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How Far from the Mark?
Manufacturing Price and Productivity Levels of Eight European Countries Compared to Germany

Laurence Nayman and Deniz Ünal

For additional information please contact:

Name: Laurence Nayman
Affiliation: CEPII, France

Email Address: laurence.nayman@cepii.fr

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ABSTRACT

This paper investigates real production and productivity levels in the manufacturing sector, on the basis of a new comparison of output price levels for the year 2007, before the global financial crisis was triggered, between several European countries and Germany (Finland, France, Greece, Italy, Poland, Portugal, Spain, and the UK), using the Prodcom and Structural Business Statistics of Eurostat. The assessments of the strengths and weaknesses of the economy in terms of prices are generally speaking carried out with growth rates, as levels are hardly available. This paper offers to fill the gap by computing producer price ratios as conversion factors of national outputs. Price, production and productivity levels matter for competitiveness issues and for real convergence within the European Union as well. Against a background of rooted crisis in the old industrial countries, where the service sector prevails, the industrial performances of the big emerging countries raise questions upon the efficiency of industrial strategies in Europe. Differences in the price and unit labour costs levels are key in solving the present financial and economic crisis in Europe. Results show real convergence had not been achieved yet in 2007 in the European countries.

JEL Classification: E31, J24, J30, L60, O52
Key Words: Europe, Manufacturing Sector, Production Price Parities, Real Output, Unit Labour Costs

HOW FAR FROM THE MARK? MANUFACTURING PRICE AND PRODUCTIVITY LEVELS OF EIGHT EUROPEAN COUNTRIES COMPARED TO GERMANY

Laurence Nayman
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INTRODUCTION

This study investigates the difference observed in the prices and costs of the manufacturing sectors in 2007 between nine European countries, in terms of hourly labour productivity and unit labour costs. This study is conducted using manufacturing production price parities for the year 2007 with Germany as the benchmark country. The countries under review are six Euro-zone countries, France, Finland, Greece, Italy, Portugal and Spain, and two non Euro-zone members, Poland and the UK.

The assessments of the strengths and weaknesses of the economy in terms of prices are generally carried out with growth rates, as levels are hardly available. This paper offers to fill the gap by computing manufacturing production price parities for the year 2007. Price, production and productivity levels matter for competitiveness issues and for real convergence as well.

Prices and costs are key factors to the external competitiveness, as they allow exports to be boosted, or at least maintained as a share of GDP. Interesting enough, the six Euro-zone countries under review, share, by definition, the same currency. They can have their real exchange rate move only by pushing prices down, changes in the nominal exchange rate depending on the macroeconomic state in the Euro-zone as a whole, and hence on the policy of the ECB. By contrast, countries with their own central banks, like Poland or the UK are supposed to be able to play on both variables.

The European Commission in its 2011 European Competitiveness Report remarks the catch-up process of the countries has been achieved after their joining the EU. However, two countries have been singled out by their rather underperformance in terms of growth: Portugal and Italy.

* Laurence Nayman (laurence.nayman@cepii.fr) and Deniz Ünal (deniz.unal@cepii.fr) are economists with the CEPII.
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The analysis delivered in this paper in terms of price, real hourly labour productivity and unit labour cost levels relative to Germany, contradicts or confirms the diagnoses formulated on some European countries in terms of growth.

Levels show and confirm real convergence in terms of manufacturing price levels had not been achieved yet in 2007. Manufacturing prices in France, in Finland and in the UK are about the same level than in Germany, whereas the other countries have price levels quite below the German one. It does not prejudge conclusions about the whole economy, but competitiveness is mainly conveyed through the manufacturing sector, as its products are traded, and then subject to international competition. Prices and then hourly labour productivity in the manufacturing sector are a major source of competitiveness.

The method developed in this paper leans on the International Comparisons of Output and Productivity Project (ICOP) carried out by the University of Groningen, Netherlands. Their last comparisons date back to the year 1997. After Germany's productivity performances have deteriorated over the nineties after its reunification with Eastern Germany, they bounced back bringing Germany forward in a leadership position at the end of the 2000s. Moreover, since the Euro was supposed to achieve real convergence of the member countries, no such comparisons were undertaken up to now. The Cepii has launched such a round for the year 2007 but at a smaller scale for a start, involving comparisons of a set of European countries (Finland, France, Greece, Italy, Poland, Portugal, Spain, and the UK) with Germany as a benchmark, on the basis of the Eurostat data.

Section 1 explains the methodology used to calculate the manufacturing price parities, based on the method developed by the University of Groningen. Section 2 shows the results for the unit value ratios and compares them to other conversion rates (the nominal and the PPP exchange rates). Section 3 delineates real value added of the eight countries relative to Germany by pointing out in which industries our sample countries are specialised relative to Germany, in terms of value added but also of exports. In section 4, hourly labour productivity and unit labour costs are analysed for the whole manufacturing sector and also detailed for the branch groupings and branches.

1. ESTIMATING OUTPUT LEVELS IN INTERNATIONAL COMPARISONS

1.1. Purchasing Power Parities *versus* Manufacturing Production Price Parities

The major hinder to overcome, as regards international comparisons of output and productivity levels, is to find a suitable conversion factor to express output in a common monetary unit. Basically there are three main approaches. The most straightforward, is to use

market exchange rates, but it can yield misleading results. As Maddison and van Ark pointed out, 'exchange rates do not indicate the average purchasing power of currencies over all goods and services, but mainly reflect their purchasing power of tradable goods and services. Furthermore, exchange rates are subject to fluctuation, and capital movements may play a major role in determining their level.'[1] In addition, while a common currency allows nominal stability for the seventeen countries of the Eurozone, it cannot prevent relative price fluctuations: 1 € doesn't buy or produce the same quantity of products in Germany or in Italy.

An alternative is to use purchasing power parities (PPPs) in order to assess final expenditures. The method was initiated by Kravis, Heston and Summers [1982] in the framework of the International Comparisons Programme (ICP) and comparisons were led worldwide by the major international institutions (World Bank, OECD, Eurostat, and international institutes for other regions). 145 countries are then covered by the programme in the 2005 round [see World Bank, 2008]. PPPs indicate the conversion rate, which is applied to the value of one country's basket of products to enable the purchase of the same quantity of products in the other country. This conversion rate equalises the purchasing power across countries by eliminating differences in their relative price levels.

Country comparisons using PPPs are useful to compare standards of living, but are less suited for analyses of industrial structures, as they do not reflect supply-side conditions. First, the basket used to estimate PPPs concern goods and services for final expenditure only, meaning intermediate goods are not considered. Second, PPPs are calculated for goods whether they are produced locally or are imported, and exports are excluded. Third, PPPs are based on retail prices, which include indirect taxes and subsidies, transport costs and distribution margins, and are collected at a given moment in time in a limited number of places.

The so-called industry-of-origin approach pioneered by Paige and Bombach [1959] is more relevant to compare production levels. It can be identified to a supply approach as the value of the common basket is computed from data on production. As prices are not directly observed, the conversion rates are calculated from unit values of the products available in the industry production surveys (values/quantities). For similar products in the two countries, so called 'unit value ratios' (UVRs) are the ratio of country's unit values to the star country's ones. UVRs for individual products are then aggregated to an industry level and applied to the manufacturing value added.

Since 1983, started by Maddison, this method was further developed and used in the ICOP project (International Comparisons of Output and Productivity) at the University of Groningen, see Maddison and Van Ark [2002] and Inklaar and Timmer [2008] for an

[1] Maddison and van Ark [1988, p.1].

overview. The lack of readily available producer price surveys has limited price estimates based on the industry-of-origin approach to a modest number of countries. The ICOP project covers about 30 countries in Asia, East and West Europe, and North and South America.[2] ICOP Comparisons are not systematically updated and the last round dates back to 1997.

More recently, in order to circumvent the industry-of-origin method that harnesses a somewhat restricted set of products, namely for services, Inklaar and Timmer [2012] chose to use the World Bank PPPs, completed by international trade prices and prices of intermediates adjusted for transport, trade margins and taxes in order to derive relative production prices.

In the manufacturing sector, with the last estimates dating back to 1997, there was an urge to update the productivity comparisons. With the present study, the CEPII has launched such a round for the benchmark year 2007 comparing Finland, France, Greece, Italy, Poland, Portugal, Spain, and the UK to Germany, the star country.[3]

1.2. Data and Methodological Implementation

In this study, we chose to apply the industry-of-origin method in order to get the most relevant conversion rate to compare real manufacturing production levels across countries. There does not exist any standardised international surveys on manufactured product prices. We compute then the ratio of values to sold quantities from the Eurostat *Prodcom* database to obtain product unit values.[4]

Products available in terms of values and quantities both in Germany and in the other country involved in the bilateral comparison (Finland, France, Greece, Italy, Poland, Portugal, Spain or the UK) constitute the common basket of manufactured products. This basket is built by matching the goods produced in both countries at the finest level of the *Prodcom* classification (8 digits). For each binary comparison of our study, the first columns in Table 1 display the number of matched products for 21 branches (NACE, 2 digits), 7 branch groupings and total manufacturing. The Greek-German common basket is so made up of 416 products vs. 1,558 for the Italian-German one.

[2] Linked to the ICOP project, the CEPII (Centre d'Etudes Prospectives et d'Informations Internationales, Paris) had carried out two detailed comparisons between France and Germany [Freudenberg and Ünal-Kesenci, 1994; Nayman and Ünal-Kesenci, 2001], a pan-Mediterranean comparison involving France, Spain, Portugal, Turkey, Morocco and Egypt [Chevallier and Ünal-Kesenci, 2001] and an American comparison between Brazil, Mexico and USA [Mulder et alii, 2002].

[3] Other European countries were dropped out for lack of consistency of the data in *Prodcom* statistics.

[4] For a more detailed description of data, browse Appendix B.

An important part of the national productions is not matched on several accounts: the quantity and/or the value of the sold production are not always available in the statistics (partly for confidentiality reasons); the units used for quantities can diverge across countries; some products are not produced in both countries, etc. Moreover, products for which the unit values show a wide gap between both countries have been removed from the matching. In this case, it was assumed that this gap may be due to quality differences between products, such that they could not be considered as equivalent.

Table 1. Manufacturing common Basket of products: Number of Matched Products (NMP) and Coverage Ratio (CR)*

NACE Code		France NMP	France CR	UK NMP	UK CR	Italy NMP	Italy CR	Spain NMP	Spain CR	Poland NMP	Poland CR	Finland NMP	Finland CR	Portugal NMP	Portugal CR	Greece NMP	Greece CR
	Total manufacturing	**847**	**26**	**946**	**29**	**1,558**	**36**	**1,336**	**38**	**1,038**	**34**	**949**	**27**	**943**	**28**	**416**	**20**
	Food & tobacco	**182**	**54**	**182**	**58**	**242**	**66**	**210**	**58**	**216**	**65**	**199**	**68**	**170**	**56**	**103**	**38**
15	Food products	182	59	181	63	242	70	208	60	214	70	199	72	168	57	102	38
16	Tobacco	0	0	1	17	0	0	2	42	2	24	0	0	2	44	1	39
	Textile & leather pr.	**82**	**19**	**81**	**20**	**150**	**31**	**142**	**37**	**127**	**30**	**88**	**27**	**126**	**34**	**72**	**20**
17	Spinning & weaving	48	33	39	24	86	48	82	45	68	37	41	34	67	41	31	28
18	Wearing apparel	25	4	37	16	51	16	48	22	49	18	39	11	50	22	35	12
19	Leather products	9	19	5	8	13	21	12	27	10	24	8	30	9	28	6	20
	Wood, paper & publish.	**80**	**27**	**86**	**26**	**118**	**37**	**110**	**33**	**93**	**35**	**98**	**36**	**69**	**20**	**52**	**17**
20	Wood & wood products	21	30	15	31	24	35	27	37	23	38	20	42	21	23	15	23
21	Paper & paperboard	27	54	37	59	45	77	31	53	28	58	41	47	19	28	14	40
22	Publishing	3	8	4	1	4	2	4	2	3	6	5	7	3	8	3	3
36	Manufacturing n.e.c.	29	27	30	40	45	45	48	52	39	45	32	46	26	22	20	18
	Chemicals	**201**	**24**	**227**	**23**	**317**	**33**	**308**	**33**	**209**	**30**	**207**	**28**	**224**	**31**	**81**	**21**
24	Chemical products	102	17	131	15	153	22	150	21	90	17	101	23	110	20	37	13
25	Rubber & plastic pr.	62	41	54	40	93	51	90	55	70	50	67	45	62	51	25	30
26	Non met. mineral pr.	37	23	42	26	71	38	68	38	49	33	39	24	52	34	19	25
	Metal pr. & machinery	**220**	**19**	**248**	**19**	**579**	**44**	**441**	**37**	**322**	**33**	**254**	**22**	**278**	**28**	**87**	**21**
27	Basic metals	63	38	75	30	133	73	92	57	83	57	51	29	42	31	17	32
28	Metal products	101	19	60	19	160	34	141	34	107	35	86	22	112	34	41	22
29	Machinery & equipment	56	9	113	12	286	35	208	25	132	16	117	18	124	22	29	7
	Electric. pr. & electronics	**69**	**13**	**98**	**12**	**133**	**24**	**102**	**22**	**51**	**16**	**86**	**10**	**58**	**21**	**17**	**11**
30	Office mach. & computers	0	0	3	3	6	19	3	36	0	0	4	16	3	28	0	0
31	Electrical machinery	37	14	39	13	68	30	51	21	31	18	54	34	36	26	15	20
32	Radio, TV & com. equip.	4	9	8	6	9	14	9	14	4	12	5	1	9	9	0	0
33	Med. precision & optical	28	15	48	20	50	20	39	24	16	7	23	15	10	17	2	2
	Transport equipment	**13**	**24**	**24**	**37**	**19**	**13**	**23**	**41**	**20**	**24**	**17**	**32**	**18**	**10**	**4**	**2**
34	Motor vehicles	10	29	20	47	13	15	19	47	14	25	13	53	13	11	4	5
35	Other transport equipment	3	1	4	1	6	4	4	6	6	13	4	5	5	6	0	0

* (CR): value of the matched products to the total value of sales (turnover) in each country for a given branch. This table shows the geometric mean of the country's ratio and the German one.

Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases.

The common basket of products is viewed as being representative if its size reaches on average at least 24.5% of the sales (turnover) of both the country and Germany at each aggregate level, after cleaning the database of the outliers (see appendix A for more details).

The turnover statistics used to compute the coverage ratio come from the Eurostat *Structural Business Surveys* (SBS).

We identify the outliers by relying on the coefficient of variation. The minimisation of dispersion in the industry (on average less than 0.005 at the two digit level and next to zero at the total level) was sometimes obtained at the expense of the number of products available. The number of matches depending on the minimisation of the coefficient of variation determines then the reliability of the matched industries: the more the database is cleant of outliers based on this procedure, the less products are available involving the risk to fall under the 24.5% mark. Falling under this threshold means the conversion rates are not considered as reliable (see the appendix for more details).

This limit was moved down for Greece to 19.5% because it seemed interesting, despite everything, to include it in the bilateral comparisons. For the latter country, the matched production represents 31% of its sales whereas it comes down to only 12% for Germany. The geometric mean (Fisher index) indicates then a 20% share of the sales.

For the other countries, the average share of the sold production in turnover varies between 26% for France to 38% for Spain (see coverage ratio, CR, second column of Table 1). At the two-digit level, the coverage ratio is always high in the 'Food products' (Nace 15). Conversely, it is observed that the 'Publishing' (Nace 22), 'Radio, TV and Communication equipment' (Nace 32), 'Chemical products' (Nace 24) or 'Other transport equipment' (Nace 35) branches are hardly representative. The coverage ratio of the tobacco products (Nace 16) displays zeros, either because figures were not reported by Eurostat for confidentiality reasons (France, Italy), or because the country does not produce any tobacco (Finland). As a result, unit values couldn't be calculated for these products.

The relative unit values, i.e. the unit value ratios of each product obtained by dividing the German price into the other country's one, are aggregated through the superlative Fisher index, a geometric mean which combines a Laspeyres index with a Paasche index. The Laspeyres index is the unit value ratio (UVR) weighted by German output value. In other words, this UVR is assessed with German quantities. The Paasche index is the UVR weighted by the other country's output quantity valued with German prices. Otherwise, it is the UVR calculated with the other country's quantities.

Unit values come out differently when weighted by one country's quantities or with the other country's ones. This is because the internal structure of prices and quantities is different

between two countries. Therefore, in the literature, the geometric mean (Fisher index) is often used. It has no theoretical or economic meaning, but has the advantage of being transitive.[5]

These products displayed in the Nace rev.1 classification are aggregated at a four (226 industries), up to the two digit level (21 branches). Results are then bundled in seven branch groupings, for readability reasons. The manufacturing production price parity conversion rate for a given level of aggregation (UVR) is measured as follows when weighted by German quantities (Laspeyres index):

$$UVR_K^{DE} = \sum_k^K \left(\frac{UV_k^{Co(FX)}}{UV_k^{DE(€)}} \times \eta_k^{DE} \right) \qquad \text{with} \qquad \eta_k^{DE} = \frac{q_k^{DE} UV_k^{DE(€)}}{\sum_k^K q_k^{DE} UV_k^{DE(€)}} \qquad (1)$$

Where *DE* is Germany, *Co* the other country, *FX* the currency of the other country, *k* the product, *K* an aggregate level of products, q the produced quantity and UV the unit value of products.

Otherwise, the Laspeyres index can be rewritten as follows:

$$UVR_K^{DE} = \frac{\sum_k^K q_k^{DE} * UV_k^{Co(FX)}}{\sum_k^K q_k^{DE} * UV_k^{DE(€)}} \qquad (2)$$

The manufacturing production price parity conversion rate for a given level of aggregation (UVR) is measured as follows when weighted by the other country's quantities (Paasche index):

$$UVR_K^{Co} = \frac{1}{\sum_k^K \left(\frac{UV_k^{F(€)}}{UV_k^{Co(FX)}} \times \eta_k^{Co} \right)} \text{ avec} \qquad \eta_k^{Co} = \frac{q_k^{Co} UV_k^{Co(FX)}}{\sum_k^K q_k^{Co} UV_k^{Co(FX)}} \qquad (3)$$

Otherwise, the Paasche index can be rewritten as follows:

$$UVR_K^{Co} = \frac{\sum_k^K q_k^{Co} * UV_k^{Co(FX)}}{\sum_k^K q_k^{Co} * UV_k^{DE(€)}} \qquad (4)$$

[5] See I. Kravis, A. Heston and R. Summers (1982, 71-74) for desired properties of an ideal PPP.

We implement a three-step procedure as follows in order to select the relevant prices. Table 2 shows this procedure for the Spanish-German comparison at the two-digit level:

- The reliable UVRs are considered at each level of aggregation as relevant to price the final output of all industries. If the UVR of an industry whatever its level of aggregation, is representative, then its UVR is kept to price the output of its level of aggregation. As seen in Table 2, it is the case for 14 out of 21 branches. UVRs in step I are forwarded to step III.

- If the coverage ratio is below the limit, then the UVR of the higher level of aggregation, provided it is reliable, is applied to the non matched industries. In Table 2, the UVR of the 'Wearing apparel' branch (Nace 18) is not representative; therefore, the UVR of the 'Textile and leather products' grouping (Nace 17 to 19) is picked up, as it is representative. If the branch grouping UVR is not representative, as it is the case for the 'Electric and electronic products' (Nace 30 to 33), then the manufacturing sector UVR is chosen. All 226 industries, thus, end up with a UVR.

- Then, with a complete mapping of prices, UVRs are weighted by the share of branches in value added given in the Eurostat *SBS* statistics. We moved to a value added concept because intermediate consumption included in production is also the production of another or the same industry. In order to exclude 'double counting', we have to move to a 'net' concept of output, for which value added is the most appropriate. In the present study, we applied the so-called single indicator method. For each industry, the 'intermediate' UVRs for gross output (directly or indirectly derived from matched products) are applied to value added. Implicitly, we assume that relative prices for input and output are identical.

In the end, by neutralising the different relative price levels across countries and offering the same set of relative prices between the country and Germany, UVR ensure that the country's real value added is compared to Germany with no interference of prices. In the same way as purchasing power parities reflect the equalisation of purchasing power across countries, manufacturing UVR level off the production ability in the manufacturing sector.

Table 2. Matched Output, Intermediate and Value Added Weighted (Final) UVRs the case of the Spain-Germany Comparison, 2007

NACE Code		STEP I			STEP II						STEP III		
		Product Matches Number	Matched output UVR Q[DE] (UV[ES]/UV[DE])	Q[ES]	Coverage ratio (%) DE	ES	Fisher	(>25% ?)	Intermediate UVR Q[DE] (UV[ES]/UV[DE])	Q[ES]	VA weighted UVR Q[DE] (UV[ES]/UV[DE])	Q[ES]	Fisher
	Total manufacturing	**1,336**	**0.79**	**0.68**	**35**	**42**	**38**	**yes**			**0.77**	**0.63**	**0.69**
	Food & tobacco	**210**	**1.11**	**0.99**	**53**	**63**	**58**	**yes**			**1.11**	**0.99**	**1.05**
15	Food products	208	1.11	0.99	57	63	60	yes			1.11	0.99	1.05
16	Tobacco	2	0.93	0.98	20	88	42	yes			0.93	0.98	0.96
	Textile & leather pr.	**142**	**0.76**	**0.56**	**32**	**43**	**37**	**yes**			**0.76**	**0.55**	**0.64**
17	Spinning & weaving	82	0.79	0.56	49	42	45	yes			0.79	0.56	0.67
18	Wearing apparel	48	0.65	0.57	10	48	22	no	0.76	0.56	0.76	0.56	0.65
19	Leather products	12	0.59	0.52	20	37	27	yes			0.59	0.52	0.55
	Wood, paper & publish.	**110**	**0.84**	**0.64**	**31**	**35**	**33**	**yes**			**0.85**	**0.64**	**0.74**
20	Wood & wood products	27	0.95	0.67	37	38	37	yes			0.95	0.67	0.80
21	Paper & paperboard	31	0.88	0.87	48	57	53	yes			0.88	0.87	0.87
22	Publishing	4	0.52	0.49	1	4	2	no	0.84	0.64	0.84	0.64	0.74
36	Manufacturing n.e.c.	48	0.76	0.52	53	52	52	yes			0.76	0.52	0.63
	Chemicals	**308**	**0.84**	**0.66**	**30**	**36**	**33**	**yes**			**0.84**	**0.69**	**0.76**
24	Chemical products	150	0.84	0.59	20	23	21	no	0.84	0.66	0.84	0.66	0.74
25	Rubber & plastic pr.	90	0.83	0.64	53	57	55	yes			0.83	0.64	0.72
26	Non met. mineral pr.	68	0.87	0.75	35	41	38	yes			0.87	0.75	0.81
	Metal pr. & machinery	**441**	**0.81**	**0.61**	**34**	**41**	**37**	**yes**			**0.74**	**0.49**	**0.60**
27	Basic metals	92	1.00	0.96	54	61	57	yes			1.00	0.96	0.98
28	Metal products	141	0.81	0.55	32	36	34	yes			0.81	0.55	0.67
29	Machinery & equipment	208	0.61	0.32	26	24	25	yes			0.61	0.32	0.44
	Electric. pr. & electronics	**102**	**0.80**	**0.53**	**17**	**29**	**22**	**no**			**0.80**	**0.68**	**0.74**
30	Office mach. & computers	3	1.06	1.09	35	38	36	yes			1.06	1.09	1.07
31	Electrical machinery	51	0.74	0.51	16	28	21	no	0.79	0.68	0.79	0.68	0.73
32	Radio, TV & com. equip.	9	0.94	0.63	6	34	14	no	0.79	0.68	0.79	0.68	0.73
33	Med. precision & optical	39	0.72	0.44	23	26	24	no	0.79	0.68	0.79	0.68	0.73
	Transport equipment	**23**	**0.54**	**0.57**	**42**	**41**	**41**	**yes**			**0.53**	**0.57**	**0.55**
34	Motor vehicles	19	0.53	0.56	46	48	47	yes			0.53	0.56	0.54
35	Other transport equip.	4	1.29	1.02	7	5	6	no	0.54	0.57	0.54	0.57	0.55

Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases.

2. MANUFACTURING PRICE PARITIES AND RELATIVE PRICE LEVELS IN 2007

The first three lines of Table 3 compare the conversion rates of eight European countries against the German euro, namely the nominal, the purchasing power parity (PPP) and the UVR manufacturing exchange rate. Six countries (France, Italy, Spain, Finland, Portugal and Greece) share a common currency with Germany. UK nominal exchange rate is at 0.68 and the Polish Zloty at 3.79 for one euro in 2007.

Exchange rates that equalise purchasing power or output prices with Germany significantly differ, in many cases, from the nominal exchange rates. These gaps illustrate how, despite a deep economic integration of European countries, domestic price systems within the European Union are far from being homogeneous. However, France and Finland look different from the other countries, since their manufacturing UVR are quite close to their nominal exchange rate (1.00 and 1.02 respectively).

The fourth and fifth lines display the relative price level of final demand (GDP) and of the manufacturing output supply (UVR). The relative price level results from the ratio of gross domestic product PPP (or the manufacturing UVR) relative to Germany to the nominal exchange rate.

Table 3. GDP and Manufacturing Relative Price Levels in 2007 (Germany=100)

		Portugal	Poland	Spain	Italy	Greece	UK	France	Finland
	National Currency Exchange Rate per 1 €^{DE}								
(1)	Nominal Exchange Rate	1,00	3,79	1,00	1,00	1,00	0,68	1,00	1,00
(2)	PPP GDP Exchange Rate	0,79	2,22	0,88	0,98	0,87	0,78	1,08	1,13
(3)	UVR Manufacturing Exchange Rate	0,67	2,55	0,69	0,70	0,85	0,64	1,00	1,02
	Relative Price Level (in % of German Level)								
(2)/(1)	GDP Price Level	79	59	88	98	87	114	108	113
(3)/(1)	Manufacturing Price Level	67	67	69	70	85	94	100	102

Reading: countries are sorted by ascending order according to their relative price level in the manufacturing sector.
Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys.

The same final demand basket is bought relatively cheaper in Poland than in our sample countries. The Polish GDP price level is at about 60% of the German one. In Portugal, Greece and Spain, the relative GDP price levels are also, in a lesser extent, lower, at 79%, 87% and 88% of the German price level. By contrast in France, the UK and Finland, relative final demand price levels are higher than in Germany (108%, 113% and 114%). Only the Italian price level is at about the same level than the German one.

Countries are not arranged along the same order with regards to the UVR price level. All countries but Finland and France are cheaper than Germany. UVR price levels are lower than German ones by about 30% in Poland, Portugal, Spain and Italy. Compared to these four countries, the price competitiveness of Greece is twice as less (15% cheaper than Germany). At last, the price competitiveness advantage for the UK is limited to 6%.

It can be observed that for the two countries not belonging to the eurozone, the UK and Poland, their manufacturing prices are below their own nominal exchange rate. As a result, the manufacturing price level in the UK is at 94% and in Poland at 67% of the German level. Actually, the UK nominal exchange rate has dramatically appreciated against the dollar from 0.54 in 2006 to 0.50 in 2007 but has remained stable against the euro at 0.68. In Poland too, the nominal exchange rate edged up against the dollar, but also against the euro (from 3.89 to 3.79).

The inverse of the price level is the real exchange rate. It means that if the manufacturing price level stays below 1, the real exchange rate will benefit the country against Germany. It is the case for all countries but Finland and France where it is equal. The re-evaluation effect induced by the real exchange rate is developed in the next section.

As we deal with fairly developed countries, we can expect that service prices that make up the largest portion of GDP are also higher, since most services are still non traded and/or are more and more externalised (not integrated into the manufacturing industry). Basically, most countries are price takers for manufactured goods (in a certain range of goods), which are traded or are competed by imports. As a result, manufacturing prices may be below service prices. Table 3 shows that the manufacturing price levels are below the PPP ones for all countries but Poland, and yet its level of development is rather weaker than the other countries of our set. The Balassa effect that links prices and productivities is developed in Appendix N.

The sector price levels for the 21 branches (at the two-digit level) are detailed in appendix C and D. Prices in the food products branch, ranging from +5% in Spain to +32% in France, are higher in all countries but in Poland, pointing to an outstanding price competitiveness for Germany in these industries. Relative prices of our sample countries (included Poland) are systematically higher in the food industry than in the other industries on average.

By contrast, in the 'Motor vehicles' branch (Nace 34), all countries but Italy and Greece have a price level significantly lower than the manufacturing average. For the car producers, the price level gap to Germany amounts to -49% in Poland, -46% in Spain, -35% in France and in Portugal. These differences may be explained by quality. However, in some countries and for this specific branch, as the UVR were badly documented, the UVR of the whole manufacturing sector was chosen. Therefore, caution is called for, since these UVR could lead to misinterpretation.

In the same way, all countries have a competitive price edge over Germany in 'Manufacturing n.e.c.' (Nace 36). These industries include the production of consumption goods (toys, furniture, some electronic consumer goods, etc.). This branch is interesting because it was

substantially offshored in most countries. The price differences with Germany could be attributed again to quality differences.

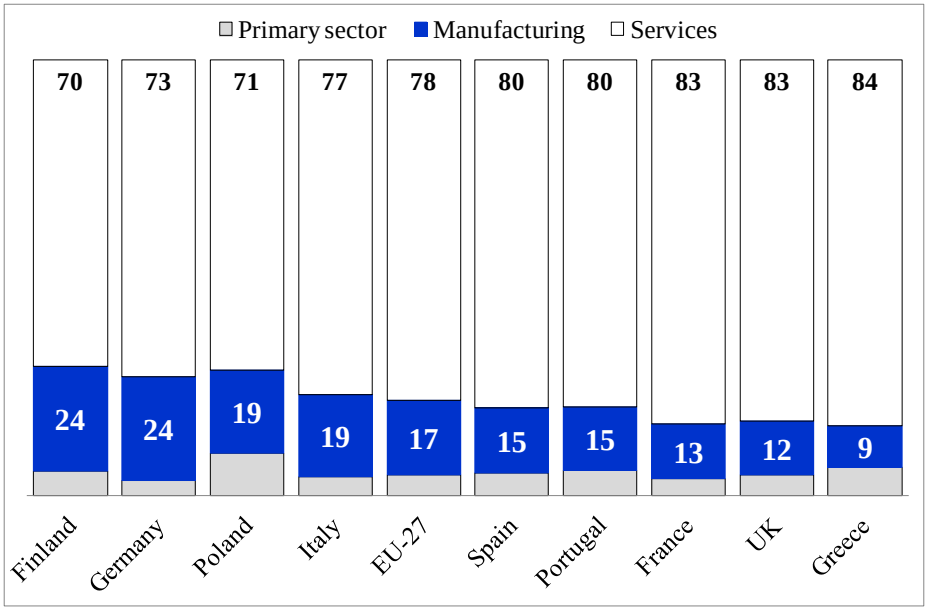
Italy outperforms Germany, competitiveness-wise, in 'Machinery and equipment' (Nace 29) and in 'Electrical Machinery' (Nace 31) with price gaps by -53% and -51%. In these industries, Germany and Italy are European biggest exporters, but not of the same range of products. Spain also has a competitive edge in 'Machinery and Equipment', with prices very close to the Italian ones.

3. MANUFACTURING VALUE ADDED IN 2007

3.1. Value Added by sector and by manufacturing branch

In Europe, the share of the manufacturing sector in gross value added keeps whittling away [Eurostat, 2009]. Figure 1 plots the share of the main economic sectors, i.e. primary, manufacturing and services in 2007 for EU-27 and the nine European countries. The primary sector is quite small in all countries but in Poland. The service sector is then the main source of value added. The highest manufacturing shares are to be found in Finland, Germany, Poland and Italy (from 24% to 19%), above the EU-27 average. Spain and Portugal's is a notch under the average, whereas France, UK and Greece are in the tailback.

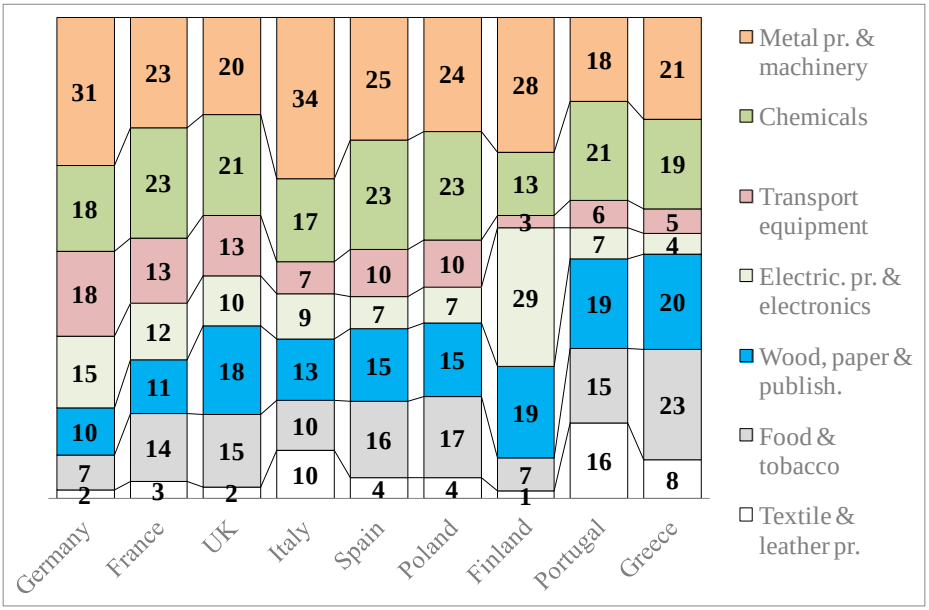
Figure 1. Share of Primary, Manufacturing and Service Sectors in Gross Value Added at basic prices, 2007 (%)



Reading: Countries are sorted according to the manufacturing sector share in their value added. Manufacturing includes energy and recycling (Nace 15-37).
Source: authors' calculations from Eurostat, Economy and finance database.

Figure 2 breaks down manufacturing value added by branch grouping in 2007 in the countries under review (see Appendix F for branch detail). Branch groupings are sorted according to their relative weight in the German manufacturing sector in order to make the comparisons with the other countries easier.

Figure 2. Structure of Manufacturing Value Added in National Currency by Branch Grouping, 2007 (%)



Reading: Branches are sorted according to the German manufacturing structure of value added.
Source: authors' calculations from Eurostat, Structural Business Surveys database.

'Metal products and Machinery' (Nace 27 to 29) together with 'Chemicals' (Nace 24 to 26), are the largest industries in the European manufacturing output. In all our sample countries, both branch groupings total up at least 40% of manufacturing value added (except in Finland where the share of the 'Chemicals' branch is quite small, 13%):

- Germany is the only country with Italy where 'Metal products and Machinery' makes up about a third of value added.

- In the 'Chemicals' branch grouping, France and UK stand out by their significant share of chemical products, which include phamaceutical products (Nace 24). Spain, Portugal and Poland are more engaged in 'Non metal mineral products' (see Appendix F).

Germany is the only country with a bulking share of Transport equipment' (Nace 34-35) in its value added: 18% in 2007, out of which 15% in Motor vehicles' (Nace 34). This share stays below 10% in this branch in the other countries (see appendix F).

'Electrical products and electronics' (Nace 30 to 33) weigh 29% in Finland (the Nokia effect) and still 15% in Germany (Siemens for example). 'Wood, paper & publishing' (Nace 20 to 22 & 36) is the second industry in Greece and Portugal, and the third in Finland and the UK. The 'Food and tobacco' (Nace 15-16) is a major branch grouping in Greece (the first one), Poland and Spain, UK and France. The 'Textile and leather products' (Nace 17 to 19) branch grouping is a small one but in Portugal.

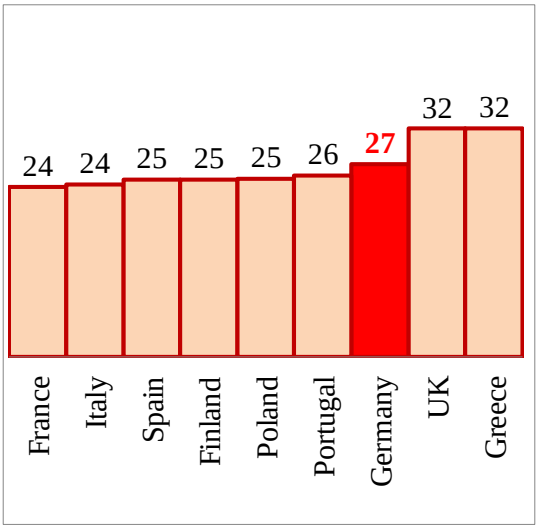
3.2. The Magnitude of Vertical Integration: the 'Value Added/Turnover' Ratio

The ratio of value added to turnover illustrates to which extent the production of goods and services is externalised. A hint is that a high ratio relative to other countries may signal a higher vertical integration of manufacturing and services. Some services such as marketing or maintenance services are bundled with manufacturing. The Knowledge Intensive Business Services (KIBS) make up about two-thirds of the production of services by the manufacturing sector, which is a big consumer and a big producer of KIBS [European Commission, 2011].

Sales encompass production and production includes intermediate products. The more intermediate products are used in producing the output, the less the value added. An industry will need more labour and capital to produce a vertically integrated product, but proportionally less than separated products if it can benefit from scale economies.

Germany was blamed for being a bazaar economy [Sinn, 2005], consisting in producing with increasing cheaper imported intermediates while a falling part of the value added is devoted to the domestic demand. France and the UK are also blamed for outsourcing most of their production from abroad, and using FDI to a large extent.

Figure 3. Value Added / Turnover Ratio in Manufacturing, 2007 (at current prices)



Source: authors' calculations from Eurostat, Structural Business Surveys database.

Figure 3 shows the ratios of value added to turnover in total manufacturing sector for our sample countries, including Germany. Greece and the UK display the highest ratio for total manufacturing (32%). Greek value added relative to turnover is largest in the 'other transport equipment' industry (60%, see Appendix E). UK value added outpaces turnover in the 'electrical and electronics' industries (39%). It could be the UK bundles services to its manufacturing products in these industries. The ratios in total manufacturing for all the other countries are very close, from 24% (France and Italy) to 27% (Germany).

In all countries, value added to turnover is highest for the 'Publishing', the 'Medical, precision and optical', and the 'Spinning & Weaving' branches and weakest in the 'Food' and in the 'Motor vehicles' branches (see Appendix E). The latter industry ranks high in the international division of labour. Unsurprisingly, Germany retains a still large portion of value added in this industry (20%) compared to the other European car producers. It could also mean this industry is more vertically integrated in Germany than in the other countries.

3.3. Level of Real Manufacturing Value Added Relative to Germany in 2007

UVR are used to assess real output. Table 4 shows the manufacturing value added of each country relative to the German one, quoted first with the nominal exchange rate, then with the

manufacturing production price parity (UVR) for 2007. The magnitude of the change in the relative supply level involved by the use of the UVR is documented in the last line of table 4 (relative nominal value added / relative real value added). Countries are sorted by ascending order of this ratio. For France and Finland, with UVR being around their nominal exchange rate, the nominal manufacturing value added is then impacted next to nix by the re-evaluation effect. However, this can be due to a composition effect, as their relative real value added can change a lot across industries (see appendix E, F, G).

Table 4. Nominal and Real Value Added Relative Levels in Manufacturing, 2007 (Germany=100)

	Finland	France	UK	Greece	Italy	Spain	Poland	Portugal
(1) **Relative Nominal Value Added** *(at Nominal Exchange Rate)*	7	46	46	3	49	27	11	4
(2) **Relative Real Value Added** *(at UVR Exchange Rate)*	7	46	49	4	70	39	16	6
(2)/(1) **Re-evaluation of Nominal Value Added by UVRs**	0.98	1.00	1.06	1.17	1.44	1.44	1.49	1.50

Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases.

For the whole manufacturing sector, the use of UVR re-evaluates quite sharply the relative levels of the manufacturing supply of Italy, Spain, Poland and Portugal (between 44 and 50%). The Greek relative real value added benefits from a significant re-evaluation effect (17%), while the British one is less large (6%).

The Italian real value added relative to Germany highlights the magnitude of this re-evaluation effect. In 2007, with a real output amounting to 70% of the German one, the Italian supply level significantly outpaces the other big European countries': 49% for UK, 46% for France and 39% for Spain. The real value added of Greece, Portugal, Finland, and in a less extent Poland, end up with ratios of 4 to 16%.

Appendix G shows relative levels of real value added by manufacturing branch. The German value added level is lower than the other countries' in the following branches:

- Tobacco products' (Nace 16): UK (104%);
- 'Spinning & weaving (Nace 17): Italy (289%);

- 'Wearing apparel' (Nace 18): France and Spain (respectively 121 and 131%);
- 'Leather products' (Nace 19): Portugal, France, Spain and Italy (150, 171, 242 and 1,034%);
- 'Publishing' (Nace 22): UK (134%);
- 'Manufacturing n.e.c. (Nace 36): UK and Italy (118 and 192%);
- 'Non metallic mineral products' (Nace 26): Spain and Italy (103 and 121%);
- 'Metal products' (Nace 28); Italy (102%);
- 'Other transport equipment' (Nace 35): France and UK (108 and 163%).

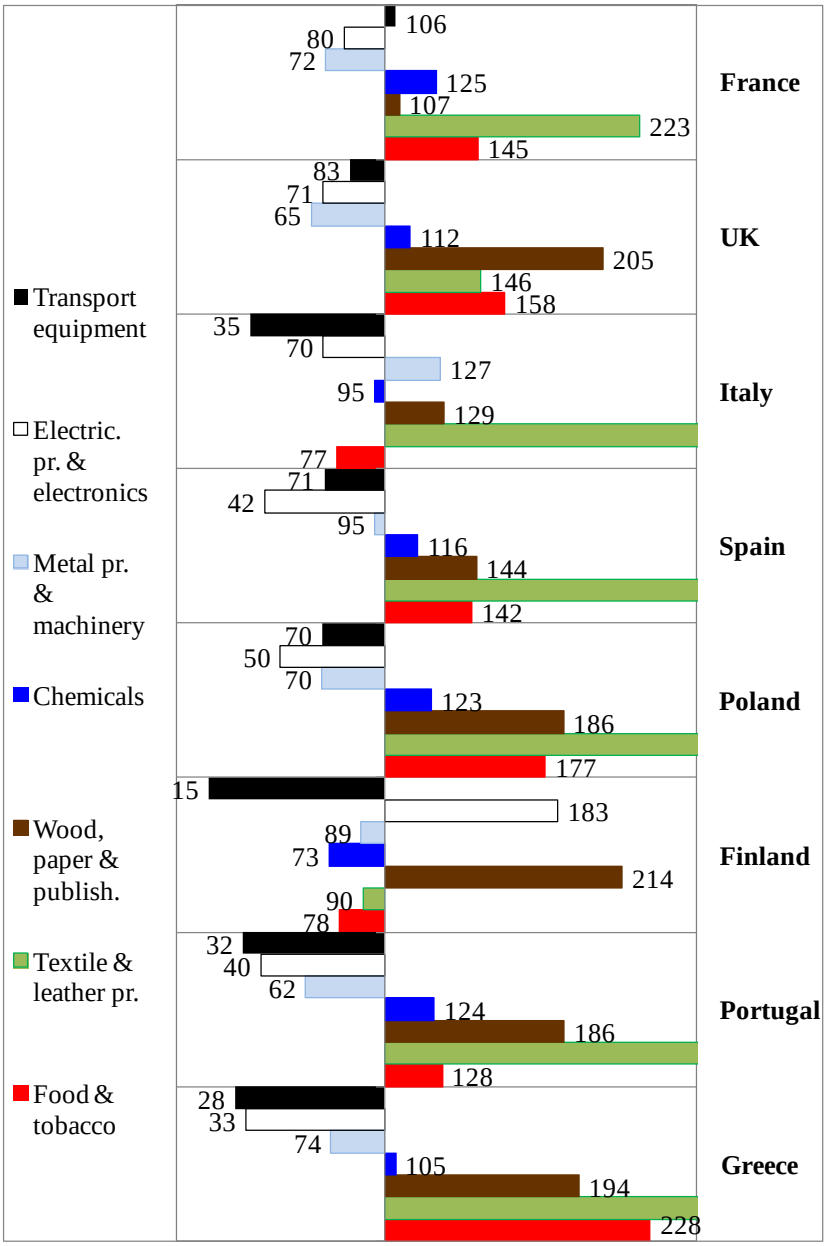
As Germany stands out as the biggest European economy and also by the size of its manufacturing sector, few industries in the other countries can keep up with German ones in terms of value added. The ratio of the country's real value added to the German one must then be put into perspective by also considering the size of the country's manufacturing sector relative to Germany:

$$Specialisation_{realVA}^{Co/DE} = \frac{realVA_b^{Co} \Big/ realVA_b^{DE}}{\sum_b^B realVA_b^{Co} \Big/ \sum_b^B realVA_b^{DE}} \qquad (5)$$

Where *DE* is Germany, *Co* the other country, *b* the branch, *B* total manufacturing branches.

This metrics of output specialisation divides the real value added of the country in a given branch relative to Germany by the size of its manufacturing value added relative to Germany. Above 100 for a branch, it indicates the country is relatively more specialised than Germany in that branch.

Figure 4. Output Specialisation Relative to Germany by Branch Grouping, 2007 (Relative Real Value Added, Germany=100 and Manufacturing=100)



Reading: A scale limit of 250% is set. The value of the indicator is above this limit in 'Textile and Leather products' for Italy, Spain, Poland, Portugal and Greece.

Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases.

Figure 4 plots output specialisation for the seven branch groupings for the year 2007. In Metal products and machinery' (Nace 27 to 29), 'Transport equipment' (Nace 34-35) and 'Electrical products and electronics' (Nace 30 to 33), the indicator is below 100 for next to all countries. Germany is a juggernaut in these industries. However, three countries manage to cope:

- Italy in 'Metal products and machinery' with 127% (especially in 'Metal products' & 'Machinery & equipment');
- France in 'Transport equipment' with 106% (especially in 'Other transport equipment');
- Finland in 'Electrical products and electronics' with 183% (especially in 'Radio, TV & Communication equipment').

In other branch groupings, Germany is rather less specialised ('Food & tobacco', 'Textile & leather products', 'Wood, Paper & Publishing' and 'Chemicals').

3.4. Manufacturing Specialisation: Value Added *versus* Exports

Intuitively, if a country produces more an item than another one and this item turns out to be a large portion of its output, it should also be foiled in its export structure, provided domestic consumption per head of a product across similar countries in terms of income is about the same.

Another metrics worth looking at, then, is an index of specialisation. Figures 5 to 8 plot for each country the specialisation of output and the specialisation of exports relative to Germany. The X axis is the share of the branch in the manufacturing output relative to Germany, and the Y axis is the share of the branch in the manufacturing exports relative to Germany. If a country's output is more specialised in a branch than Germany, then it will appear on the right of the Y-axis, and if its exports are more specialised than Germany, that branch will appear above the X-axis. If the country exhibits a double specialisation in output and exports relative to Germany, then the branch will be featured in the upper right-hand quadrant.[6]

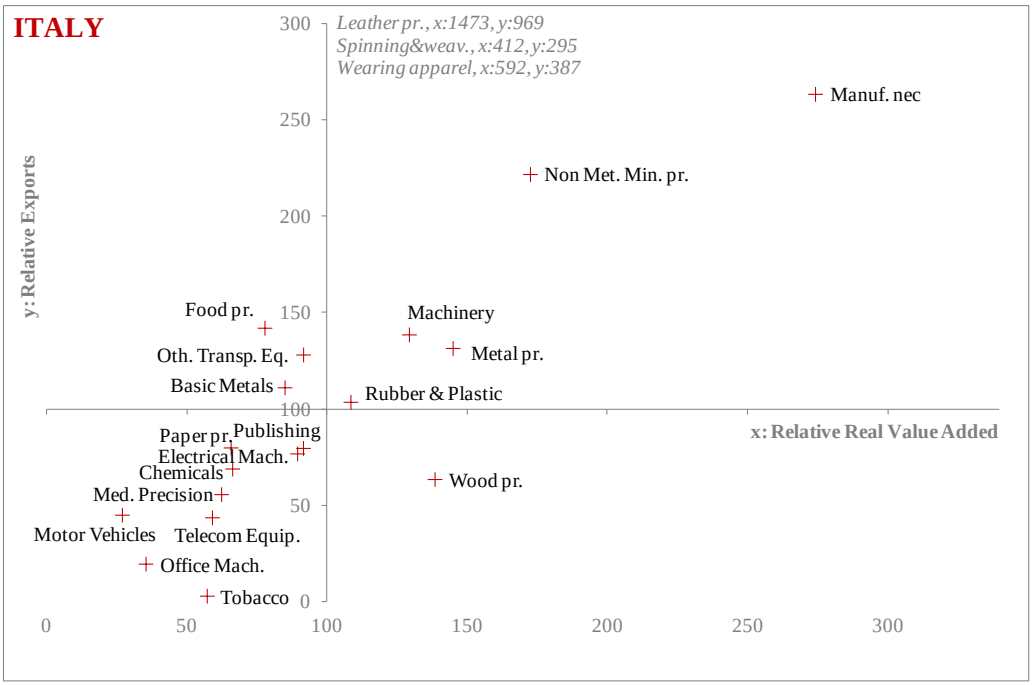
[6] The output concept here is based on value added and the export one is on production as statistics on export value added do not exist. Further, it deals with real value added and exports at current prices.

The graphs display an upward trend between the structure of production and the one of exports relative to Germany. The R^2 ranges from 97% for Italy to 36% for Poland.[7] All countries but Finland have a comparative advantage relative to Germany in the 'Textile and leather product' industries. France and the UK take advantage of the Airbus production network in Europe. The 'Food products' industries rank among the top ones in France, UK, Spain, Poland, and Portugal. 'Chemical products', another strong output position of many countries relative to Germany, is featured in the upper right quadrant for France and the UK. The already mentioned strong advantage of Finland in telecoms, paper and wood is confirmed by exports. The one of UK in 'Publishing' and the Italian one in 'Metal products and machinery' stand out as comparative advantages of these countries. Two other industries, 'Manufacturing n.e.c.' and 'Non metallic mineral products' show up respectively for the UK, Italy, Poland and Portugal on the one hand and France, Italy, Spain, Poland and Greece on the other hand.

Germany's comparative advantage in exports reflects its output structure bent on the manufacturing of cars, machinery and electrical products. Only the Spanish export structure and in a lesser extent the Polish one seem to get an export bias towards cars relative to Germany. Italy has a strong export position in machinery and Poland in electrical products. It doesn't mean these countries compete with Germany. It rather reflects vertical production networks in Europe (Polish electrical products or car parts exported to Germany), and also different assumed quality ranges (Italian machinery vs. German one for example).

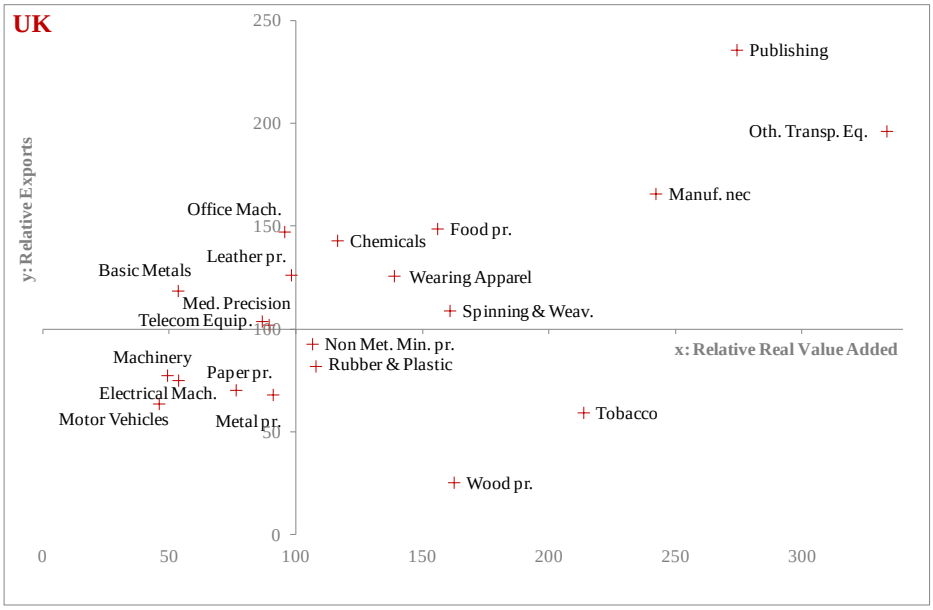
[7] The R^2 is for Italy: 97%, Portugal: 84%, Spain: 79%, Greece: 68%, France: 63%, Finland: 48%, UK: 38%, Poland: 36%.

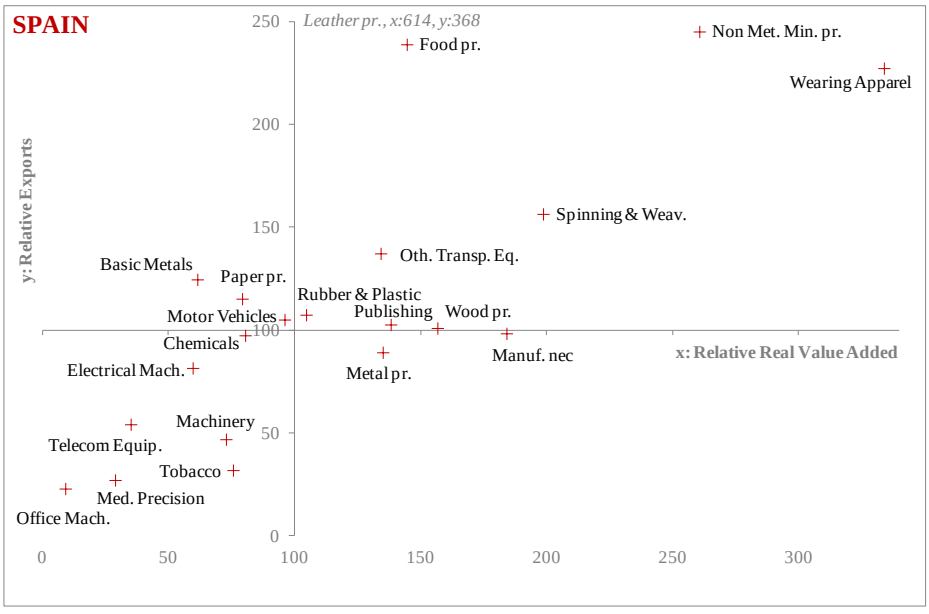
Figure 5. Output Specialisation Compared to Export Specialisation, 2007
FRANCE & ITALY
(Manufacturing=100 & Germany=100)



Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases; and from CEPII-CHELEM-International Trade database.

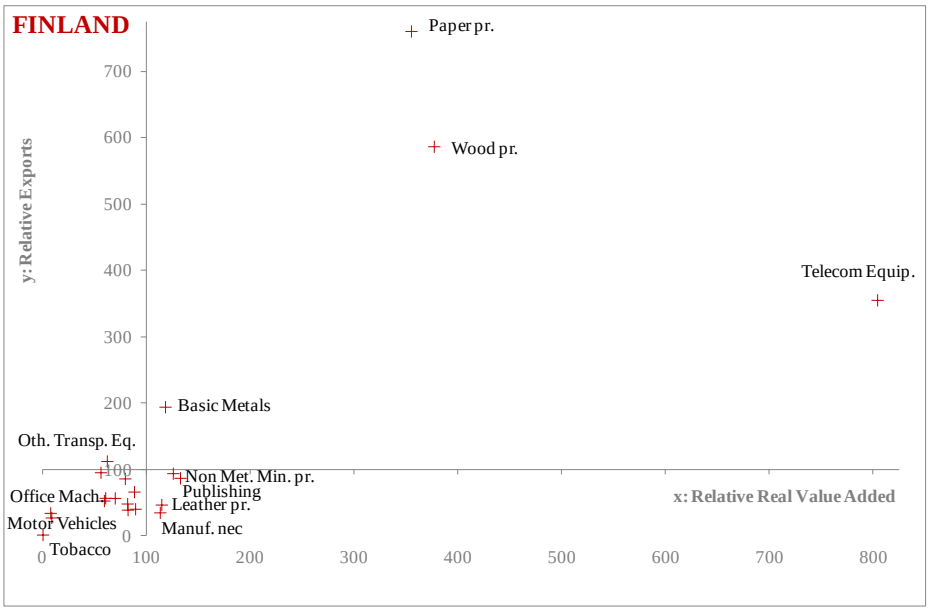
Figure 6. Output Specialisation Compared to Export Specialisation, 2007
UNITED-KINGDOM & SPAIN
(Manufacturing=100 & Germany=100)





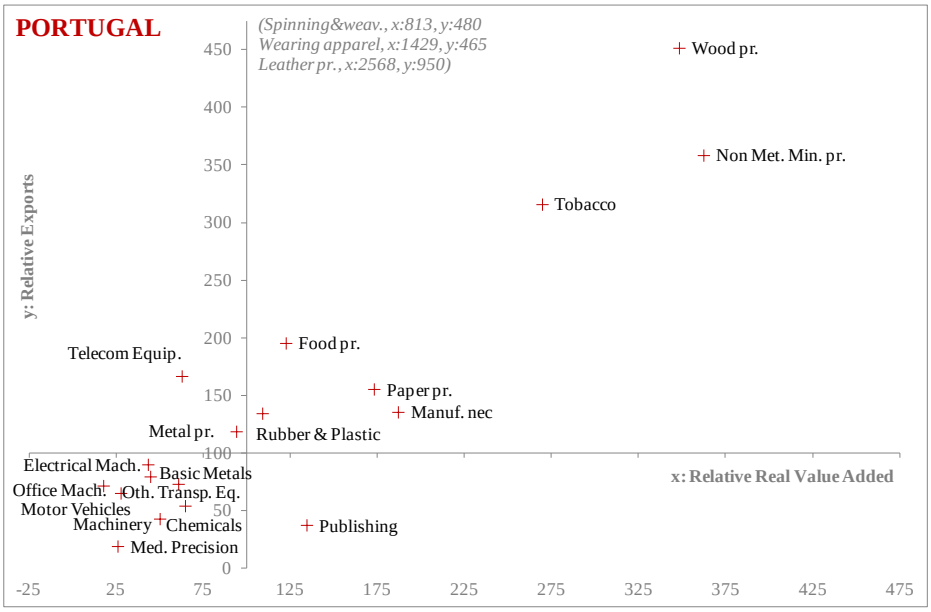
Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases; and from CEPII-CHELEM-International Trade database.

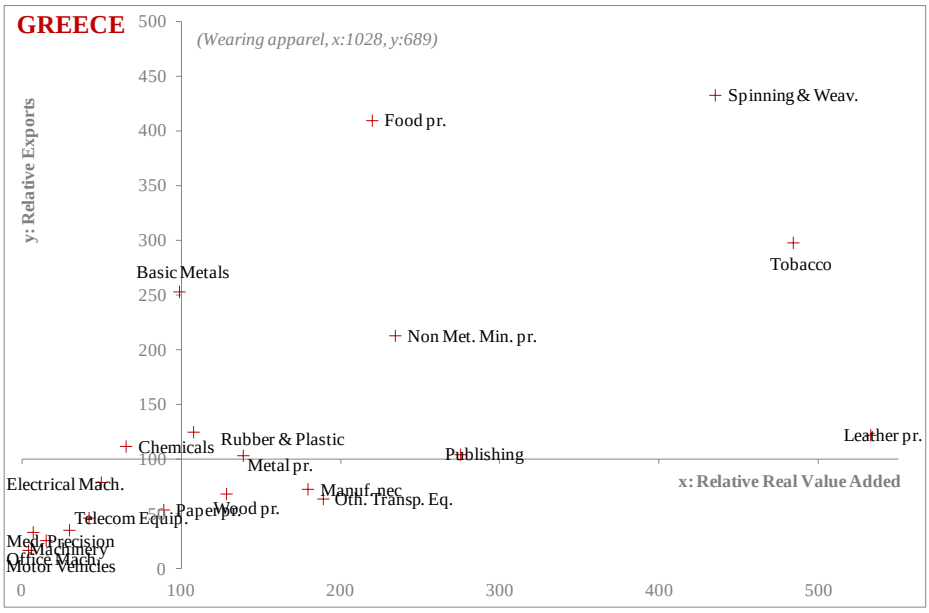
Figure 7. Output Specialisation Compared to Export Specialisation, 2007
POLAND & FINLAND
(Manufacturing=100 & Germany=100)



Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases; and from CEPII-CHELEM-International Trade database.

Figure 8. Output Specialisation Compared to Export Specialisation, 2007
PORTUGAL & GREECE
(Manufacturing=100 & Germany=100)





Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases; and from CEPII-CHELEM-International Trade database.

4. RELATIVE REAL LABOUR PRODUCTIVITY AND UNIT LABOUR COSTS IN 2007

4.1. A Synopsis of Relative Real Labour Productivity and Unit Labour Costs in 2007

In the previous sections, UVR calculated with the ICOP methodology allowed the relative price levels and real value added to be assessed for the eight countries relative to Germany in the manufacturing sector. Table 5 replicates figures for price levels and the size of the manufacturing supply relative to Germany in the first two lines.

The following lines of table 5 are related to the labour input in each country: numbers of persons engaged to produce value added; average hours worked in one year; and the product of both variables, total hours worked.

Table 5. Relative Levels of Price, Real Output, Labour Input, Productivity and Unit Labour Cost in Total Manufacturing, 2007 (Germany=100)

		Poland	Portugal	Spain	Italy	UK	Finland	Greece	France
(UVR/FX)	Price Level	67	67	69	70	94	102	85	100
(VA)	Real Value Added	16	6	39	70	49	7	4	46
(L)	Persons Engaged	37	11	35	64	42	6	6	49
(H)	Annual Average Hours Worked	124	125	111	119	128	111	158	108
(LH)=(L×H)	Total Hours Worked	46	14	39	76	54	6	9	53
(VA)/(L)	Real Labour Productivity per Person Engaged	44	51	112	110	116	126	68	93
(VA)/(LH)	Real Labour Productivity per Hour	35	41	101	92	91	113	43	86
W/(LH)	Hourly Labour Compensation	16	25	62	63	70	88	35	88
(W/LH)/(VA/LH)	**Unit Labour Cost**	**45**	**61**	**61**	**68**	**77**	**78**	**82**	**103**

Reading: Countries are sorted according to the relative unit labour costs.

Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases; OECD-Stan database; EUKlems database.

These output and input figures are then used to calculate the apparent real productivity levels in the following lines (per person engaged or per hour):

- Line 7 (VA/LH): for instance, the Polish hourly labour productivity amounts to 35% of the German one in the manufacturing sector.

- Hourly labour productivity is measured by the ratio 'real value added / total hours worked. Polish real value added is at 16%, and total hours worked at 46% of the German level. Actually, the average actual work-time in Poland is longer than in Germany (124%). With an input exceeding its output, the real hourly productivity is lower than in Germany (35%).

- Real labour productivity is however high when it is related to persons engaged. Dividing real value added (16%) by persons engaged (37%), the apparent labour productivity swells up to 44%.

Table 5 displays the relative unit labour costs by introducing a new piece of information: labour compensation per hour (W/LH). Compensation per hour combined with relative real labour levels result in unit labour costs. Manufacturing price levels shown in the first line can then be compared to the unit labour costs, two essential components of competitiveness.

Like Russian dolls, nesting one into another, Table 5 synthesises the relevant pieces of information likely to reveal the factors of manufacturing competitiveness in Europe.[8] Three of these fittings will be analysed in the following sections.

4.2. Relative Unit Labour Costs

In 2007, among the eight countries, France is the only one where the manufacturing unit labour cost exceeds the German one (+3%, figure 9.A). Greece comes second to France, with a relative unit labour cost (82%) higher than those of Finland and UK (78% and 77%). Italy is in-between (68%), while the unit labour costs of the Iberian countries amount to 61% of the German level. Poland is by far, the country where the output of a unit of the common basket of manufacturing goods costs less in terms of labour input (45%).

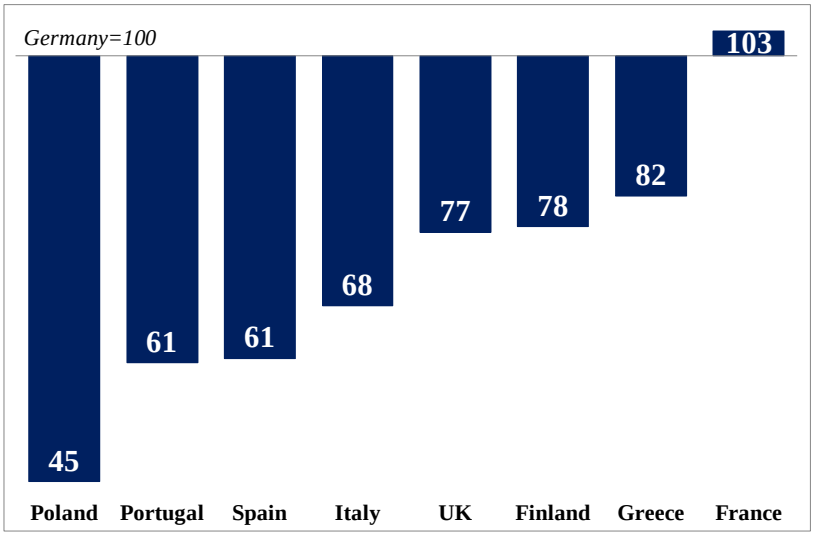
Unit labour costs are measured by the ratio of total compensation of persons engaged to the real value added by these persons engaged. Figure 9.B displays the gaps between the relative compensation levels (X axis) and the real productivity per hour (Y axis). On the diagonal, the relative cost per hour is equal to the relative productivity per hour (Germany=100).

[8] The analysis will be refined, by considering the detailed results by industry presented in the appendices.

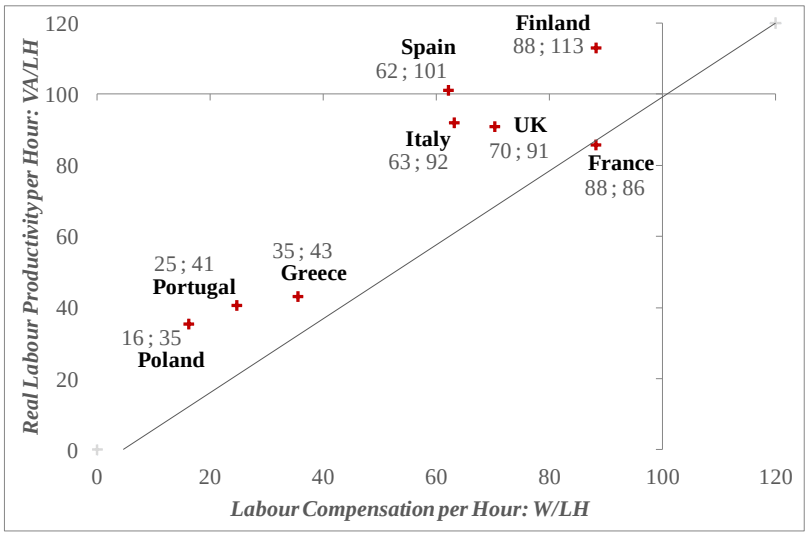
In 2007, a French person engaged in the manufacturing sector is paid 29 € on average vs. 33€ in Germany (Appendices B & K). The French compensation per hour is then at 88% of the German level, since the French relative hourly labour productivity is lower (86%, table 5). As a result, the unit labour cost is a bit higher than in Germany. With a relative level of 103%, France is located next to the diagonal in Figure 9.B.

Figure 9. Labour Unit Cost Relative to Germany in Total Manufacturing, 2007 (Germany=100)

A. Relative Unit Labour Costs



B. Relative Real Hourly Labour Productivity & Labour Compensation



Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases; OECD-Stan database; EUKlems database.

With relative productivities per hour exceeding relative compensation per hour, all the other countries are far from the diagonal. Finland so, where the relative compensation per hour is at the same level than in France, owns a real labour productivity per hour racing ahead (113% of the German level) and benefits then from competitive unit labour costs (78% of the German level).

At the branch level, the highest labour costs per hour are to be found in the motor vehicle, computer and chemical products in Germany (Appendix M). In all countries, the chemical products and tobacco industries pay workers better wages than average in accordance with a higher labour productivity. In France, the highest compensation in tobacco, chemicals, transport equipment, is also matched with a higher relative labour productivity in these industries. In UK, the radio and communication industry pays above average to meet high labour productivity standards. This is also the case for basic metals and machinery in Italy, for paper-publishing, basic metals, machinery, electrical products and rubber in Spain; for paper products, communication equipment, basic metals in Finland; for paper in Portugal; for publishing and electrical machinery in Greece.

Some industries pay less than could have been expected by their hourly labour productivity performance. That is the case in the food branch in the UK, Spain and Finland, and also the case in the leather branch for France and Italy, or in the spinning and weaving industries in Italy and Finland, and further, in the rubber industries in Finland.

Unit labour costs then are higher in the industries compensating more than labour productivity per hour or per person engaged. Appendix M shows that the compensation rate compared to the hourly labour productivity is chiefly high in France in several industries relative to Germany. France, Italy, Greece and Finland have high relative labour costs in the 'Food products', Finland, France and Greece in the 'Wearing apparel' branch, Greece and France in the wood industries, France, UK and Finland in the paper industries, France in 'Publishing', France and Greece in the 'Manufacturing n.e.c.', France in next to all other branches but 'Chemical products', 'Machinery & Equipment', 'Electrical products' and 'Motor vehicles'. Finland has also a cost disadvantage vs. Germany in 'Office machinery' and 'Other transport equipment', and Greece in 'Office machinery'.

4.3. Relative Real Hourly Labour Productivity

Hourly labour productivity is a central component of competitiveness: as already stated, Finland and France compensate their workers more than the other countries compared to Germany, but relative unit labour cost in Finland are lower than in France, thanks to an enhanced productivity there. Figure 10.A ranks the eight countries according to their real hourly labour productivity levels in the manufacturing sector.

The second country with the best productivity performance relative to Germany is Spain. In 2007, before the triggering of the global crisis, the Spanish industry is slightly more productive than the German industry (101%) and is relatively cheaper in terms of unit labour costs (61%). The current crisis is then not linked to a competitiveness underperformance in the manufacturing sector in terms of levels. However, and this is true for other countries, the global macro-economic imbalances have revealed that manufacturing output per hour was too low to haul up labour productivity of the whole economy.[9]

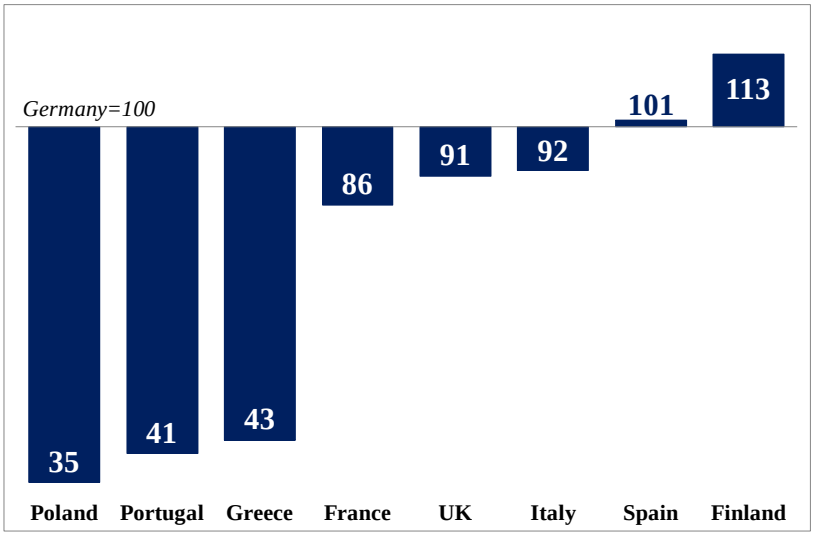
Italy experiences the same kind of industrial performance. It produces 70% of the German value added, with 76% of labour input. Its relative level of labour productivity is the same as in the UK (92% and 91%) but Italian unit labour costs are significantly lower (68% vs. 77%).

By contrast, performances in terms of output per hour relative to Germany are rather damaged for Poland, Portugal, and Greece. Poland, with 16% of the German value added level and 46% of the German hours worked level (Figure 10.B) is only at 35% of the German hourly labour productivity. But with a compensation rate of 5€ vs. 33€ in Germany, the Polish unit labour costs are very competitive. This could be translated in the Polish industrial price (Table 5). In the same way, Portugal's rather decaying performances are outbalanced by low compensation rates (8€ per hour). In Greece, the compensation rate of 12€ hardly balances the low labour productivity performance. Therefore, the relative unit labour costs are at 82% of the German level, second to France. Thus, in 2007, the country's manufacturing competitiveness was in a bad shape, portenting the financial crisis it is through at present.

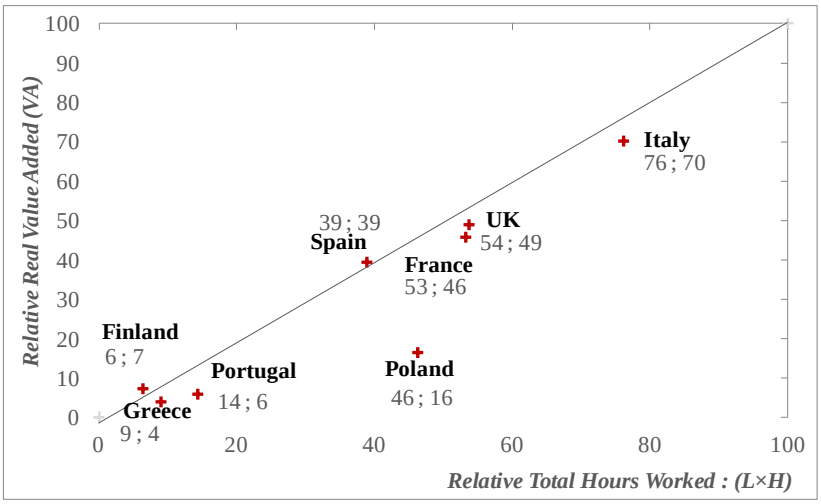
[9] In Spain, the collapse of finance and construction, and then distribution services, where growth of output per hour was high, could be blamed for its current bad economic performance.

Figure 10. Relative Real Hourly Labour Productivity in Total Manufacturing, 2007 (Germany=100)

A. Relative Real Hourly Labour Productivity



B. Real Value Added & Total Hours Worked



Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases; OECD-Stan database; EUKlems database.

4.4. Relative Labour and Hour Input

Labour productivity mixes up several effects: value added prices, labour and hours. We have seen how prices impacted value added in our sample countries. The countries set their labour input according to their production function, and labour input proportions between hours and employment are also chosen according to regulations and labour market policies.

Figure 11 shows the trade-off between hours and persons engaged relative to Germany for our sample countries. Relative total actual hours, (annual actual average hours worked times persons engaged) shown in figure 11.A, result from this mix. They reflect more or less the size of the population and of the manufacturing sector relative to Germany, and demographic changes as well. Finland, Greece and Portugal have total hours worked ranging from 6 to 14%, Poland and Spain from 39 to 46%, France and UK about 55% and Italy 76%. It is noteworthy that Italy's large input of hours worked relative to Germany has not been a drawback for its labour productivity.

Part B of figure 11 shows that Finland, Portugal and Greece, the three smallest countries by the size of their population, produce their value added with fewer workers who work longer than in Germany. Annual average hours worked in Greece even amount to 158% the average work-time in Germany. In Greece, the self-employed rate amounts to 35% in 2008 (OECD, Country Profiles Statistics). Self-employed people generally state working more hours than employees. In Portugal with a population about the size of Greece, employment was nearly double the Greek one. By contrast, Italy and France have a higher relative labour input (64% and 49% respectively). In-between, the ratios of UK, Poland and Spain show a mix biased towards hours rather than employment. These ratios demonstrate, the other way around, that Germany produces value added with more labour input and fewer hours.

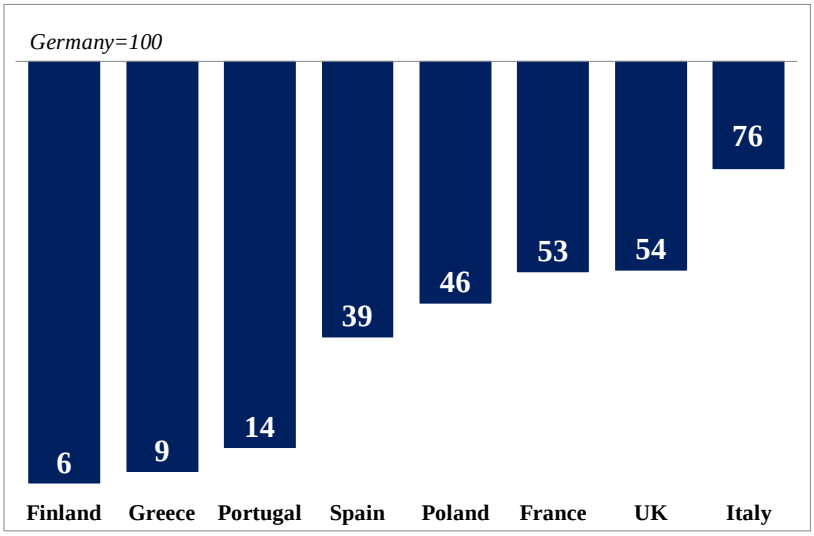
By sector, appendices H to J show hours worked, in level in the country, or relative to Germany. In Germany lesser hours are spent in the computer, publishing, and motor vehicle industries. In France and Spain, some labour productivity effect could have been expected in the chemicals branch, in France like in Italy, in transport equipment, and in Poland in the textile industries. It is not always the case. Astonishingly, UK workers spend more time in the computer industry than the average.

The concentration of hours worked follows more or less the structure of value added. In chemicals and transport equipment, the hour input is rather less important for all countries as a share of total hours than the share of value added. In the textiles, wood-paper and food industries, actual total hours are more or equally concentrated than is value added, except in Greece for food and in Portugal for textiles. Noteworthy is the position of Finland that spends

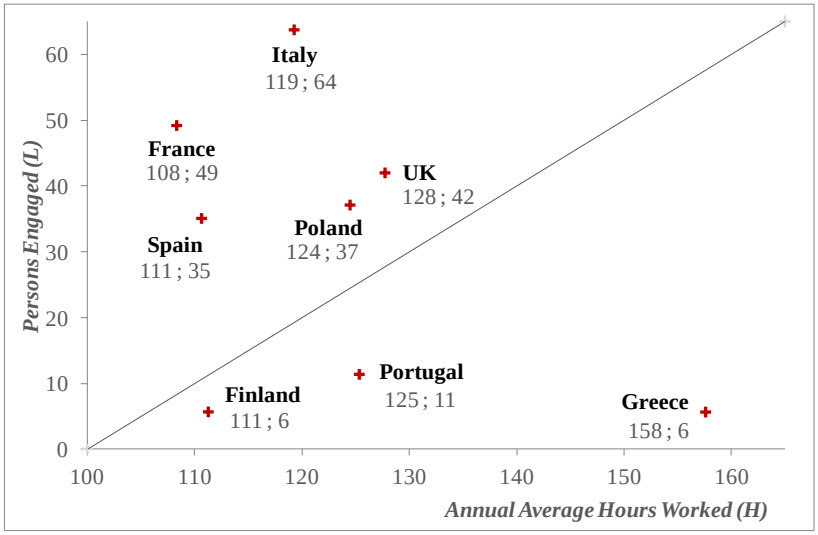
9% of its hours in the communication equipment industry and produces 22% of the manufacturing value added.

Figure 11. Relative Hours Worked in Total Manufacturing, 2007 (Germany=100)

A. Relative Hours Worked



B. Persons Engaged & Annual Average Working Hours



Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases; OECD-Stan database; EUKlems database.

CONCLUDING REMARKS

Prices and hourly labour productivity and unit labour costs are key determinants of competitiveness. These factors of competitiveness maintain a close relationship, and help understand where the corrective patches should be applied to retrieve growth.

Unit value ratios calculated according to ICOP methodology reveal that domestic price systems within the EU are far from being homogeneous despite a deep economic integration of European countries. All countries under review but Finland and France are cheaper than Germany. UVR price levels are lower than German ones by about 30% in Poland, Portugal, Spain and Italy. Compared to these four countries, the price competitiveness of Greece is twice as less (15% cheaper than Germany). At last, the price competitiveness advantage for the UK is limited to 6%.

For the whole manufacturing sector, the use of UVR re-evaluates quite sharply the relative levels of the manufacturing supply of Italy, Spain, Poland and Portugal (between 44 and 50%). The Greek relative real value added benefits from a significant re-evaluation effect (17%), while the British one is less large (6%).

Results for output specialisation show that Germany is a juggernaut relatively to its partners in three branch groupings: 'Metal products and machinery', 'Transport equipment' and 'Electrical products and electronics'. However, three countries manage to cope in these branch groupings: Italy in 'Metal products and machinery' (especially in 'Metal products' & 'Machinery & equipment'); France in 'Transport equipment' (especially in 'Other transport equipment'); Finland in 'Electrical products and electronics' (especially in 'Radio, TV & Communication equipment').

Germany's comparative advantage in exports reflects its output structure bent on the manufacturing of cars, machinery and electrical products. Only the Spanish export structure and in a lesser extent the Polish one seem to get an export bias towards cars relative to Germany. Italy has a strong export position in machinery and Poland in electrical products. It doesn't mean these countries compete with Germany. It rather reflects vertical production networks in Europe (Polish electrical products or car parts exported to Germany), and also different assumed quality ranges (Italian machinery vs. German one for example).

Data on the real output and labour input allow to calculate the apparent real productivity levels and unit labour costs. In 2007, among the eight countries, France is the only one where

the manufacturing unit labour cost exceeds the German one. Greece comes second to France, with a relative unit labour cost (82%) higher than those of Finland and UK (78% and 77%). Italy is in-between (68%), while the unit labour costs of the Iberian countries amount to 61% of the German level. Poland is by far, the country where the output of a unit of the common basket of manufacturing goods costs less in terms of labour input (45%).

Hourly labour productivity is a central component of competitiveness: as already stated, Finland and France compensate their workers more than the other countries compared to Germany, but relative unit labour cost in Finland are lower than in France, thanks to an enhanced productivity there.

The second country with the best productivity performance relative to Germany is Spain. In 2007, before the triggering of the global crisis, the Spanish industry is slightly more productive than the German industry (101%) and is relatively cheaper in terms of unit labour costs (61%). The current crisis is then not linked to a competitiveness underperformance in the manufacturing sector in terms of levels. However, and this is true for other countries, the global macro-economic imbalances have revealed that manufacturing output per hour was too low to haul up labour productivity of the whole economy.

Italy experiences the same kind of industrial performance. It produces 70% of the German value added, with 76% of labour input. Its relative level of labour productivity is the same as in the UK (92% and 91%) but Italian unit labour costs are significantly lower (68% vs. 77%).

By contrast, performances in terms of output per hour relative to Germany are rather damaged for Poland, Portugal, and Greece. Poland, with 16% of the German value added level and 46% of the German hours worked level (Figure 10.B) is only at 35% of the German hourly labour productivity. But with a compensation rate of 5€ vs. 33€ in Germany, the Polish unit labour costs are very competitive. This could be translated in the Polish industrial price (Table 5). In the same way, Portugal's rather decaying performances are outbalanced by low compensation rates (8€ per hour). In Greece, the compensation rate of 12€ hardly balances the low labour productivity performance. Therefore, the relative unit labour costs are at 82% of the German level, second to France. Thus, in 2007, the country's manufacturing competitiveness was in a bad shape, portenting the financial crisis it is through at present.

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APPENDIX A: THE ICOP METHODOLOGY[10]

Basic structure

A major task in the ICOP approach to manufacturing is to derive industry-specific conversion factors on the basis of relative product prices. As a first step, unit values (uv) are derived by dividing ex-factory output values (o) by produced quantities (q) for each product i in each country

$$uv_i = \frac{o_i}{q_i} \qquad (\mathbf{6})$$

The unit value can be considered as an average price, averaged throughout the year for all producers and across a group of nearly similar products. Subsequently, in a bilateral comparison, broadly defined products with similar characteristics are matched, for example ladies' shoes, cigarettes, cheese and car tyres. For each matched product, the ratio of the unit values in both countries is taken. This unit value ratio (UVR) is given by

$$UVR_i^{xu} = \frac{uv_i^x}{uv_i^u} \qquad (\mathbf{7})$$

indicates the relative producer price of the matched product in the two countries.

Product UVRs are used to derive an aggregate UVR for manufacturing branches and total manufacturing in a stepwise weighting procedure. Next figure shows the four levels which are being distinguished: products, industries, branches and total manufacturing. These levels correspond with the levels distinguished in the International Standard Industrial Classification (ISIC rev 3). ICOP industries include four-digit ISIC industries, and ICOP branches consist of two-digit divisions. The total manufacturing output is the sum of branch output, which is the sum of industries' output value. The output value of an industry is the sum of the value of output of its products. In a binary comparison some of these products can be matched, but not all. This is because of lack of value or quantity data, difficulties in finding corresponding products, the existence of country-unique products, etc.

Two UVR are derived at each level. A Laspeyres UVR is calculated by using base country weights and a Paasche by using weights for the other country. The Laspeyres and Paasche

[10] Based on a note by M. Timmer in cooperation with B. van Ark, N. Mulder, L. Nayman and D. Ünal (see Nayman and Ünal, 2001).

indices are combined into a Fisher index when a single currency conversion factor is required. It is defined as the geometric average of the Laspeyres and the Paasche.

Aggregation Step One Industry Level UVR

The industry UVR (UVRj) is given by the mean of the UVR of the sampled products. Product UVRs are weighted by their output value as more important products should have a bigger weight in the industry UVR:

$$UVR_j = \sum_{i=1}^{I_j} w_{ij} UVR_{ij} \qquad (\mathbf{8})$$

with i=1,.., I_j the matched products in industry j; $w_{ij} = o_{ij} / o_j^M$ the output share of the i^{th} commodity in industry j in total matched output; and $o_j^M = \sum_{i=1}^{I_j} o_{ij}$ the total matched value of output in industry j. In bilateral comparisons the weights of the base country (u) or the other country (x) can be used. The use of base country value weights leads to the Laspeyres index. Substituting base country weights in (3) gives:

$$UVR_j^{xu(u)} = \sum_{i=1}^{I_j} w_{ij}^{u(u)} \; UVR_{ij} \qquad (\mathbf{9})$$

with $w_{ij}^{u(u)} = o_{ij}^{u(u)} / o_j^{M\,u(u)}$; $o_j^{M\,u(u)} = \sum_{i=1}^{I_j} o_{ij}^{u(u)}$; and $o_{ij}^{u(u)} = u v_{ij}^u q_{ij}^u$, the output value of matched product i in country u at own prices. Using (1), (4) can be rewritten as

$$UVR_j^{xu(u)} = \frac{\sum_{i=1}^{I_j} uv_{ij}^x q_{ij}^u}{\sum_{i=1}^{I_j} uv_{ij}^u q_{ij}^u} \qquad (\mathbf{10})$$

with $UVR_j^{xu(u)}$ indicating the Laspeyres index which is the unit value ratio between country u and x weighted at base-country quantities indicated by the u between brackets. For the Paasche index, weights of the other country quantities valued at base country prices are used in formula (3). This gives

$$UVR_j^{xu(x)} = \sum_{i=1}^{I_j} w_{ij}^{u(x)} UVR_{ij} \qquad (\mathbf{11})$$

with $w_{ij}^{u(x)} = o_{ij}^{u(x)} / o_j^{M\,u(x)}$; $o_j^{M\,u(x)} = \sum_{i=1}^{I_j} o_{ij}^{u(x)}$; and $o_{ij}^{u(x)} = u v_{ij}^{u} q_{ij}^{x}$, the output value of matched product i in country x at u prices. Using (1), (6) can be rewritten as:

$$\mathrm{UVR}_{\mathrm{j}}^{xu(x)} = \frac{\sum_{\mathrm{i=1}}^{\mathrm{I_j}} \mathrm{u v_{ij}^{x} q_{ij}^{x}}}{\sum_{\mathrm{i=1}}^{\mathrm{I_j}} \mathrm{u v_{ij}^{u} q_{ij}^{x}}} \qquad \textbf{(12)}$$

with $\mathrm{UVR}_{\mathrm{j}}^{\mathrm{xu(x)}}$ indicating the Paasche index which is the unit value ratio between country u and x weighted at the quantities of the other country (x).

Aggregation Step Two Branch Level UVR

Branch UVRs ($\mathrm{UVR_k}$) are calculated as a weighted average of industry UVR. Use of weights from the base country and the industry UVR at base country weights, gives the Laspeyres index for branch k.

$$\mathrm{UVR}_{\mathrm{k}}^{xu(u)} = \sum_{\mathrm{j=1}}^{\mathrm{J_k}} w_{\mathrm{jk}}^{u(u)}\, \mathrm{UVR}_{\mathrm{jk}}^{xu(u)} \qquad \textbf{(13)}$$

with j=1,.., $\mathrm{J_k}$ the number of industries in branch k in which a product match has been made and $w_{jk}^{u(u)}$ the industry weight. UVR of industries with bigger output should have a higher weight to reflect the structure of the economy. However, this weight should also depend on the reliability of the industry UVR, being lower the lower the reliability, as unreliable UVR should have a limited influence on the higher level result. Therefore the set of industries $\mathrm{J_k}$ is split into two, $\mathrm{J_k(a)}$ and $\mathrm{J_k(b)}$ depending on their reliability. UVR of industries belonging to the first set ($\mathrm{J_k(a)}$) are weighted with the total industry output at own prices: $o_{jk}^{T\,u(u)}$. The UVR from the other industries (belonging to $\mathrm{J_k(b)}$) are weighted only by the output value of the matched products in the industry: $o_{jk}^{M\,u(u)} = \sum_{\mathrm{i=1}}^{\mathrm{I_j}} \mathrm{u v_{ij}^{u} q_{ij}^{u}}$. Hence the weights are given by

$$w_{jk}^{u(u)} = o_{jk}^{T\,u(u)} / o_k^{M\,u(u)} \qquad \forall j \in J_k(a)$$

$$w_{jk}^{u(u)} = o_{jk}^{M\,u(u)} / o_k^{M\,u(u)} = \sum_{\mathrm{i=1}}^{\mathrm{I_j}} \mathrm{u v_{ij}^{u} q_{ij}^{u}} / o_k^{M\,u(u)} \qquad \forall j \in J_k(b)$$

with $o_k^{M\,u(u)} = \sum_{J_k(a)} o_{jk}^{T\,u(u)} + \sum_{J_k(b)} o_{jk}^{M\,u(u)}$

To get the Paasche index, the output weights of country x valued at base prices is substituted. This gives

$$\mathrm{UVR}_{\mathrm{k}}^{xu(x)} = \sum_{\mathrm{j=1}}^{\mathrm{J_k}} w_{\mathrm{jk}}^{u(x)}\,\mathrm{UVR}_{\mathrm{jk}}^{xu(x)} \qquad \textbf{(14)}$$

With:

$$w_{jk}^{u(x)} = o_{jk}^{T\,u(x)} / o_k^{M\,u(x)} \qquad \forall j \in J_k(a)$$

$$w_{jk}^{u(x)} = o_{jk}^{M\,u(x)} / o_k^{M\,u(x)} \sum_{\mathrm{i=1}}^{\mathrm{I_j}} \mathrm{uv}_{\mathrm{ij}}^{u}\,\mathrm{q}_{\mathrm{ij}}^{x} / o_k^{M\,u(x)} \qquad \forall j \in J_k(b)$$

With:

$$o_k^{M\,u(x)} = \sum_{J_k(a)} o_{jk}^{T\,u(x)} + \sum_{J_k(a)} o_{jk}^{M\,u(x)}$$

The split in the industry set is based on an assessment of the reliability of the industry UVR. Given the homogeneous character of the products belonging to an industry, it is expected that product UVR in an industry do not differ much. Hence, if the variation of the product UVR is high, this is deemed as an indication of unreliability. Also, reliability increases the higher the percentage of industry output covered by matched products. Therefore the coverage ratio is also taken into account when assessing the industry UVR reliability by using the so-called finite population correction in calculating the variance. The following decision rule is used: when the coefficient of variation is less than 0.1, the industry is assigned to $J_k(a)$, otherwise to $J_k(b)$: [11]

$$\begin{aligned} &\textit{if} \quad cv\left\lfloor \mathrm{UVR}_j \right\rfloor < 0.1 \quad \textit{then} \quad j \in J_k(a) \\ &\textit{otherwise} \qquad\qquad\qquad\quad j \in J_k(b) \end{aligned}$$

The coefficient of variation of industry j (cv_j) is measured as follows:

[11] This just replaces the original 25%-rule.

$$cv\left[\mathrm{UVR}_j\right] = \frac{\sqrt{\mathrm{var}\left[\mathrm{UVR}_j\right]}}{\mathrm{UVR}_j}$$

The variance of the industry UVR is given by the mean of the weighted deviations of the product UVRs around the industry UVR (see also Selvanathan 1991):

$$\mathrm{var}\left[\mathrm{UVR}_j\right] = (1 - f_j)\,\frac{1}{I_j - 1}\sum_{i=1}^{I_j} w_{ij}\,(\mathrm{UVR}_{ij} - \mathrm{UVR}_j)^2 \qquad \textbf{(15)}$$

with I_j the number of products matched in industry j and with f_j the share of industry output which is covered by the matched products within an industry (O^M_j / O^T_j). ($1 - f_j$) is the finite population correction (fpc).[12] The fpc ensures that with an increasing coverage of products, the variance goes down. This formulae can be applied to either the Laspeyres or Paasche UVR using output value weights of the base country for the variance of the Laspeyres, and quantity weights of the other country valued at base prices for the variance of the Paasche. To allocate an industry to one of the two sets, a decision is made on the basis of the (geometric) average variance for the Paasche and Laspeyres.

Aggregation Step Three Total Manufacturing UVR

The total manufacturing UVR is a weighted average of the branch UVR. Use of weights from the base country and the branch UVR at base country weights, gives the Laspeyres index for total manufacturing ($\mathrm{UVR}^{xu(u)}$)

$$\mathrm{UVR}^{xu(u)} = \sum_{k=1}^{K} w_k^{u(u)}\,\mathrm{UVR}_k^{xu(u)} \qquad \textbf{(16)}$$

with k=1,.., K the number of branches and $w_k^{u(u)}$ the branch weight. For branch weights the total branch output $o_k^{u(u)}$ is used irrespective their reliability, so $w_k^{u(u)} = o_k^{u(u)} / o^{u(u)}$ with: $o^{u(u)} = \sum_{k=1}^{K} o_k^{u(u)}$.

[12] The fpc is normally stated as one minus the number of products sampled divided by the total number of products in the population. Here I use the output share of sampled products rather than the number of products to account for the difference in importance of products.

To get the Paasche index, the output weights of country x valued at base prices is substituted. This gives:

$$\mathrm{UVR}^{xu(x)} = \sum_{k=1}^{K} w_{\mathrm{k}}^{u(x)} \mathrm{UVR}_{\mathrm{k}}^{xu(x)} \qquad \textbf{(17)}$$

With: $w_k^{u(x)} = o_k^{u(x)} / o^{u(x)}$ with: $o^{u(x)} = \sum_{k=1}^{K} o_k^{u(x)}$.

To have an indication of the reliability of the branch and total manufacturing UVR, the coefficient of variation for these UVRs can be calculated as follows. The sample variance of the UVR for total manufacturing is given by the quadratic output weighted average of corresponding branch UVR variances.

$$\mathrm{var}[\mathrm{UVR}] = \sum_{k=1}^{K} w_{\mathrm{k}}^2 \mathrm{var}[UVR_k] \qquad \textbf{(18)}$$

In a similar vein, the estimated variance of the UVR in branch k is given by:

$$\mathrm{var}[\mathrm{UVR}_k] = (1 - f_k) \sum_{j=1}^{J_k} w_{jk}^2 \mathrm{var}[UVR_{jk}] \qquad \textbf{(19)}$$

with f_k the share of branch output which is covered by the matched products within a branch. Branch variance is thus defined as a weighted average of the estimated variances of the industry UVR, var[UVR_{jk}], corrected by the finite population correction (fpc).[13]

[13] Note that therefore, the industry variance used for calculating the branch variance is given in equation (10) but without the fpc as this cannot be applied twice.

APPENDIX B: THE DATABASE

The statistical work has been organised as follows:

- First, we computed production price parities that allow national production schemes to be compared in a bilateral price system in 2007. Prices have been assessed by unit values. Their calculation is achieved from Spanish, Italian, Portuguese, Polish, Finnish, British, Greek, French and German values and quantities available in the *Prodcom* database published by Eurostat at an eight-digit level; For example, 850 manufacturing products could be matched in the French- German comparison out of the 3,900 products available in the Eurostat *Prodcom* list. In the latter database, the euro is the reference currency used to quote values. As regards Poland and the UK, their unit value ratios were adjusted with their own exchange rate. In *Prodcom*, quantities have been expressed in a common quantity unit for all countries. These products displayed in the NACE rev.1 classification are aggregated at a four, three and two digit level. Results are then bundled in seven branch groupings, for readability reasons. The manufacturing sector includes sectors 15 to 36 of the NACE Rev.1 classification (from manufactured food to miscellaneous industries) but excludes Nace 23, which is the manufacture of coke, refined petroleum products and nuclear fuel.

- Second, we assessed real levels (in production price parity) of value added, hourly labour productivity and unit labour costs for the year 2007. Data for value added, employees, total persons engaged and compensation of employees come from the *Structural Business surveys* published by Eurostat; Missing cells were filled in with data from the Stan database by the OECD. Compensation rates are adjusted for wages for total employment (compensation rates of the employees times numbers engaged) as compensation rates for total persons engaged are not given in the SBS database.
- Data for actual hours worked per employee are drawn from the *the EUKlems* database for the year 2007. They are then applied to persons engaged from the Business surveys data.
- Data for the nominal exchange rate, PPPs and exports come from the Cepii Chelem database.

A caveat must be brought forward as average actual hours worked come from the old EUKlems database.[14] Then, hourly labour productivity may be subject to changes. For example, for France, should the actual hours worked be retrieved from the French and German statistics, the relative real hourly labour productivity computed from INSEE and DESTATIS, with no UVR and with hours not being adjusted for the Eurostat *SBS* statistics, stand at 88% instead of 86% in our computation for 2007. We chose the Euklems database because it is closest to the national accounts of the different countries. The new EUKlems database will use the OECD Stan database for value added and labour input (persons engaged and hours). The Stan database is built from the national accounts of each country. In France, the national accounts introduced a new base year (2005), and with it, brought its lot of changes. For example, hours were revised downwards on account of a revision of non-registered hours worked by registered workers.

Eurostat compensation and hours lean on the ECMO (Enquête sur le Coût de la Main d'Œuvre) surveys [for a discussion of hours in the Eurostat, EUKlems and BLS databases, see Askenazy, 2011]. A comparison with the ECMO survey shows anyway that labour costs per hour calculated with the Eurostat SBS and the EUKlems hours let emerge no such great differences but for France (ECMO: 33 euros, ours: 29 euros) and for Greece (ECMO: 16€; ours: 12€). For Germany, the rates are the same (33€).

As to the computation of persons engaged (employees and self-employed persons), it does not take into account, neither part-time work nor multi jobs activity. But as full time equivalents are not published in the business surveys, we put aside this correction. When total actual hours are considered, we get rid of this methodological drawback, insofar as part-time impacts the annual average work-time.

[14] The new EUKlems database will be released before end 2012.

APPENDIX C: PRODUCTION PRICE PARITIES BY MANUFACTURING BRANCH IN 2007

Country's Unit Value Ratios per *German Euro* ($€^{DE}$=1) by branch

NACE Code		**France** [$€^{FR}/€^{DE}$]	**UK** [GBP/$€^{DE}$]	**Italy** [$€^{IT}/€^{DE}$]	**Spain** [$€^{ES}/€^{DE}$]	**Poland** [PLN/$€^{DE}$]	**Finland** [$€^{FI}/€^{DE}$]	**Portugal** [$€^{PT}/€^{DE}$]	**Greece** [$€^{GR}/€^{DE}$]
	Total manufacturing	**1.00**	**0.64**	**0.70**	**0.69**	**2.55**	**1.02**	**0.67**	**0.85**
	Food & tobacco	**1.32**	**0.83**	**1.26**	**1.05**	**3.28**	**1.22**	**1.08**	**1.16**
15	Food products	1.32	0.83	1.26	1.05	3.28	1.22	1.09	1.17
16	Tobacco	1.30	0.84	1.26	0.96	3.25	1.22	0.96	0.89
	Textile & leather pr.	**0.94**	**0.64**	**0.72**	**0.64**	**2.06**	**1.01**	**0.54**	**0.66**
17	Spinning & weaving	0.90	0.64	0.69	0.67	2.18	0.97	0.52	0.63
18	Wearing apparel	1.00	0.64	0.73	0.65	1.96	1.04	0.53	0.67
19	Leather products	0.91	0.64	0.73	0.55	1.96	1.08	0.54	0.72
	Wood, paper & publish.	**1.07**	**0.59**	**0.70**	**0.74**	**2.15**	**0.92**	**0.69**	**0.89**
20	Wood & wood products	1.03	0.59	0.86	0.80	2.67	0.97	0.65	0.83
21	Paper & paperboard	1.23	0.78	0.96	0.87	2.89	0.97	0.83	0.86
22	Publishing	1.14	0.59	0.74	0.74	2.12	0.97	0.65	0.91
36	Manufacturing n.e.c.	0.88	0.49	0.51	0.63	1.58	0.70	0.65	0.91
	Chemicals	**1.03**	**0.67**	**0.70**	**0.76**	**2.61**	**1.01**	**0.62**	**0.84**
24	Chemical products	1.00	0.64	0.71	0.74	2.60	1.01	0.65	0.87
25	Rubber & plastic pr.	1.06	0.66	0.64	0.72	2.39	1.03	0.62	0.58
26	Non met. mineral pr.	1.08	0.78	0.74	0.81	2.85	1.01	0.56	0.98
	Metal pr. & machinery	**1.04**	**0.65**	**0.60**	**0.60**	**2.81**	**1.04**	**0.61**	**0.79**
27	Basic metals	1.22	0.72	0.82	0.98	3.56	1.22	0.97	0.94
28	Metal products	1.04	0.64	0.73	0.67	2.63	1.00	0.58	0.75
29	Machinery & equipment	0.98	0.64	0.47	0.44	2.61	1.00	0.54	0.77
	Electric. pr. & electronics	**0.98**	**0.64**	**0.62**	**0.74**	**2.55**	**1.08**	**0.73**	**0.73**
30	Office mach. & computers	1.00	0.64	0.75	1.07	2.55	1.00	0.83	0.91
31	Electrical machinery	0.96	0.64	0.49	0.73	2.55	1.10	0.80	0.57
32	Radio, TV & com. equip.	1.00	0.64	0.75	0.73	2.55	1.00	0.65	0.91
33	Med. precision & optical	1.00	0.64	0.75	0.73	2.55	1.00	0.65	0.91
	Transport equipment	**0.72**	**0.55**	**0.75**	**0.55**	**2.04**	**0.94**	**0.65**	**0.91**
34	Motor vehicles	0.65	0.55	0.75	0.54	1.94	0.94	0.65	0.91
35	Other transport equipment	1.00	0.55	0.75	0.55	2.55	0.94	0.65	0.91

Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases.

APPENDIX D: RELATIVE PRICE LEVELS BY MANUFACTURING BRANCH IN 2007

"UVR/Nominal Exchange Rate" Ratio (Germany=100)

NACE Code		France	UK	Italy	Spain	Poland	Finland	Portugal	Greece
	Total manufacturing	**100**	**94**	**70**	**69**	**67**	**102**	**67**	**85**
	Food & tobacco	**132**	**121**	**126**	**105**	**86**	**122**	**108**	**116**
15	Food products	132	121	126	105	87	122	109	117
16	Tobacco	130	123	126	96	86	122	96	89
	Textile & leather pr.	**94**	**94**	**72**	**64**	**54**	**101**	**54**	**66**
17	Spinning & weaving	90	94	69	67	58	97	52	63
18	Wearing apparel	100	94	73	65	52	104	53	67
19	Leather products	91	94	73	55	52	108	54	72
	Wood, paper & publish.	**107**	**86**	**70**	**74**	**57**	**92**	**69**	**89**
20	Wood & wood products	103	86	86	80	70	97	65	83
21	Paper & paperboard	123	114	96	87	76	97	83	86
22	Publishing	114	87	74	74	56	97	65	91
36	Manufacturing n.e.c.	88	71	51	63	42	70	65	91
	Chemicals	**103**	**98**	**70**	**76**	**69**	**101**	**62**	**84**
24	Chemical products	100	94	71	74	69	101	65	87
25	Rubber & plastic pr.	106	97	64	72	63	103	62	58
26	Non met. mineral pr.	108	114	74	81	75	101	56	98
	Metal pr. & machinery	**104**	**96**	**60**	**60**	**74**	**104**	**61**	**79**
27	Basic metals	122	106	82	98	94	122	97	94
28	Metal products	104	94	73	67	69	100	58	75
29	Machinery & equipment	98	94	47	44	69	100	54	77
	Electric. pr. & electronics	**98**	**94**	**62**	**74**	**67**	**108**	**73**	**73**
30	Office mach. & computers	100	94	75	107	67	100	83	91
31	Electrical machinery	96	94	49	73	67	110	80	57
32	Radio, TV & com. equip.	100	94	75	73	67	100	65	91
33	Med. precision & optical	100	94	75	73	67	100	65	91
	Transport equipment	**72**	**80**	**75**	**55**	**54**	**94**	**65**	**91**
34	Motor vehicles	65	80	75	54	51	94	65	91
35	Other transport equipment	100	80	75	55	67	94	65	91

Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases.

APPENDIX E: SHARE OF VA IN TURNOVER BY MANUFACTURING BRANCH IN 2007

"Value Added/Turnover" Ratio
(VA and Turnover expressed in National Currency, in %)

NACE Code		Germany	France	UK	Italy	Spain	Poland	Finland	Portugal	Greece
	Total manufacturing	**27**	**24**	**32**	**24**	**25**	**25**	**25**	**26**	**32**
	Food & tobacco	**19**	**19**	**28**	**21**	**21**	**19**	**25**	**21**	**28**
15	Food products	21	19	30	21	21	20	25	20	28
16	Tobacco	7	7	13	69	45	9	-	43	41
	Textile & leather pr.	**27**	**26**	**35**	**24**	**28**	**33**	**35**	**32**	**32**
17	Spinning & weaving	29	26	35	27	28	29	38	29	33
18	Wearing apparel	26	23	36	23	28	41	30	36	32
19	Leather products	23	34	36	22	25	30	38	32	37
	Wood, paper & publish.	**31**	**28**	**40**	**26**	**32**	**30**	**22**	**30**	**45**
20	Wood & wood products	27	27	37	26	28	28	23	23	33
21	Paper & paperboard	26	22	26	20	27	28	16	32	27
22	Publishing	37	32	47	33	40	36	39	38	55
36	Manufacturing n.e.c.	32	27	39	26	31	27	33	29	41
	Chemicals	**29**	**25**	**31**	**24**	**27**	**30**	**31**	**28**	**33**
24	Chemical products	28	23	29	21	23	28	28	23	31
25	Rubber & plastic pr.	30	27	35	25	27	26	33	28	31
26	Non met. mineral pr.	33	30	38	29	31	37	37	33	36
	Metal pr. & machinery	**31**	**28**	**34**	**26**	**28**	**29**	**28**	**30**	**27**
27	Basic metals	22	20	24	17	19	26	24	26	17
28	Metal products	36	33	41	32	33	30	38	29	35
29	Machinery & equipment	34	29	34	27	30	30	26	33	37
	Electric. pr. & electronics	**31**	**29**	**39**	**28**	**25**	**23**	**23**	**18**	**28**
30	Office mach. & computers	24	19	43	20	21	16	18	24	48
31	Electrical machinery	31	26	35	26	24	26	30	22	23
32	Radio, TV & com. equip.	24	25	36	28	20	12	21	10	36
33	Med. precision & optical	42	37	44	34	39	36	38	34	45
	Transport equipment	**21**	**19**	**25**	**18**	**17**	**20**	**23**	**18**	**57**
34	Motor vehicles	20	15	18	16	15	17	29	16	42
35	Other transport equipment	31	30	39	23	26	34	19	31	60

Source: authors' calculations from Eurostat, Structural Business Surveys databases.

APPENDIX F: STRUCTURE OF VA (CURRENT PRICES) BY MANUFACTURING BRANCH IN 2007

Value Added by Branch Grouping and Branch (VA expressed in National Currency, in % of Total Manufacturing)

NACE Code		Germany	France	UK	Italy	Spain	Poland	Finland	Portugal	Greece
	Total manufacturing									
	in million €	*478,368*	*218,847*	*220,040*	*233,254*	*130,725*	*52,903*	*35,146*	*18,654*	*15,913*
	in %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Food & tobacco	**7**	**14**	**15**	**10**	**16**	**17**	**7**	**15**	**23**
15	Food products	7	14	14	10	16	16	7	14	22
16	Tobacco	0	0	1	0	0	1	0	1	1
	Textile & leather pr.	**2**	**3**	**2**	**10**	**4**	**4**	**1**	**16**	**8**
17	Spinning & weaving	1	1	1	4	2	2	1	6	3
18	Wearing apparel	1	1	1	3	2	2	0	6	4
19	Leather products	0	1	0	3	1	1	0	4	1
	Wood, paper & publish.	**10**	**11**	**18**	**13**	**15**	**15**	**19**	**19**	**20**
20	Wood & wood products	1	2	2	2	3	4	5	5	2
21	Paper & paperboard	2	2	2	2	3	2	7	5	2
22	Publishing	4	5	10	4	6	4	5	5	12
36	Manufacturing n.e.c.	2	3	4	5	4	5	2	4	4
	Chemicals	**18**	**23**	**21**	**17**	**23**	**23**	**13**	**21**	**19**
24	Chemical products	10	13	12	7	9	8	6	6	7
25	Rubber & plastic pr.	5	5	5	5	5	6	3	5	3
26	Non met. mineral pr.	3	4	4	6	9	8	4	9	8
	Metal pr. & machinery	**31**	**23**	**20**	**34**	**25**	**24**	**28**	**18**	**21**
27	Basic metals	5	4	3	5	6	6	7	3	6
28	Metal products	9	10	8	14	12	10	8	8	11
29	Machinery & equipment	16	9	9	14	8	8	13	7	4
	Electric. pr. & electronics	**15**	**12**	**10**	**9**	**7**	**7**	**29**	**7**	**4**
30	Office mach. & computers	1	0	1	0	0	0	0	0	0
31	Electrical machinery	7	4	3	4	4	4	4	3	2
32	Radio, TV & com. equip.	3	3	2	2	1	1	22	2	1
33	Med. precision & optical	4	4	4	3	1	2	3	1	1
	Transport equipment	**18**	**13**	**13**	**7**	**10**	**10**	**3**	**6**	**5**
34	Motor vehicles	15	8	6	4	7	7	1	4	1
35	Other transport equipment	2	5	7	2	2	2	1	1	5

Source: authors' calculations from Eurostat, Structural Business Surveys database.

APPENDIX G: RELATIVE LEVELS OF REAL VA BY MANUFACTURING BRANCH IN 2007

Real Value Added expressed in UVR (Germany=100)

NACE Code		France	UK	Italy	Spain	Poland	Finland	Portugal	Greece
	Total manufacturing	**46**	**49**	**70**	**39**	**16**	**7**	**6**	**4**
	Food & tobacco	**66**	**77**	**54**	**56**	**29**	**6**	**7**	**9**
15	Food products	68	76	55	57	29	6	7	9
16	Tobacco	31	104	40	30	35	0	16	19
	Textile & leather pr.	**102**	**72**	**414**	**112**	**53**	**6**	**70**	**25**
17	Spinning & weaving	77	79	289	78	39	6	47	17
18	Wearing apparel	121	68	415	131	72	6	84	40
19	Leather products	171	48	1 034	242	70	8	150	21
	Wood, paper & publish.	**49**	**100**	**90**	**57**	**31**	**16**	**11**	**8**
20	Wood & wood products	57	79	97	62	42	27	20	5
21	Paper & paperboard	36	37	46	41	17	26	10	3
22	Publishing	49	134	64	54	21	10	8	11
36	Manufacturing n.e.c.	58	118	192	73	55	8	11	7
	Chemicals	**57**	**55**	**67**	**46**	**20**	**5**	**7**	**4**
24	Chemical products	59	57	46	32	13	4	4	3
25	Rubber & plastic pr.	51	53	76	38	24	5	6	4
26	Non met. mineral pr.	60	52	121	103	39	9	21	9
	Metal pr. & machinery	**33**	**32**	**89**	**38**	**11**	**6**	**4**	**3**
27	Basic metals	28	26	60	31	13	9	3	4
28	Metal products	46	44	102	53	17	6	5	5
29	Machinery & equipment	27	26	91	29	8	6	3	1
	Electric. pr. & electronics	**37**	**35**	**49**	**17**	**8**	**13**	**2**	**1**
30	Office mach. & computers	10	47	25	4	5	1	1	0
31	Electrical machinery	31	24	63	23	11	4	3	2
32	Radio, TV & com. equip.	50	44	41	14	7	58	4	2
33	Med. precision & optical	43	42	44	11	6	4	2	1
	Transport equipment	**48**	**41**	**25**	**28**	**11**	**1**	**2**	**1**
34	Motor vehicles	37	22	19	24	11	1	2	0
35	Other transport equipment	108	163	64	53	17	4	4	7

Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases.

APPENDIX H: PERSONS ENGAGED BY MANUFACTURING BRANCH IN 2007

Number of Persons Engaged

NACE Code		Germany	France	UK	Italy	Spain	Poland	Finland	Portugal	Greece
	Total manufacturing	**7,198,687**	**3,545,510**	**3,027,250**	**4,592,022**	**2,529,184**	**2,675,703**	**413,259**	**823,601**	**411,333**
	Food & tobacco	**837,636**	**625,514**	**441,641**	**498,000**	**389,683**	**454,375**	**38,600**	**110,821**	**90,361**
15	Food products	826,009	622,208	436,994	495,500	385,878	447,061	38,600	109,861	87,946
16	Tobacco	11,627	3,306	4,647	2,500	3,805	7,314	-	960	2,415
	Textile & leather pr.	**169,696**	**163,874**	**112,855**	**621,591**	**205,073**	**273,088**	**11,080**	**235,613**	**61,730**
17	Spinning & weaving	97,558	71,362	72,134	223,971	72,944	84,284	5,121	71,156	18,593
18	Wearing apparel	50,633	62,986	31,753	234,197	83,819	151,862	4,036	109,179	37,400
19	Leather products	21,505	29,526	8,968	163,423	48,310	36,942	1,923	55,278	5,737
	Wood, paper & publish.	**898,718**	**489,384**	**646,301**	**695,789**	**466,804**	**510,507**	**99,795**	**147,531**	**91,246**
20	Wood & wood products	149,280	84,122	86,052	168,594	97,921	147,427	28,553	44,025	14,460
21	Paper & paperboard	144,096	75,768	66,550	78,518	54,340	44,820	29,681	11,780	7,804
22	Publishing	372,633	194,939	326,002	163,632	152,990	101,488	28,048	35,435	28,957
36	Manufacturing n.e.c.	232,709	134,555	167,697	285,045	161,553	216,772	13,513	56,291	40,025
	Chemicals	**1,086,789**	**628,888**	**507,696**	**639,380**	**459,013**	**427,121**	**51,674**	**105,096**	**57,047**
24	Chemical products	456,414	267,139	198,721	194,236	138,434	108,051	18,021	20,559	18,343
25	Rubber & plastic pr.	387,835	224,845	191,794	200,305	120,615	168,703	16,204	25,964	12,673
26	Non met. mineral pr.	242,540	136,904	117,181	244,839	199,964	150,367	17,449	58,573	26,031
	Metal pr. & machinery	**2,198,000**	**835,605**	**676,125**	**1,440,764**	**641,358**	**581,941**	**128,155**	**147,030**	**78,011**
27	Basic metals	263,508	98,525	70,370	137,069	76,036	70,535	18,444	11,846	13,803
28	Metal products	827,611	421,966	324,597	728,913	375,271	291,050	48,491	89,484	41,016
29	Machinery & equipment	1,106,881	315,114	281,158	574,782	190,051	220,356	61,220	45,700	23,192
	Electric. pr. & electronics	**1,015,731**	**399,168**	**318,978**	**413,248**	**152,340**	**219,506**	**65,335**	**42,764**	**16,461**
30	Office mach. & computers	43,689	6,593	24,066	14,971	5,055	8,863	368	876	1,039
31	Electrical machinery	475,916	147,119	119,097	185,734	85,488	116,018	18,069	22,391	8,660
32	Radio, TV & com. equip.	157,337	105,909	60,533	78,523	24,836	42,362	34,546	12,227	4,390
33	Med. precision & optical	338,789	139,547	115,282	134,020	36,961	52,263	12,352	7,270	2,372
	Transport equipment	**992,117**	**403,077**	**323,654**	**283,250**	**214,913**	**209,165**	**18,620**	**34,746**	**16,477**
34	Motor vehicles	847,925	254,916	165,946	169,217	155,057	135,161	7,071	24,333	2,872
35	Other transport equipment	144,192	148,161	157,708	114,033	59,856	74,004	11,549	10,413	13,605

Source: authors' calculations from Eurostat, Structural Business Surveys database; EU Klems database.

APPENDIX I: AVERAGE HOURS ACTUALLY WORKED IN MANUFACTURING, 2007

Annual Average Worked Hours per Person Engaged

NACE Code		Germany	France	UK	Italy	Spain	Poland	Finland	Portugal	Greece
	Total manufacturing	**1,457**	**1,578**	**1,860**	**1,737**	**1,611**	**1,813**	**1,620**	**1,825**	**2,295**
	Food & tobacco	**1,510**	**1,599**	**1,876**	**1,855**	**1,656**	**1,824**	**1,597**	**1,879**	**2,308**
15	Food products	1,502	1,599	1,877	1,855	1,655	1,825	1,596	1,879	2,308
16	Tobacco	2,175	1,530	1,811	1,855	1,708	1,746	1,973	1,879	2,308
	Textile & leather pr.	**1,435**	**1,606**	**1,741**	**1,653**	**1,665**	**1,772**	**1,625**	**1,798**	**2,310**
17	Spinning & weaving	1,484	1,566	1,784	1,639	1,701	1,766	1,590	1,762	2,300
18	Wearing apparel	1,333	1,669	1,669	1,676	1,629	1,770	1,641	1,814	2,300
19	Leather products	1,478	1,593	1,730	1,637	1,683	1,789	1,687	1,822	2,407
	Wood, paper & publish.	**1,468**	**1,616**	**1,817**	**1,791**	**1,597**	**1,845**	**1,589**	**1,834**	**2,308**
20	Wood & wood products	1,579	1,571	1,914	1,865	1,571	1,864	1,586	1,837	2,260
21	Paper & paperboard	1,948	1,557	1,862	1,697	1,637	1,808	1,622	1,795	2,274
22	Publishing	1,223	1,631	1,758	1,772	1,576	1,861	1,535	1,820	2,274
36	Manufacturing n.e.c.	1,527	1,653	1,851	1,788	1,618	1,830	1,641	1,848	2,374
	Chemicals	**1,469**	**1,537**	**1,871**	**1,704**	**1,545**	**1,797**	**1,633**	**1,858**	**2,287**
24	Chemical products	1,435	1,506	1,844	1,619	1,537	1,746	1,626	1,837	2,257
25	Rubber & plastic pr.	1,473	1,532	1,886	1,716	1,562	1,820	1,617	1,838	2,285
26	Non met. mineral pr.	1,526	1,579	1,890	1,762	1,543	1,813	1,654	1,874	2,319
	Metal pr. & machinery	**1,473**	**1,581**	**1,898**	**1,752**	**1,606**	**1,814**	**1,621**	**1,860**	**2,266**
27	Basic metals	1,704	1,538	1,893	1,678	1,606	1,733	1,660	1,840	2,294
28	Metal products	1,395	1,593	1,900	1,774	1,645	1,838	1,593	1,869	2,294
29	Machinery & equipment	1,473	1,578	1,897	1,741	1,545	1,811	1,634	1,848	2,217
	Electric. pr. & electronics	**1,449**	**1,559**	**1,855**	**1,740**	**1,651**	**1,805**	**1,678**	**1,626**	**2,266**
30	Office mach. & computers	1,193	1,544	1,905	1,726	1,688	1,746	1,739	1,772	2,266
31	Electrical machinery	1,420	1,544	1,862	1,719	1,627	1,773	1,646	1,504	2,266
32	Radio, TV & com. equip.	1,854	1,540	1,841	1,719	1,661	1,840	1,709	1,758	2,266
33	Med. precision & optical	1,321	1,590	1,839	1,788	1,685	1,861	1,631	1,805	2,266
	Transport equipment	**1,353**	**1,542**	**1,885**	**1,599**	**1,634**	**1,802**	**1,604**	**1,802**	**2,257**
34	Motor vehicles	1,306	1,541	1,875	1,584	1,635	1,805	1,745	1,833	2,257
35	Other transport equipment	1,642	1,543	1,895	1,624	1,633	1,798	1,532	1,745	2,257

Source: authors' calculations from Eurostat, Structural Business Surveys database; EU Klems database.

APPENDIX J: TOTAL ACTUAL HOURS WORKED BY MANUFACTURING BRANCH IN 2007

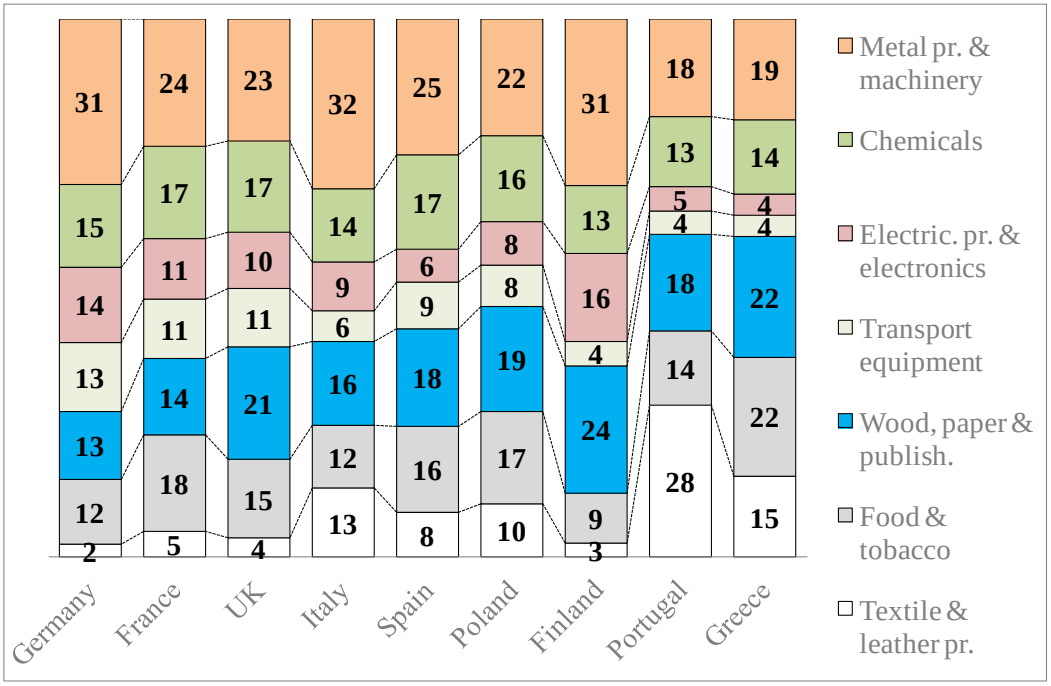
I. Structure of Total Actual Hours Worked by Manufacturing Branches and Branch Groupings

("Persons Engaged ×Annual Average Worked Hours", in % of Total Manufacturing)

NACE Code		Germany	France	UK	Italy	Spain	Poland	Finland	Portugal	Greece
	Total manufacturing	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Food & tobacco	**12**	**18**	**15**	**12**	**16**	**17**	**9**	**14**	**22**
15	Food products	12	18	15	12	16	17	9	14	21
16	Tobacco	0	0	0	0	0	0	0	0	1
	Textile & leather pr.	**2**	**5**	**4**	**13**	**8**	**10**	**3**	**28**	**15**
17	Spinning & weaving	1	2	2	5	3	3	1	8	5
18	Wearing apparel	1	2	1	5	3	6	1	13	9
19	Leather products	0	1	0	3	2	1	0	7	1
	Wood, paper & publish.	**13**	**14**	**21**	**16**	**18**	**19**	**24**	**18**	**22**
20	Wood & wood products	2	2	3	4	4	6	7	5	3
21	Paper & paperboard	3	2	2	2	2	2	7	1	2
22	Publishing	4	6	10	4	6	4	6	4	7
36	Manufacturing n.e.c.	3	4	6	6	6	8	3	7	10
	Chemicals	**15**	**17**	**17**	**14**	**17**	**16**	**13**	**13**	**14**
24	Chemical products	6	7	7	4	5	4	4	3	4
25	Rubber & plastic pr.	5	6	6	4	5	6	4	3	3
26	Non met. mineral pr.	4	4	4	5	8	6	4	7	6
	Metal pr. & machinery	**31**	**24**	**23**	**32**	**25**	**22**	**31**	**18**	**19**
27	Basic metals	4	3	2	3	3	3	5	1	3
28	Metal products	11	12	11	16	15	11	12	11	10
29	Machinery & equipment	16	9	9	13	7	8	15	6	5
	Electric. pr. & electronics	**14**	**11**	**10**	**9**	**6**	**8**	**16**	**5**	**4**
30	Office mach. & computers	0	0	1	0	0	0	0	0	0
31	Electrical machinery	6	4	4	4	3	4	4	2	2
32	Radio, TV & com. equip.	3	3	2	2	1	2	9	1	1
33	Med. precision & optical	4	4	4	3	2	2	3	1	1
	Transport equipment	**13**	**11**	**11**	**6**	**9**	**8**	**4**	**4**	**4**
34	Motor vehicles	11	7	6	3	6	5	2	3	1
35	Other transport equipment	2	4	5	2	2	3	3	1	3

Source: authors' calculations from Eurostat, Structural Business Surveys database; EU Klems database.

II. Structure of Total Hours Worked in Manufacturing by Branch Groupings, 2007 (%)



Reading Industries are sorted according to their weight in the German value added.

Source: authors' calculations from Eurostat, Structural Business Surveys database; and EU Klems database.

III. Total Hours Worked by Manufacturing Branch Relative to Germany (Germany=100)

NACE Code		France	UK	Italy	Spain	Poland	Finland	Portugal	Greece
	Total manufacturing	**53**	**54**	**76**	**39**	**46**	**6**	**14**	**9**
	Food & tobacco	**79**	**65**	**73**	**51**	**65**	**5**	**16**	**16**
15	Food products	80	66	74	51	66	5	17	16
16	Tobacco	20	33	18	26	50	0	7	22
	Textile & leather pr.	**108**	**81**	**421**	**140**	**198**	**7**	**174**	**58**
17	Spinning & weaving	77	89	254	86	103	6	87	30
18	Wearing apparel	156	79	582	202	398	10	294	127
19	Leather products	148	49	842	256	208	10	317	43
	Wood, paper & publish.	**60**	**88**	**94**	**56**	**71**	**12**	**20**	**16**
20	Wood & wood products	56	70	133	65	117	19	34	14
21	Paper & paperboard	42	44	47	32	29	17	8	6
22	Publishing	70	126	64	53	41	9	14	14
36	Manufacturing n.e.c.	63	87	143	74	112	6	29	27
	Chemicals	**60**	**59**	**68**	**44**	**48**	**5**	**12**	**8**
24	Chemical products	61	56	48	32	29	4	6	6
25	Rubber & plastic pr.	60	63	60	33	54	5	8	5
26	Non met. mineral pr.	58	60	117	83	74	8	30	16
	Metal pr. & machinery	**41**	**40**	**78**	**32**	**33**	**6**	**8**	**5**
27	Basic metals	34	30	51	27	27	7	5	7
28	Metal products	58	53	112	53	46	7	14	8
29	Machinery & equipment	30	33	61	18	24	6	5	3
	Electric. pr. & electronics	**42**	**40**	**49**	**17**	**27**	**7**	**5**	**3**
30	Office mach. & computers	20	88	50	16	30	1	3	5
31	Electrical machinery	34	33	47	21	30	4	5	3
32	Radio, TV & com. equip.	56	38	46	14	27	20	7	3
33	Med. precision & optical	50	47	54	14	22	5	3	1
	Transport equipment	**46**	**45**	**34**	**26**	**28**	**2**	**5**	**3**
34	Motor vehicles	35	28	24	23	22	1	4	1
35	Other transport equipment	97	126	78	41	56	7	8	13

Source: authors' calculations from Eurostat, Structural Business Surveys database; EU Klems database.

APPENDIX K: LABOUR COMPENSATION BY MANUFACTURING BRANCH IN 2007

Hourly Labour Compensation in €
(Hours of Persons Engaged)

NACE Code		Germany	France	UK	Italy	Spain	Poland	Finland	Portugal	Greece
	Total manufacturing	**33**	**29**	**23**	**21**	**20**	**5**	**29**	**8**	**12**
	Food & tobacco	**19**	**22**	**20**	**18**	**17**	**5**	**25**	**8**	**12**
15	Food products	18	22	20	18	17	5	25	8	12
16	Tobacco	30	44	33	23	34	11	0	31	22
	Textile & leather pr.	**24**	**22**	**17**	**16**	**13**	**3**	**21**	**6**	**9**
17	Spinning & weaving	23	23	17	18	15	4	24	7	10
18	Wearing apparel	25	22	15	15	13	3	20	5	8
19	Leather products	21	21	18	16	12	3	17	6	9
	Wood, paper & publish.	**25**	**26**	**22**	**18**	**18**	**4**	**29**	**8**	**9**
20	Wood & wood products	21	22	18	14	15	4	24	7	9
21	Paper & paperboard	23	29	23	22	22	6	38	14	12
22	Publishing	30	28	25	24	22	7	29	11	13
36	Manufacturing n.e.c.	23	23	17	16	16	4	21	6	6
	Chemicals	**34**	**33**	**25**	**24**	**24**	**6**	**28**	**10**	**14**
24	Chemical products	45	41	33	33	30	8	33	16	15
25	Rubber & plastic pr.	27	26	20	21	22	5	26	10	11
26	Non met. mineral pr.	27	29	22	20	21	6	26	9	14
	Metal pr. & machinery	**32**	**28**	**22**	**21**	**21**	**6**	**28**	**8**	**12**
27	Basic metals	32	31	26	25	27	8	31	12	15
28	Metal products	28	25	20	18	18	5	25	7	10
29	Machinery & equipment	35	30	23	23	23	6	30	10	12
	Electric. pr. & electronics	**37**	**34**	**24**	**22**	**22**	**6**	**33**	**13**	**13**
30	Office mach. & computers	55	32	23	23	19	5	25	9	8
31	Electrical machinery	38	31	22	21	23	6	29	13	13
32	Radio, TV & com. equip.	35	38	28	24	20	5	36	15	15
33	Med. precision & optical	34	33	24	22	20	6	31	10	9
	Transport equipment	**47**	**36**	**28**	**26**	**24**	**7**	**26**	**12**	**17**
34	Motor vehicles	49	34	28	26	24	6	24	11	12
35	Other transport equipment	38	39	28	25	26	7	28	12	18

Source: authors' calculations from Eurostat, Structural Business Surveys database; EU Klems database.

APPENDIX L: RELATIVE REAL LABOUR PRODUCTIVITIES BY MANUFACTURING BRANCH IN 2007

I. Relative Real Labour Productivity per Person Engaged in Manufacturing (Germany=100)

NACE Code		France	UK	Italy	Spain	Poland	Finland	Portugal	Greece
	Total manufacturing	**93**	**116**	**110**	**112**	**44**	**126**	**51**	**68**
	Food & tobacco	**89**	**147**	**91**	**120**	**54**	**123**	**56**	**82**
15	Food products	90	144	91	122	53	126	54	80
16	Tobacco	108	261	187	91	56	0	191	91
	Textile & leather pr.	**105**	**108**	**113**	**93**	**33**	**99**	**50**	**69**
17	Spinning & weaving	105	106	126	105	45	123	65	89
18	Wearing apparel	97	108	90	79	24	74	39	54
19	Leather products	125	115	136	108	40	93	58	78
	Wood, paper & publish.	**90**	**139**	**117**	**109**	**54**	**140**	**66**	**74**
20	Wood & wood products	102	138	86	94	43	143	69	52
21	Paper & paperboard	68	81	85	109	55	125	124	64
22	Publishing	94	153	146	133	79	127	83	138
36	Manufacturing n.e.c.	101	164	157	104	59	141	45	41
	Chemicals	**99**	**118**	**113**	**108**	**51**	**111**	**75**	**78**
24	Chemical products	101	131	109	104	53	108	84	63
25	Rubber & plastic pr.	88	107	147	122	55	120	95	128
26	Non met. mineral pr.	106	108	120	125	64	126	88	85
	Metal pr. & machinery	**86**	**103**	**136**	**129**	**43**	**110**	**54**	**82**
27	Basic metals	76	98	115	108	50	122	58	73
28	Metal products	90	113	115	117	47	109	51	109
29	Machinery & equipment	93	103	175	167	40	104	71	55
	Electric. pr. & electronics	**94**	**110**	**122**	**111**	**38**	**206**	**56**	**80**
30	Office mach. & computers	65	85	72	31	23	64	51	11
31	Electrical machinery	99	96	161	131	43	106	54	106
32	Radio, TV & com. equip.	74	113	83	87	24	265	47	58
33	Med. precision & optical	105	124	111	104	41	120	70	83
	Transport equipment	**119**	**125**	**87**	**129**	**54**	**60**	**53**	**66**
34	Motor vehicles	123	114	95	132	66	73	56	45
35	Other transport equipment	105	149	81	127	33	56	49	78

Source: authors' calculations from Eurostat, Structural Business Surveys database; EU Klems database.

II. Relative Real Labour Productivity per Hour in Manufacturing (Germany=100)

NACE Code		France	UK	Italy	Spain	Poland	Finland	Portugal	Greece
	Total manufacturing	**86**	**91**	**92**	**101**	**35**	**113**	**41**	**43**
	Food & tobacco	**84**	**118**	**74**	**110**	**45**	**117**	**45**	**54**
15	Food products	84	115	74	111	44	119	43	52
16	Tobacco	153	314	219	116	69	0	221	86
	Textile & leather pr.	**94**	**89**	**98**	**80**	**27**	**88**	**40**	**43**
17	Spinning & weaving	100	88	114	91	38	115	55	57
18	Wearing apparel	78	86	71	65	18	60	28	31
19	Leather products	116	98	123	94	33	81	47	48
	Wood, paper & publish.	**82**	**114**	**96**	**101**	**43**	**130**	**53**	**47**
20	Wood & wood products	103	114	73	95	36	142	59	36
21	Paper & paperboard	85	84	97	130	59	150	134	55
22	Publishing	70	107	101	103	52	101	56	74
36	Manufacturing n.e.c.	93	136	134	99	50	131	37	26
	Chemicals	**95**	**92**	**98**	**103**	**42**	**100**	**59**	**50**
24	Chemical products	96	102	97	98	44	96	66	40
25	Rubber & plastic pr.	85	83	126	115	45	110	76	83
26	Non met. mineral pr.	103	87	104	123	54	116	71	56
	Metal pr. & machinery	**80**	**80**	**114**	**117**	**35**	**100**	**43**	**53**
27	Basic metals	84	88	116	115	49	125	54	54
28	Metal products	79	83	91	99	36	95	38	66
29	Machinery & equipment	87	80	148	159	33	94	57	37
	Electric. pr. & electronics	**87**	**86**	**101**	**98**	**30**	**178**	**50**	**51**
30	Office mach. & computers	50	53	50	22	15	44	35	6
31	Electrical machinery	91	73	133	114	35	92	51	67
32	Radio, TV & com. equip.	89	114	90	97	25	287	50	48
33	Med. precision & optical	87	89	82	81	29	97	52	48
	Transport equipment	**104**	**90**	**74**	**107**	**41**	**50**	**40**	**40**
34	Motor vehicles	104	80	78	106	48	55	40	26
35	Other transport equipment	112	129	82	128	30	60	46	57

Source: authors' calculations from Eurostat, Structural Business Surveys database; EU Klems database.

APPENDIX M: UNIT LABOUR COSTS BY MANUFACTURING BRANCH IN 2007

"Labour Compensation in Current € / Real VA expressed in UVRs" Ratio (Germany=100)

NACE Code		France	UK	Italy	Spain	Poland	Finland	Portugal	Greece
	Total manufacturing	**103**	**77**	**68**	**61**	**45**	**78**	**61**	**82**
	Food & tobacco	**140**	**90**	**130**	**85**	**59**	**116**	**92**	**119**
15	Food products	140	92	132	85	59	115	96	120
16	Tobacco	95	34	35	96	52	0	46	86
	Textile & leather pr.	**99**	**79**	**71**	**71**	**50**	**103**	**59**	**88**
17	Spinning & weaving	98	82	68	70	44	90	52	77
18	Wearing apparel	111	68	82	79	59	129	68	102
19	Leather products	87	90	64	59	44	102	56	86
	Wood, paper & publish.	**124**	**76**	**74**	**72**	**41**	**88**	**59**	**78**
20	Wood & wood products	104	75	93	79	48	80	54	121
21	Paper & paperboard	147	117	97	74	42	109	45	98
22	Publishing	134	77	78	70	42	93	66	56
36	Manufacturing n.e.c.	104	55	51	68	33	70	65	106
	Chemicals	**102**	**80**	**72**	**68**	**42**	**83**	**51**	**80**
24	Chemical products	97	73	76	70	41	76	55	84
25	Rubber & plastic pr.	115	87	60	70	42	88	47	49
26	Non met. mineral pr.	104	92	72	63	39	83	45	93
	Metal pr. & machinery	**107**	**85**	**57**	**55**	**52**	**87**	**60**	**70**
27	Basic metals	118	93	67	73	50	77	68	89
28	Metal products	114	83	71	65	53	94	68	54
29	Machinery & equipment	98	83	45	42	53	90	48	97
	Electric. pr. & electronics	**106**	**76**	**59**	**61**	**51**	**51**	**70**	**69**
30	Office mach. & computers	115	80	85	157	61	105	45	235
31	Electrical machinery	89	79	41	53	42	83	65	50
32	Radio, TV & com. equip.	123	70	77	60	62	36	84	90
33	Med. precision & optical	115	81	79	73	62	95	58	55
	Transport equipment	**72**	**66**	**74**	**48**	**34**	**110**	**61**	**90**
34	Motor vehicles	65	70	68	46	27	89	58	94
35	Other transport equipment	91	58	81	52	60	121	68	82

Source: authors' calculations from Eurostat, Structural Business Surveys database; EU Klems database.

APPENDIX N: WHAT ABOUT THE THE BALASSA-EFFECT IN EUROPE?

According to the purchasing power parity, the domestic and foreign prices should equalise in the long term in a perfect competition framework, on account of trade-offs in the world market of goods and services, and between currencies. B. Balassa [1964] rebuts this theory by showing there exist systematic differences between nominal exchange rates and PPP. He explains that while developing, a country increases more its productivity in the tradable sector, overwhelmingly the manufacturing sector, than in the non-tradable one, mainly services. Because of the inter-sector labour mobility, the wage levels are more or less equal in both sectors. Non-tradable sector prices P_{NT} then increase more than tradable product prices, P_T. Thus, the ratio $\frac{P_{NT}}{P_T}$ increases over time with development. This ratio is higher in a developed country than in a developing one: $\frac{P_{NT}^{D}}{P_T^{D}} > \frac{P_{NT}^{Dev}}{P_T^{Dev}}$.

It is assumed that the nominal exchange rate, e, adjusts so as to equalise the tradable price in the world market $\frac{P_T^{D} \cdot e}{P_T^{Dev}} = 1$. Combined with the preceding inequality, the non-tradable (and the GDP) price of the developed country, converted to the nominal exchange rate, exceeds then the non-tradable price of the developing country: $P_{NT}^{D} \cdot e > P_{NT}^{Dev}$.

So, the Balassa's effect allows the level of real exchange rates to be explained, and also the evolution of exchange rates over time (with development).

Econometric studies found evidence that the price levels of the tradable sector are also sensitive to the development level. This could come from labour productivity differences but also from specialisation gaps: developing countries are more specialised in goods with strong demand elasticity than the developed ones. The latter hold then a greater market power than developing countries.

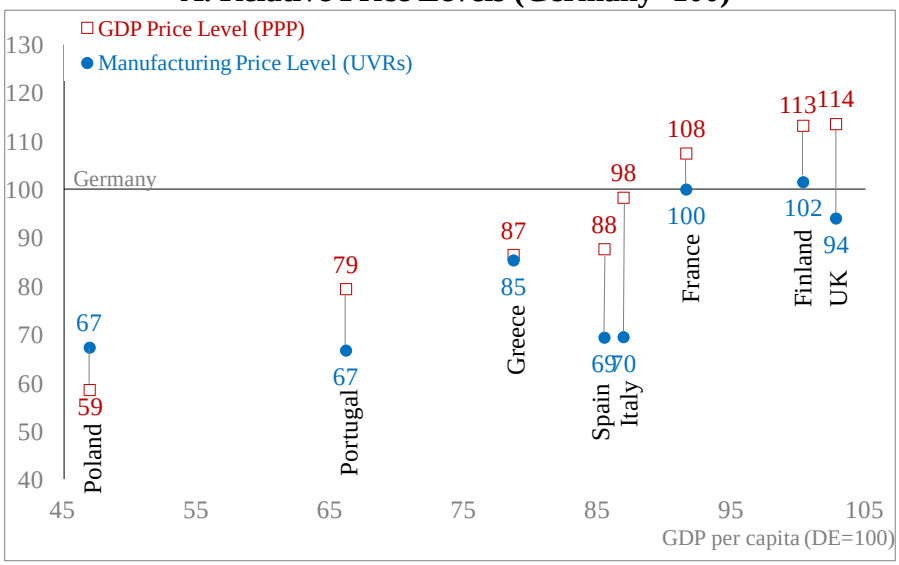
On the whole, in our sample countries, manufacturing prices are far from being close to German manufacturing prices: the manufacturing price level stands at 67% for Poland and Portugal, 69% for Spain, 70% for Italy. UK, France, Finland, and to a lesser extent Greece, are closer to Germany in terms of manufacturing prices. Relative prices in the manufacturing sector are then far from levelling off.

Further, relative GDP prices should be lower than in the developed country according to the Balassa's effect. That's the case of Poland, Portugal, Greece and Spain. The price gap

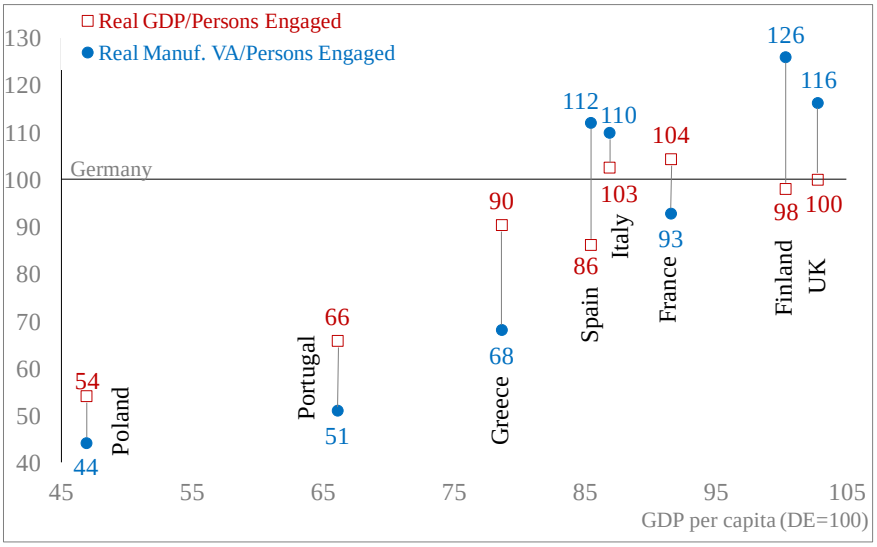
between PPP and UVR is supposed to be all the wider that the country is less developed. Accordingly, the price differences are higher for manufacturing products than for GDP prices relative to Germany. In our sample, this difference can be seen for all countries but Poland: its manufacturing price parity level stands at 67% and the GDP one at 59% of the German level (Figure I.A). In Greece, the UVR PPP gap is quite small.

Figure I. Price and Productivity Levels, 2007

A. Relative Price Levels (Germany=100)



B. Relative Labour Productivity Levels (Germany=100)



Source: authors' calculations from Eurostat, Prodcom and Structural Business Surveys databases; and from OECD.Stat.

According to the Balassa's effect, the tradable sector prices of a developed country and of a developing country are close enough, but their productivities are much apart in that sector.

Figure I.B shows it is the case for Poland, Portugal and Greece, in which manufacturing labour productivities are at 44%, 51% and 68% respectively of the German level. The labour productivities of Italy, Spain, the UK and Finland are quite above the German one. Odd enough, France singles out with its real value added per person engaged in the manufacturing sector being 7% below the German one.

The real GDP (PPP) per person engaged can be compared to the real manufacturing (UVR) value added per person engaged. Apparent relative GDP productivity is higher than the one in the manufacturing sector for Poland, Portugal, Greece and France, lower for Spain, UK, Finland and Italy. Relative productivity can be explained by a higher labour productivity in the agricultural products in France and in services in France and in Greece, although the source of labour productivity may be of a different nature in both countries.