Average export shares and yearly growth rates of real exports for total manufacturing

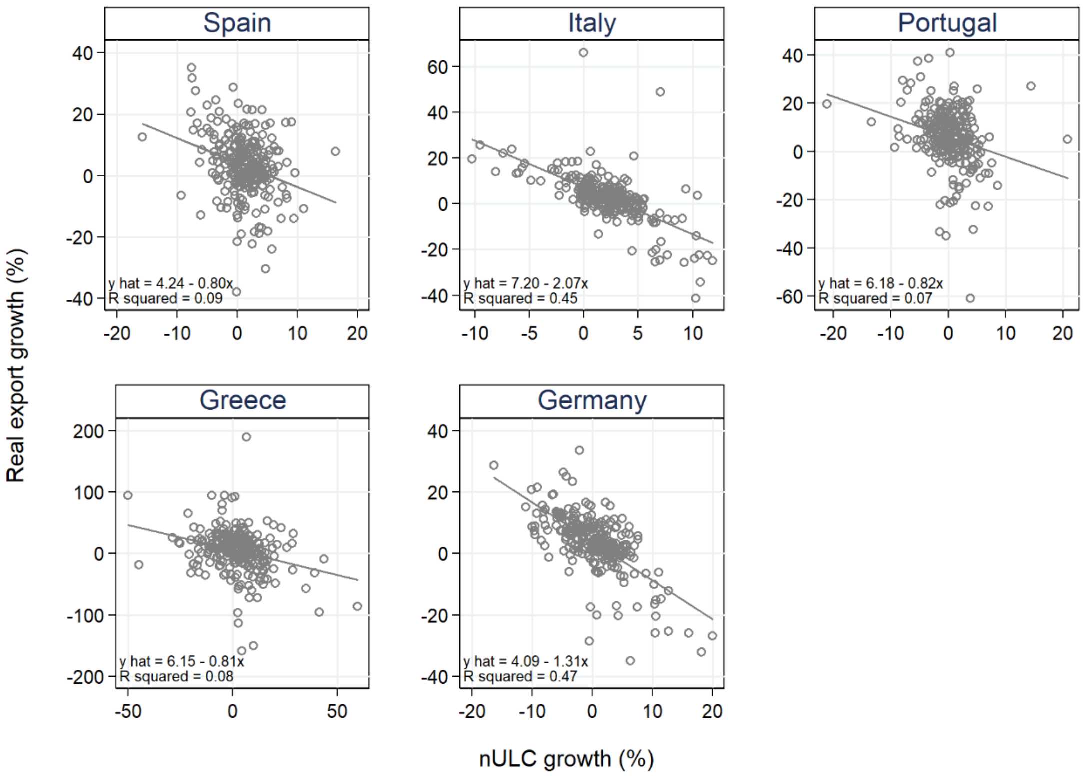


Source: WIOD, own calculations

[3] This greater sophistication is reflected well by the economic complexity index. In 2018, this country was the third most complex in the world, while Italy (15th), Spain (32nd), Portugal (38th), and particularly Greece (50th) present less technologically sophisticated export baskets (Atlas of Economic Complexity).

Figure 4 presents a first approximation to the relationship between export performance and labor cost competitiveness in these five economies, showing the results of a fixed effects model with no control variables. As can be seen, labor costs seem to have a strong effect on export growth in both Germany and the Mediterranean economies. However, the impact of labor costs on exports is not so straightforward. First, labor costs do not exert a direct impact on export growth but rather an indirect one through relative prices. Therefore, besides considering an export equation, we need to introduce a price equation to assess how the growth in labor costs affects relative prices. Second, to establish a causal relationship between export performance and labor cost competitiveness, we need to include control variables in both price and export equations.

Figure 4. Correlation between real export growth and nULC growth across manufacturing subsystems



Source: WIOD, own calculations

Consequently, to test the relationship between labor cost competitiveness and export growth in these five economies, for each economy we estimate a two-equation model, in which nULC impacts export prices, which in turn affect export growth through relative prices.

The specification is written as follows:

$$\Delta \ln(pX)_{jt} = \alpha_{0j} + \beta_1 \Delta \ln(nULC')_{jt} + \delta_2 \Delta \ln(pM)_{jt} + \varepsilon_{jt} \quad (6)$$

$$\Delta \ln(pX)_{jt} = \alpha_{0j} + \beta_1 \Delta \ln(nULC')_{mjt} + \beta_2 \Delta \ln\,(nULC')_{sjt} + \delta_3 \Delta \ln(pM)_{jt} + \varepsilon_{jt} \quad (6a)$$

$$\Delta \ln(X)_{jt} = \alpha_{0j} - \rho_1 \Delta ln\left(\frac{pX}{pM}\right)_{jt} + \gamma_2 \Delta \ln\,(wY)_t + \alpha_3 \Delta \ln\,(KIBS')_{jt} + \varepsilon_{jt} \quad (7)$$

where $j = 1, \ldots, N$ represents manufacturing subsystems (cross-sectional dimension) and $t = 1, \ldots, T$ denotes the time dimension. Again, the apostrophe means that the variable has been vertically integrated. Variables are expressed in first differences of logarithms (Δ), so the results are interpreted as growth rate elasticities. The definition of each variable is presented in the Appendix (Table A.5.).

Equation (6) indicates that export prices (*pX*) are a positive function of both vertically integrated nominal unit labor costs (*nULC'*) and import prices (*pM*). The latter captures both the effect of imported intermediate input prices and the extent to which exporters set prices strategically (Horn et al., 2017). Hence, it is assumed that firms do not operate in perfectly competitive markets and may charge a mark-up on their marginal costs. Additionally, Equation (6a) is just an extension of the former, dividing the nULC growth within each VIS *j* into services *s* and the remaining activities *m*.

Equation (7) illustrates the growth of real exports as a negative function of price competitiveness, expressed as the relationship between export and import prices (*pX/pM*) and a positive function of world demand (*wY*). Besides these two explanatory variables, we introduce the growth in the share of KIBS employment (*KIBS'*) in each subsystem j. As the increasing demand for these services is associated with the ability of manufacturing subsystems to innovate and compete through differentiation strategies, it is expected that *KIBS'* will have a positive impact on export growth.

These equations are estimated using OLS Panel Corrected Standard Errors (PCSEs) correcting for heteroskedasticity and cross-sectional dependence.[4] All the regression models include VIS fixed effects to account for idiosyncratic differences in production techniques and other factors across sectors that are unlikely to be explained by the other variables.

Table 4 reports the results of Equation (6) for each economy. In every case, the estimated coefficients are statistically significant and show the expected sign. As can be seen, the effect of nULC is rather small in all these five economies: a decrease of 1 pp in this variable drives down export prices by between 0.02 pp (in Greece) and 0.23 pp (in Portugal). Therefore, labor costs are only passed on to prices to a minor extent. While there have been previous studies that have proved this point for Germany (Storm & Naastepad, 2015; Herrero & Rial, 2022), we show that this is also true for these Mediterranean economies.

Contrary to the limited role played by labor costs, import prices exhibit a stronger coefficient. This might reflect the importance of imported input prices for the cost structure of exporters. At the same time, this result may be a sign of pricing-to-market behavior.

Extending the analysis to divide the nULC growth in services and the rest of activities (Equation (6a), Table 5), we find that the two parts of the subsystem exhibit different effects on prices. In most of these economies, the evolution of labor costs in the rest of the VIS (which mainly comprises manufacturing activities) is the driving factor behind the coefficient of total nULC found in Table 4, while the effect of the nULC in services is either non-significant (in Spain, Italy, Portugal, and Germany) or close to zero (in Greece). This is explained by the fact that service industries do not concentrate most of the employment in the manufacturing VIS, so the evolution of labor costs in these services is not able to substantially alter the nULC growth in the subsystem.

[4] Given the structure of the data (N > T), the FGLS (feasible generalized least squares) estimator was not considered due to its tendency to produce extremely optimistic standard errors (Beck & Katz, 1995).

As a result, the wage restraint policies in services implemented by Spain, Portugal, and Germany did not allow a significant improvement in price-competitiveness.

Table 4. Equation (6) results

	(1) Spain	(2) Italy	(3) Portugal	(4) Greece	(5) Germany
nULC'	0.171***	0.186***	0.233***	0.0232**	0.155***
	(0.0583)	(0.0539)	(0.0505)	(0.00971)	(0.0299)
Import prices	0.766***	0.458***	0.474***	0.165***	0.511***
	(0.0441)	(0.0381)	(0.0429)	(0.0500)	(0.0421)
Constant	-2.931***	0.726***	-0.757	1.264***	1.197***
	(0.484)	(0.235)	(0.536)	(0.323)	(0.442)
Observations	252	252	252	249	252
R-squared	0.954	0.962	0.943	0.901	0.956
Number of VIS	18	18	18	18	18
VIS FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

*Note: nULC (nominal unit labor cost). All models are estimated by PCSE
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5. Equation (6a) results

	(1) Spain	(2) Italy	(3) Portugal	(4) Greece	(5) Germany
nULC (rest)'	0.112*	0.150**	0.209***	0.000657	0.174***
	(0.0676)	(0.0723)	(0.0538)	(0.0108)	(0.0559)
nULC (services)'	0.0730	0.0217	-0.0103	0.0241**	-0.00900
	(0.0802)	(0.0701)	(0.0819)	(0.0104)	(0.0482)
Import prices	0.762***	0.452***	0.475***	0.166***	0.502***
	(0.0446)	(0.0386)	(0.0436)	(0.0509)	(0.0426)
Constant	-2.864***	0.702***	-0.836	1.367***	1.247***
	(0.506)	(0.252)	(0.545)	(0.330)	(0.444)
Observations	252	252	252	249	252
R-squared	0.954	0.962	0.943	0.901	0.957
Number of VIS	18	18	18	18	18
VIS FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

*Note: nULC (nominal unit labor cost). All models are estimated by PCSE
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6 presents the results of Equation (7). As usual, the size of the world income coefficient is the largest and shows in any of these five economies a strong response of exports to the evolution of world demand. Conversely, relative prices seem to affect export growth in a more limited way, with a smaller coefficient that is significant only in Spain, Italy, and Germany. Interestingly, despite Germany's technological upper hand, its exports do not consistently exhibit either a higher income-elasticity or a lower price-elasticity with respect to the Mediterranean economies. This finding is in line with evidence reported by previous literature (e.g. Naastepad & Storm, 2007; Onaran & Obst, 2016; Stockhammer et al., 2011; Villanueva et al., 2020).

Table 6. Equation (7) results

	(1) Spain	(2) Italy	(3) Portugal	(4) Greece	(5) Germany
(pX/pM)	-0.680***	-0.592**	-0.175	0.224	-0.514***
	(0.147)	(0.238)	(0.273)	(0.720)	(0.183)
wY	2.752***	2.955***	4.533***	5.961**	2.699***
	(0.474)	(0.702)	(0.907)	(2.632)	(0.531)
KIBS'	0.383***	0.0296	0.450**	0.732***	0.581***
	(0.0803)	(0.126)	(0.219)	(0.150)	(0.152)
Constant	-6.695***	-3.950*	-5.437*	-3.926	-3.404*
	(2.024)	(2.217)	(2.808)	(27.10)	(1.779)
Observations	252	252	252	252	252
R-squared	0.499	0.457	0.454	0.170	0.588
Number of VIS	18	18	18	18	18
VIS FE	YES	YES	YES	YES	YES

*Note: pX/pM (export prices relative to import prices), wY (world demand). All models are estimated by PCSE
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Added to the relevance of world demand, the growing integration of KIBS within manufacturing subsystems intensifies the prevalent role of non-price factors in driving export growth in Germany and three of the four Mediterranean economies. In those four economies, a 1 pp increase in the employment share of KIBS raises export growth by between 0.38 pp (in Spain) and 0.73 pp (in Greece). This result, together with the evidence shown in Table 5, allows us to shed light on how the complex relationship between services and manufacturing affects export growth. On the one hand, the evolution of labor costs in the services that supply inputs to manufacturing subsystems is irrelevant for improving price competitiveness. On the other hand, the development of tighter relationships between KIBS and manufacturing significantly impacts export growth. These services are both knowledge suppliers and innovation drivers, and they support manufacturers competing in international markets via non-price strategies (Ciriaci et al., 2015; Franke & Kalmbach, 2005). Therefore, the relationship between services and manufacturing is not a matter of cost but rather one of innovation and product differentiation through the expansion of KIBS.

Despite the valuable insights taken from the previous analysis, it is possible to complete our understanding of the impact of unit labor costs, relative prices, world demand, and KIBS on export performance in these economies by computing the contribution of these variables of interest to export growth. To do so, we perform the following calculation, which is based on the estimated coefficients and the actual growth rate of each variable:

$$\Delta X = \left[\left(\epsilon_{nULC}^{pX} * \epsilon_{pX}^{X}\right) * \Delta nULC\right] + \left[\left(\epsilon_{(pX-pM)}^{X} * \Delta\left(\frac{pX}{pM}\right)\right) - \left(\left(\epsilon_{nULC}^{pX} * \epsilon_{pX}^{X}\right) * \Delta nULC\right)\right] + \left[\epsilon_{KIBS}^{X} * \Delta KIBS\right] + \left[\epsilon_{wY}^{X} * \Delta wY\right] \qquad (8)$$

This equation illustrates the total effect of a change in the explanatory variables on exports. For instance, regarding the nULC, we see that the annual growth of exports thanks to the nULC is equal to the yearly growth of the latter variable multiplied by its effect on export prices $\left(\epsilon_{nULC}^{pX}\right)$

and by the effect of the latter on export volumes$\left(\epsilon_{pX}^{X}\right)$.[5] As a result, the obtained growth rate elasticities ($\epsilon_{nULC}^{X} = \epsilon_{nULC}^{pX} * \epsilon_{pX}^{X}$) vary from 0.00 in Portugal and Greece to –0.12 in Spain. Furthermore, because the coefficient of the rest of the VIS is nearly as large as ϵ_{pX}^{X}, the contribution can be almost entirely attributed to this element. Second, when we subtract the total effect of the nULC from the contribution of relative prices, we obtain the effect of price factors not related to labor costs.

We calculated the unweighted average for the manufacturing sector of each of these five economies over two periods to check whether these factors behaved differently before (2001–2008) and after the onset of the crisis (2009–2014). These results are reported in Figure 5.

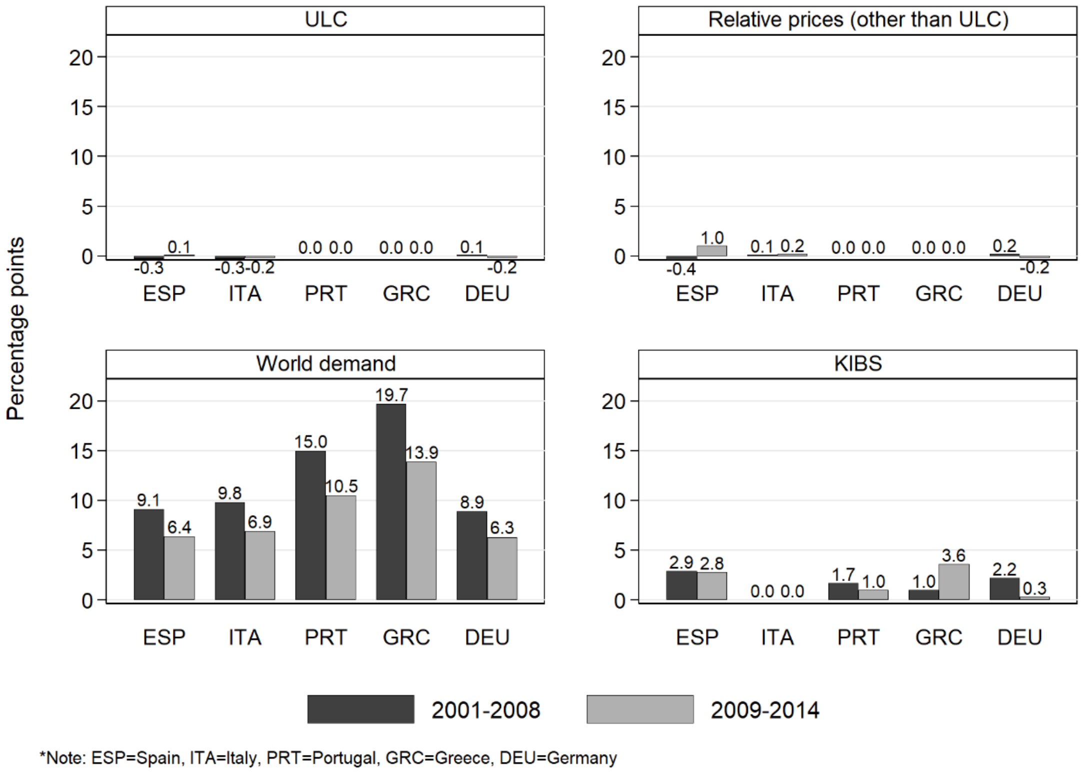
As can be seen, price factors played a residual role in accounting for both export growth in each economy and differences in export growth across these economies. Within price factors, the contribution of unit labor costs is limited for two reasons: 1) the fact that labor costs are only passed on to prices to a minor extent, and 2) the fact that relative prices have only a small or even insignificant impact on export growth. As a result, the wage restraint policies implemented after the crisis did not have any impact on export performance in Greece and Portugal, while in Spain they drove up export growth by only 0.4 pp. Looking at this effect from a different angle, the more intense slowdown in unit labor cost growth that took place in Spain, Portugal, and Greece after the crisis barely fostered export growth by between 0.2 and 0.3 pp with respect to the German economy. Conversely, the stronger restraint in unit labor costs implemented by Germany in 2001–2008 only drove up export growth by between 0.1 and 0.4pp with respect to the Mediterranean economies.

Contrary to the limited role played by unit labor costs and other price factors, world demand stands out as the main driver of export growth and is able to better account for differences in export performance across these economies. Given that Greece and Portugal are the economies where world demand has a larger coefficient (Table 6), these economies are also the ones where this variable exhibits a higher contribution and where exports grew at a faster rate (Figure 3). Notwithstanding this heterogeneity across economies, the slowdown in world demand after 2008 (from 3.3% in 2001–2008 to 2.3% in 2009–2014) heavily impacted export growth in all of them, driving it down by between 2.3 pp (in Spain) and 5.8 pp (in Greece). This stems from the fact that exports show a strong response to the evolution of world demand in any of these economies. As a result, the slowdown in the contribution of world demand in 2009–2014 vastly offsets the positive impact of the restraint of unit labor costs in countries such as Spain and outweighs the slowdown in the contribution of unit labor costs in the German economy.

Lastly, the growing integration of KIBS within manufacturing subsystems arises as a factor that is more relevant than price competitiveness at spurring export growth. The expansion of these services made a substantial contribution to export performance in Germany and three of the four Mediterranean economies, driving up export growth by more than 1 pp. Among these economies, the contribution of KIBS in Spain particularly stands out, fostering export growth by 2.8 pp over the period 2001–2014.

[5] The effect is taken as zero if in our estimations the coefficient is found to be not significantly different from zero at the 5% level.

Figure 5. Contributions to export growth



Source: WIOD, own calculations

7. Concluding remarks

After the onset of the Eurozone crisis, the Mediterranean economies were forced to implement a set of structural reforms with the aim of correcting their macroeconomic imbalances and transitioning from a debt-led to an export-led growth model. Following the example set by the German economy between the mid-1990s and the late 2000s, they applied fiscal austerity and liberalized their labor markets to regain cost-competitiveness, managing to quickly turn trade deficits into trade surpluses.

Despite the apparent success of these reforms, it has been argued that they accomplished the correction of trade imbalances by depressing domestic demand and imports (Kohler & Stockhammer, 2021; Villanueva et al., 2020), while their impact on export performance remains unclear due to the inconclusive role of cost-competitiveness in the Mediterranean economies. On the one hand, some authors claim that in these economies labor costs and prices play a larger role in driving export growth than in northern European economies like Germany, given the lower sophistication of their production (e.g. Felipe and Kumar, 2014). On the other hand, other scholars have found that labor cost and price elasticities of export demand for the Mediterranean economies are small and comparable to those of Germany (e.g. Naastepad & Storm, 2007; Onaran & Obst, 2016; Villanueva et al., 2020).

This paper aimed to contribute to this debate by addressing the effect of labor costs on export growth in the Mediterranean economies, comparing them with Germany, the benchmark economy for good economic performance and labor market reforms. To do so, we have applied a novel methodology that combines the subsystem approach to IO analysis and panel data regressions.

This methodology presents a number of advantages. First, taking into account all the domestic activities that satisfy final demand allows us to consider how the productive interlinkages between services and manufacturing affect export performance. This is important because, both in Germany between the mid-1990s and the late 2000s and in Spain and Portugal after the crisis, the process of wage devaluation was more intense in the service industries that supply inputs to manufacturing than in manufacturing itself. In addition, this methodology allowed us to capture the fact that the five economies experienced an increasing integration of KIBS in manufacturing production, which might have improved their non-price competitiveness. Second, estimating a two-equation model with price and export equations allows us to take into account that, rather than exerting a direct impact, labor costs affect export growth indirectly through relative prices.

Our results show that the Mediterranean economies, despite the lower sophistication of their production, exhibit similar income and price elasticities of export demand to those of Germany, with non-price factors acting as the main drivers of export performance. In these five economies, the effect of labor costs on relative prices and export growth turns out to be negligible. According to our estimations, the wage restraint policies implemented after the crisis did not have a significant impact on export performance in Greece and Portugal, while in Spain they only drove up export growth by 0.4 pp.

Contrary to the limited role played by labor costs, the increasing integration of KIBS in manufacturing production made a substantial contribution to export performance in Germany and three of the four Mediterranean economies, fostering export growth by more than 1 pp over 2001–2014. This shows that, when addressing the drivers of competitiveness, the relationship between manufacturing and services is not a matter of costs but rather one of innovation and product differentiation through the expansion of KIBS.

Some policy implications follow these findings. To begin with, investing in the development of tighter relationships between KIBS and manufacturing stands out as a more effective tool than restraining labor costs to boost export growth both in the Mediterranean economies and in Germany. Added to the positive impact of KIBS on competitiveness, the labor-intensive nature of these services and the generation of spillovers for other activities would also help reduce the unemployment rate without damaging aggregate productivity. Thus, KIBS can help to develop a 'high-road' strategy for economic growth and must be taken into consideration in the design of industrial policies, particularly in the Mediterranean economies.

Lastly, our analysis has also shown that the decline in labor costs experienced by the Mediterranean economies after the crisis was only passed on to prices to a minor extent. As a logical consequence, this led to growth of the profit share (Villanueva & Cárdenas, 2021). Given the low sensitivity of corporate investment to higher profits and the higher propensity to consume out of wages, the restraint in labor costs resulted in lower rates of economic growth. Therefore, even though the structural reforms implemented by the Mediterranean economies were effective at correcting the trade imbalances, they managed to do so at the cost of depressing economic growth. It seems that if they had allowed wages to grow faster, these economies would have achieved higher growth rates without hurting export performance.

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