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# SECTORAL STRUCTURE, RISK SHARING AND THE EURO

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**Abstract**

Under the prospects of productive specialization, the degree of success of the euro was seen since inception as closely linked to the development of effective risk-sharing mechanisms across union members. Without shared fiscal resources, financial integration was expected to play a leading role in this respect. This paper documents the failure in the task of fulfilling this expectation: Along with an analysis of the evolution of specialization and risk-sharing, we present evidence supporting the claim that progress in financial integration has not been conductive for income risk-sharing across euro members, while it has favored a specialization split between countries with low-medium and high technology productive structures. As a result, monetary union members face higher income fluctuation risk without enhanced insurance protection. Additionally, evidence suggests that the specialization split has had differential impacts on sector productivity, affecting negatively to euro members specializing in low-medium technologies, and so helping to make the monetary union a club of less equals.

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Keywords: European Integration, Specialization, Risk-Sharing.

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# 1 Introduction

Much of the debate during the run up years to the adoption of the euro focused on the degree of asymmetric macroeconomic fluctuations across would-be-member countries. These were countries with different productive structures, regulatory frameworks and macro policy traditions that could hardly be seen as defining an optimal currency area. Therefore, the giving up of their monetary stabilization tools could be expected to have a negative welfare impact in a context of likely asymmetric fluctuations. In fact, the empirical evidence of the time (e.g. Bayoumi and Eichengreen (1993); Ballabriga, Sebastian, and Valles (1999)) pointed toward a rather high degree of asymmetry in the business cycle variability of the European countries involved in the EMU process.

In spite of this, the optimistic view was predominant, based on the argument that optimal currency areas could be made along the way: Prospective structural reforms would make regulatory frameworks more homogeneous and would activate market stabilizers; fiscal policy coordination would tame differences in traditions, minimizing asymmetric policy shocks and guaranteeing it would remain ready for use as an effective macro stabilizer; capital market integration would allow both for higher risk-sharing through increased cross-ownership of assets across borders, activating and additional stabilizer, and for higher productive specialization across countries, leading to a productivity catch-up process that would make the monetary union a club of equals. More than a decade later, we know that fiscal coordination has failed, but we do not know whether the euro has had any significant impact on the implementation of structural reforms and whether country specialization has taken place and has helped in the productivity catch-up process. Early evidence suggests that some increase in risk-sharing and specialization took place during the 1990s (Kalemli-Ozcan, Sørensen, and Yosha (2004)), and that the euro may have initially accelerated some structural reforms during the period 1999-2003 (Alesina, Ardagna, and Galasso (2010)). But this is basically pre-euro evidence. The current euro zone difficulties seem to suggest that the euro has operated as a brake on structural reforms and also that has favored a split of countries between those specializing in high productivity sectors and those specializing in low productivity

ones. Southern Europe would be in the latter bloc, lacking resilience and effective growth drivers and being especially vulnerable to global competitors and crisis impact (see e.g. Ballabriga (2014)).

This paper focuses on the specialization dimension. We specifically look at the evolution of specialization and risk-sharing and their connection with capital market integration in the euro area. As mentioned, the expectation was that the euro would trigger capital market integration, which would allow for increased risk-sharing and productive specialization. What we find is that specialization has really been enhanced, but in the direction of increasing the productivity distant between north and south. At the same time, we find that risk-sharing decreased during the 2000s, suggesting that the kind of financial integration at work was not the appropriate to allow for higher risk-sharing among euro area countries. This implies that the claimed causal chain running from risk-sharing to specialization (Kalemli-Ozcan, Sørensen, and Yosha (2003)) has not been allowed to operate in the euro area, and suggests that financial integration can actually enhance specialization without the connecting ring of risk-sharing.

The paper is organized as follows. Section 2 looks at the evolution of specialization in the euro area and its effect on productivity. Section 3 looks at risk-sharing. Section 4 explores the connection between financial integration, risk-sharing and specialization. Section 5 concludes.

## 2 Specialization Trends in the Euro Area

### 2.1 Data

We make use of the EU KLEMS database on sectoral data by country. This database originally includes 29 OECD countries.[1] We are interested in patterns of specialization across European countries in the euro area regions, so we focus on the following list of countries reporting data from 1970 to 2006: Austria, Belgium, Germany, Spain, Finland, France, Greece, Ireland, Italy,

[1] Australia, Austria, Belgium, Cyprus, Czec Republic, Denmark, Spain, Estonia,Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Sweden, United Kingdom and United States.

Luxembourg, the Netherlands and Portugal.

For each country and year there is industry level information on gross value added at current basic prices (in millions of national currency), value added deflators and the number of employees. There are 16 sectors at the one-digit NACE Rev 1.1. classification level and 19 sectors at the two-digit NACE Rev 1.1. classification.[2] In the most disaggregated version of the data (two-digit industry classification) we work with 8,433 observations corresponding to 12 countries, 19 sectors and 37 years.

## 2.2 Specialization Index

We construct an index of sector specialization at the two-digit industry level for a sub-sample of sectors for which EU KLEMS provides consistent data over time.[3] In each period, the index is computed for each country and averaged across countries. The index compares the share of a given sector in one country with the share of the same sector in the euro area as a whole. Values above (below) one indicate specialization (lack of specialization) of the country in that sector, and the higher the value of the indicator the higher the country's specialization compared to the euro area average. Let $VA_{i,s}$ denote the value added of sector $s$ in country $i$, and $VA_{EA,s}$ the total value added of sector $s$ in the euro area as a whole. The index is calculated as:

$$SPEC_{i,s} = \frac{\frac{VA_{i,s}}{\sum_s VA_{i,s}}}{\frac{VA_{EA,s}}{\sum_s VA_{EA,s}}} \tag{1}$$

The degree of specialization in a country is measured as the Euclidean distance between the country's vector of specialization and the vector corresponding to the hypothetical non-specialization case (the specialization coefficient would be equal to one). For each country "$i$" and sectors $s = 1, ..., S$ the country specialization index is computed as:

[2]See appendix Table (A.1) for a description of the sector classification.

[3]The two-digit sectors are: 15t16, 17t19, 21t22, 23, 24, 25, 26, 27t28, 30t33, 34t35, 36t37, 45,50,51,52, 60t63, 64, 70, 71t74, that correspond to one-digit sectors D (Manufacturing), I (Transport, Storage and Telecommunication), K (Real State) and F (Construction).

$$SPEC_i = \sqrt{(1 - SPEC_{i,1})^2 + (1 - SPEC_{i,2})^2 + ... + (1 - SPEC_{i,S})^2} \quad (2)$$

Figure (1) shows the over time evolution of the average specialization index at the two-digit industry level in the euro area. It is clear from the graph that after a moderate initial decrease in the rate of specialization at the beginning of the sample (from 1970 to the early 80s) there has been a continuous increase in the average specialization index that has been clearly accentuated starting in the late 90s until nowadays. Figure (2) shows that the pattern of specialization has not been the same across countries in the euro area. Southern European countries like Spain, Italy, Greece and Portugal but also Ireland, report above average specialization rates.

A key aspect of the effect of the specialization rates on growth is the type of sector countries specialized in. We follow the OECD classification of sectors according to their technological content.[4] Figure (3) shows the evolution of the average specialization index according to the sector technology classification. Since the beginning of the period there has been a steady increase in specialization in low technology industries within the euro area. Only since the 1990s the euro area has increased the specialization in high technology industries. Similarly to the aggregate specialization index not all geographical areas followed the same pattern of specialization. Figure (4) shows that Southern European countries (Spain, Greece and Italy) always had on average higher specialization in low technology industries and witnessed a rapid increase in the case of medium-low technological sectors starting in the 1990s. In contrast, Northern European countries experienced an accelerated growth in the specialization rate in high-technology sectors. Figure (5) confirms by country the aggregate patterns shown in Figure (4). For example, Spain experienced almost no change in the specialization index of high and medium-high technologies while a notable increase in low and medium-low technological sectors.

[4]See Table (1) for a description of the sector classification according to technology intensity and Table (2) for the number of observations.

There are two main aspects to the specialization process endured by the euro area countries during the last three decades. First, graphical inspection of figures (3) and (4) show a clear upward trend in the medium-low and high technology specialization indexes around the time the euro was introduced (year 1999). Second, it is clear from figures (4) and (5) that Southern European countries specialized in low technology industries while Northern European countries specialized in high technology industries. Based on this evidence we would like to explore the impact of sector specialization on growth.

### 2.3 Specialization and Productivity

The question we would like to address is whether specialization had any effect on sector productivity and if we can identify a differential effect after the implementation of the euro. In order to do so, we estimate the following specification:

$$\begin{aligned} ln(VA/EMPL)_{i,s,t} &= \beta_0 + \beta_1 SPEC2dig_{i,s,t} \times Euro_{i,t} + \\ & \beta_2 SPEC2dig_{i,s,t} \\ & + \delta_t + \delta_{i,s} + u_{i,s,t} \end{aligned} \tag{3}$$

where $ln(VA/EMPL)_{i,s,t}$ is the log of country-sector-year productivity measured as value added per employee, $SPEC2dig_{i,s,t}$ is the specialization index of country $i$, two-digit sector $s$ and time $t$ (see the previous section on how this index is constructed), $Euro_{i,t}$ is a dummy variable that takes the value of one if the corresponding country introduced the euro in 1999 and thereafter, $\delta_t$ is a time dummy for years 1970 to 2006 and $\delta_{i,s}$ corresponds to country-sector fixed effects.

Results are reported in Table 3. Column (1) shows that on average sectors with higher relative specialization are also more productive. However, as shown in column (2), after the introduction of the euro, higher sector specialization had a detrimental impact on average sectoral productivity. The total effect is statistically significant. Other sectoral events correlated with specialization might

have an impact on sectoral productivity. For example, the deregulation of specific sectors might increase competition forcing low productivity firms out of the market and mechanically increasing the average productivity in the sector. To avoid these confounding factors in this study it is crucial the introduction of sector-year fixed effects that capture global sectoral trends. Results are reported in column (3) and confirm that controlling for sectoral trends is crucial to identify the total effect of specialization after the introduction of the euro. Similar to global sectoral trends we could think that country specific events might impact productivity through channels other than specialization, for example, political change or a technology breakthrough in a particular country could drive our results. In order to isolate the effect of specialization, column (4) includes both sector-year and country-year fixed effects and confirm our previous findings. Notice regardless of the negative effect after the euro, the total effect of specialization is positive. Finally, column (5) reports the effect of specialization on productivity *growth* after the euro. The total effect is significant but smaller in magnitude compared to the level effect and mainly driven by the direct effect of specialization.

From Table 3 we can conclude that there is a positive correlation between sector specialization and productivity that was lower after the introduction of the euro. We hypothesize that the decline in sector productivity after the introduction of the euro is related to the specialization by some countries in low-productivity sectors. To explore whether there is a differential effect for Southern European countries we estimate:

$$\begin{aligned} ln(VA/EMPL)_{i,s,t} \quad = \quad & \beta_0 + \beta_1 SPEC2dig_{i,s,t} \times Euro_{i,t} \times South_i + \\ & \beta_2 SPEC2dig_{i,s,t} \times South_i + \\ & \beta_3 SPEC2dig_{i,s,t} \times Euro_{i,t} + \\ & \beta_4 South_i \times Euro_{i,t} + \\ & \beta_5 SPEC2dig_{i,s,t} + \\ & + \delta_{i,t} + \delta_{s,t} + \delta_{i,s} + u_{i,s,t} \end{aligned} \tag{4}$$

where all variables are defined as in equation (3) and South is a dummy that equals one in Spain, Italy, Greece, Portugal and Ireland.[5] We expect $\beta_1$ to be negative and significant so that Southern European countries that specialized more after the introduction of the euro show lower productivity. This specification is similar to a difference-in-difference strategy so that $\beta_1$ compared to $\beta_3$ shows the incremental effect on productivity of specializing in the South after the introduction of the euro versus the effect of specialization in the North post-euro (captured by $\beta_3$). Similarly, $\beta_1$ compared to $\beta_4$ reflects the increase in productivity in Southern Europe after the introduction of the euro compared to the average effect of the introduction of the euro in the South regardless of specialization ($\beta_4$). Notice when the specification includes country-year fixed effects, to control for alternative country level shocks, we will not be able to separately identify the effect of the euro on Southern Europe $\beta_4$.

Table 4 reports our main results. Column (1) supports our main hypothesis: specialization has on average a positive effect on sector productivity and the negative effect after the introduction of the euro is mainly driven by Southern European countries. The difference-in-difference strategy requires that south and north had similar specialization trends prior to the euro.[6] Visual inspection of figure 2 suggests we should concentrate on the period 1995-2006. Columns (2) to (4) in Table 4 report the results for the period 1995-2006 and confirm the findings in column (1) for the total sample. Results in column (3) suggest that specialization had on average a positive effect on sector productivity (0.537), but that effect was lower in Southern Europe after the introduction of the euro (-0.109).

[5]Similar results are obtained if South is defined as Spain, Portugal and Greece in columns (1) and (2) but column (3) changes, the negative effect is still significant and some of the interactions are dropped because of multicollinearity.

[6]We would like to attribute differences between south and north to the introduction of the euro and not to other prior events.

# 3 Risk Sharing

Specialization makes a region more vulnerable to idiosyncratic production shocks, leading to an increase in output fluctuations that with uninsured production risk entails a welfare loss. Thus, with risk-averse residents, one would expect risk-sharing to be concomitant of region specialization. Kalemli-Ozcan, Sørensen, and Yosha (2003) go even further and present empirical evidence supporting the claim that risk-sharing may in fact be a causal determinant of regional specialization. Regional risk-sharing can take several forms, but a main mechanism for spreading risk among regions is geographical diversification of income sources via financial markets, especially in the absence of own monetary tool and shared fiscal resources. This section looks at the evolution of risk-sharing in the euro area and the next will explore whether financial integration has actually led to more risk-sharing among its member countries.

## 3.1 Benchmark Model

We follow the decomposition proposed in Sørensen and Yosha (1998) and specify year by year regressions that quantify deviations from perfect income risk sharing. Consider a group of countries and the following set of cross-sectional regressions, one for each year t:

$$\Delta logGNI_{it} - \Delta logGNI_t = \beta_0 + \beta_{k,t}(\Delta logGDP_{it} - \Delta logGDP_t) + \epsilon_{it} \tag{5}$$

The coefficient $\beta_{k,t}$ measures the average co-movement of country-specific GNI growth with country-specific GDP growth in year t. Under perfect risk sharing, the left-hand side of equation (5) will be zero implying that $\beta_{k,t}$ is zero. The smaller the co-movement of idiosyncratic GNI with GDP, the more GNI is buffered against GDP fluctuations and the smaller the estimated value of $\beta_{k,t}$. Since GNI equals GDP plus net factor income from abroad, this regression measures the amount of income risk sharing provided by net factor income flows, the lower $\beta_{k,t}$, the higher is income risk sharing in year t. The estimated coefficients, $\beta_{k,t}$, measure the evolution of risk sharing

over time. Often it is more instructive to look at the equivalent series $1-\beta_{k,t}$. This series will take the value one if risk sharing is perfect and the value zero if GNI moves one-to-one with output.

Figure (6) displays the smoothed series of risk sharing measures for the euro area countries and the period 1960-2013. We display the estimated values of $100 \times (1-\beta_{k,t})$ which are interpreted as the percentage of income risk sharing obtained. Income risk sharing improved during the 1990s but has declined since 1999, year of the introduction of the euro. Similar to Sørensen and Yosha (1998) we find no substantial income risk sharing before 1990. These results are also consistent with those in Demyanyk, Ostergaard, and Sørensen (2008) who find that income risk sharing has improved over time for EMU countries although its level is still quite modest.[7]

### 3.2 Robustness

Following Kose, Prasad, and Terrones (2009) we explore the robustness of these results to alternative estimation techniques using 9-year rolling windows to smooth the risk-sharing coefficients. First, cross-section regressions are estimated for each year over the period 1960-2013. Specifically, we compute:

$$(1-\beta_t) = \frac{1}{9}\sum_{s=0}^{8}(1-\beta_{t-8+s}) \quad t = 1969, ..., 2004$$

Panel A in Figure (7) shows the basic results, with an increase in income risk sharing from mid 90s to mid 2000s and a decrease thereafter.

Second, Panel B in Figure (7) shows the results from time series estimation. We run the regression for each country and then compute the median $\beta$ over the country sample for each period. In other words, we estimate $(1-\beta_t = median_i(1-\beta_{it}))$ where $\beta_{it}$ is estimated from a regression for each "$i$" over "t-8 to t" and $t = 1969, ..., 2004$. Third, Panel C in Figure (7) plots the coefficient from estimating the panel version of the same equation estimated over nine-year rolling

[7]Table (5) shows the individual coefficients from yearly cross-sectional regressions as in equation (5). There is no evidence of income risk sharing among the euro area countries prior to 1995. Since then, income risk sharing has been about 7% on average.

panels. Specifically, $(1-\beta_t)$ is obtained from panel regressions "t-8 to t" where $t = 1969, ..., 2004$.

Panel A, B and C are greatly consistent and suggest an increase in income risk sharing from the mid-late 90s. However, there seems to be a trend reversal from the mid 2000s that ends in similar levels of risk sharing to those observe during the 70s and 80s. Considering that the 9-year smoothing window shifts the average forward, the results are consistent with Figure (6), showing an increase in risk-sharing during the 90s and a decline during the 2000s.

# 4 Specialization, Risk Sharing and Financial Integration

## 4.1 Financial Integration and Risk-Sharing

One of the expected benefits from the euro adoption was an increase in financial integration among euro area countries. This increase in financial flows was supposed to positively contribute to an increase in income risk sharing. To explore the effects of financial integration on income risk sharing we follow Sørensen, Wu, Yosha, and Zhu (2007) and Kose, Prasad, and Terrones (2009) and estimate the following equation:

$$\begin{aligned} \Delta logGNI_{it} - \Delta logGNI_t &= \mu_i + \beta_k(\Delta logGDP_{it} - \Delta logGDP_t) + \\ &\quad \beta_2(\Delta logGDP_{it} - \Delta logGDP_t) \times FI_{it} + \\ &\quad \beta_3 FI_{it} + \delta_t + \epsilon_{it} \end{aligned} \tag{6}$$

where $FI_{it}$ refers to the gross stocks of external assets plus liabilities scaled by GDP. We split financial stocks differentiating among equity, foreign direct investment (FDI), debt, and private flows, the latter representing the sum of equity and FDI. We expect a negative $\beta_2$ to positively contribute to an increase in income risk sharing.

To measure financial integration we use the updated and extended version of the dataset constructed by Lane and Milesi-Ferretti (2007). This database contains information on foreign assets and foreign liabilities for a large sample of countries for the period 1970-2011. It also reports, where available, the split between "portfolio investment: debt securities" and "other investment" for both the category "external debt assets" and the category "external debt liabilities".

Table (6) shows our main results. There is no significant effect of financial integration on income risk sharing.

We then go one step further and explore the possibility that foreign assets and liabilities have a different impact on income risk sharing. We estimate equation (6) differentiating among the stock of foreign assets and foreign liabilities. A priori we expect foreign assets to positively contribute to an increase in income risk sharing. Again a negative coefficient on the interaction term translates in higher income risk sharing. Table (7) shows the results. Panel A in Table (7) shows the results when the full sample is considered (period 1970-2011). Column (2) focuses on FDI and contrary to what is usually argued there is no significant effect. By contrast, columns (3) and (4) show a positive effect of debt and equity foreign assets on income risk sharing while a negative impact of liabilities. Column (6) pools all variables and confirms that an increase in private assets is correlated with increases in income risk sharing, not the case for foreign debt assets any more. Additionally, debt and private liabilities keep their significant positive sign, confirming that they are consistently associated with a deterioration in income risk sharing. Panel B in Table (7) shows that these results are reinforced for the period 1996-2011.

Overall, the results in Tables (6) and (7) confirm that, with the exception of equity assets, different types of capital flows do not appear to have been conductive of income risk-sharing in the euro area, but rather the opposite, with foreign liabilities standing as a significant obstacle. The results are consistent with the interpretation that in order to be helpful financial integration has to be deep enough and inclusive of all types of financial flows. When it is just incipient and dominated by plain borrowing, the integration may actually end up having negative results in terms of country

income fluctuations. Arguably, this has likely been the euro area case, where the introduction of the euro initiated a process of financial integration mainly dominated by borrowing of the south from the north, eventually leading to a highly indebted south. This is clearly not an integration process that should be expected to provide risk sharing through geographical diversification.

### 4.2 Financial Integration and Specialization

Results so far point to an increased specialization with different technological content in the south and the north, and to a financial integration process that has not been conductive for risk-sharing improvements. So the euro area evolution in regard with these dimensions does not conform with the conventional pattern whereby financial integration acts as a main provider of risk-sharing (Asdrubali, Sørensen, and Yosha (1996)) and risk-sharing as a determinant of specialization (Kalemli-Ozcan, Sørensen, and Yosha (2003)), providing an example where financial integration may have enhanced specialization without the intermediation of risk-sharing, thus leaving countries exposed to the greater income risk associated with specialization.

To test this later possibility, whether financial integration has contributed to greater specialization, we estimate the following equation:

$$\begin{aligned} SPEC2dig_{i,s,t} &= \mu_i + \beta_1 FI_{it} + \beta_2 FI_{it} \times Euro_{i,t} \\ &\quad + \delta_t + \delta_{s,t} + \epsilon_{i,s,t} \end{aligned} \tag{7}$$

where as in equation (6) the variable $FI_{it}$ refers to the gross stocks of external assets plus liabilities scaled by GDP and we split financial stocks differentiating among equity, foreign direct investment (FDI), debt, and private flows. $SPEC2dig_{i,s,t}$ is the specialization index of country $i$, two-digit sector $s$ and time $t$, $Euro_{i,t}$ is a dummy variable that takes the value of one if the corresponding country introduced the euro in 1999 and thereafter, $\delta_t$ is a time dummy and $\delta_{s,t}$

corresponds to sector-year fixed effects.

Columns (1) to (3) in Table (8) use the total sample including all sectors while columns (4) to (6) concentrate in the subsample of medium-low and high technology sectors. Column (3) shows that foreign equity liabilities are the main type of capital inflow contributing the most to greater sector specialization after the introduction of the euro; this effect is especially pronounced for medium-low and high specialization sectors (see column (6)).

# 5 Concluding Remarks

The euro was adopted knowing that country members were far from conforming an optimal currency area (OCA), but with the expectation that it would endogenously become one along the way. This expectation was mainly grounded on the future ability of the monetary union for developing effective country income stabilization mechanisms, since a landscape characterized by asymmetric income variability across countries was projected to remain under the likely prospects of productive specialization. Without own monetary tools and without shared fiscal resources, stabilization via market adjustment and geographical diversification were seen as key elements for a successful union. The first called for market structural reforms and the second for effective financial integration. This paper has focused on the latter, assessing the empirical evolution of specialization and risk-sharing and their connection with financial integration. Our results point to a failure in the task of fulfilling the endogenous OCA expectation in this dimension: progress in financial integration has not been conductive for income risk-sharing across euro members, while it has favored a specialization split between countries with low-medium and high technology productive structures. As a result, monetary union members face higher income fluctuation risk without enhanced insurance protection. Additionally, evidence suggests that the specialization split has had differential impacts on sector productivity, affecting negatively to euro members specializing in low-medium technologies, and so helping to make the monetary union a club of less equals.

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# A Figures

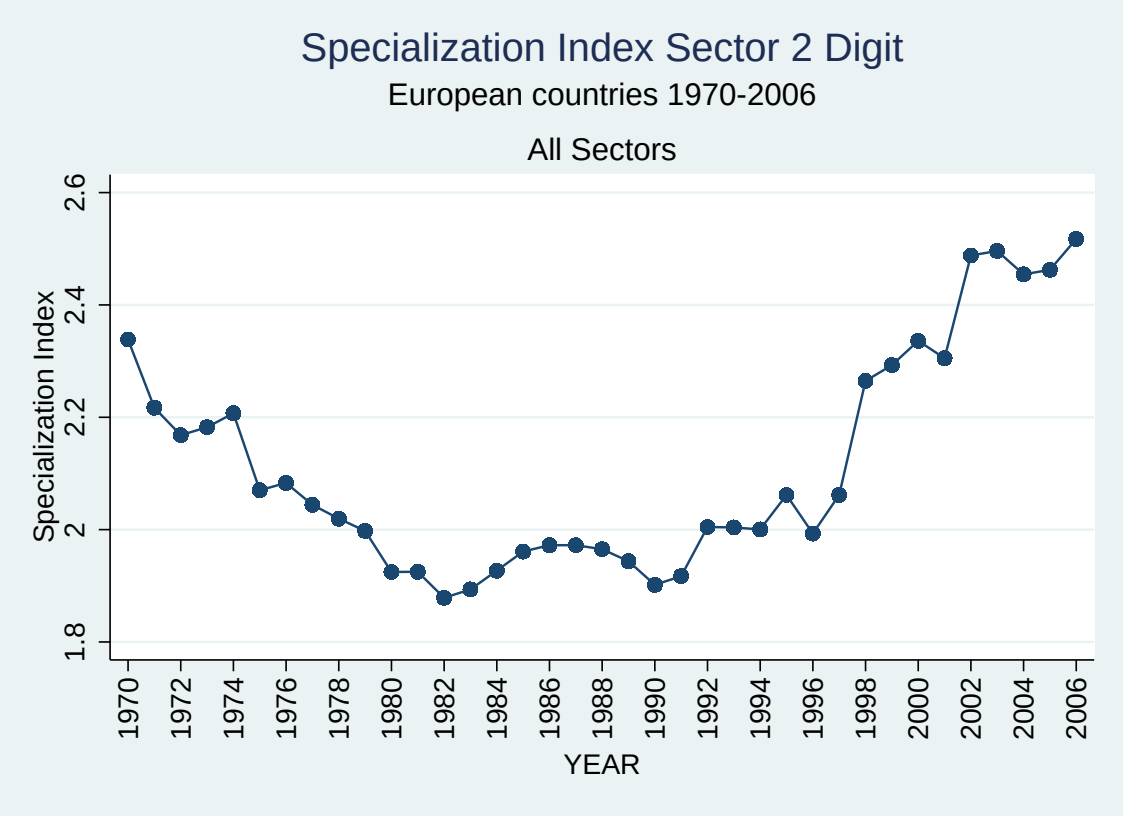
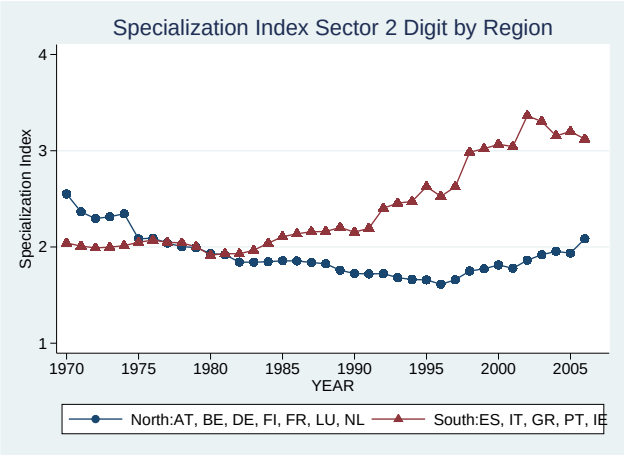
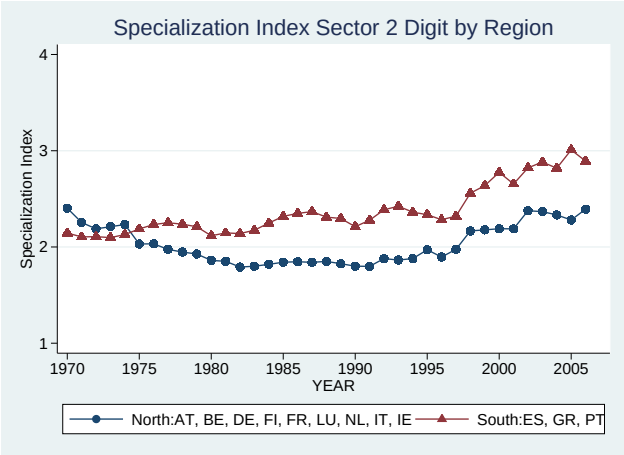



Figure 1: Specialization Index (2 digit sector). The two-digit sectors are: 15t16, 17t19, 21t22, 23, 24, 25, 26, 27t28, 30t33, 34t35, 36t37, 45,50,51,52, 60t63, 64, 70, 71t74, that correspond to one-digit sectors D (Manufacturing), I (Transport, Storage and Telecommunication), K (Real State) and F (Construction). See section 2.2. for a description of how the index is constructed. For each country "i" and sector $s = 1, ..., S$ the country specialization index is constructed as: $SPEC_i = \sqrt{(1 - SPEC_{i,1})^2 + (1 - SPEC_{i,2})^2 + ... + (1 - SPEC_{i,S})^2}$ where $SPEC_{i,s} = (\frac{VA_{i,s}}{\sum_s VA_{i,s}})/(\frac{VA_{EA,s}}{\sum_s VA_{EA,s}})$ and $VA$ stands for value added. Sample of countries: Austria, Belgium, Germany, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, the Netherlands and Portugal. The figure plots the average value of the index across countries over time.




(a) South includes Italy and Ireland




(b) South excludes Italy and Ireland

Figure 2: Specialization Index (2 digit sector) by Region. The two-digit sectors are: 15t16, 17t19, 21t22, 23, 24, 25, 26, 27t28, 30t33, 34t35, 36t37, 45,50,51,52, 60t63, 64, 70, 71t74, that correspond to one-digit sectors D (Manufacturing), I (Transport, Storage and Telecommunication), K (Real State) and F (Construction). See section 2.2. for a description of how the index is constructed. For each country "i" and sector $s = 1, ..., S$ the country specialization index is constructed as: $SPEC_i = \sqrt{(1 - SPEC_{i,1})^2 + (1 - SPEC_{i,2})^2 + ... + (1 - SPEC_{i,S})^2}$ where $SPEC_{i,s} = (\frac{VA_{i,s}}{\sum_s VA_{i,s}})/(\frac{VA_{EA,s}}{\sum_s VA_{EA,s}})$ and $VA$ stands for value added. North: Austria (AT), Belgium (BE), Germany (DE), Finland (FI), France (FR), Luxembourg (LU) and the Netherlands (NL). South: Spain (ES), Italy (IT), Greece (GR), Portugal (PT) and Ireland (IE). The figure plots the average value of the index by country group (North/South) over time.

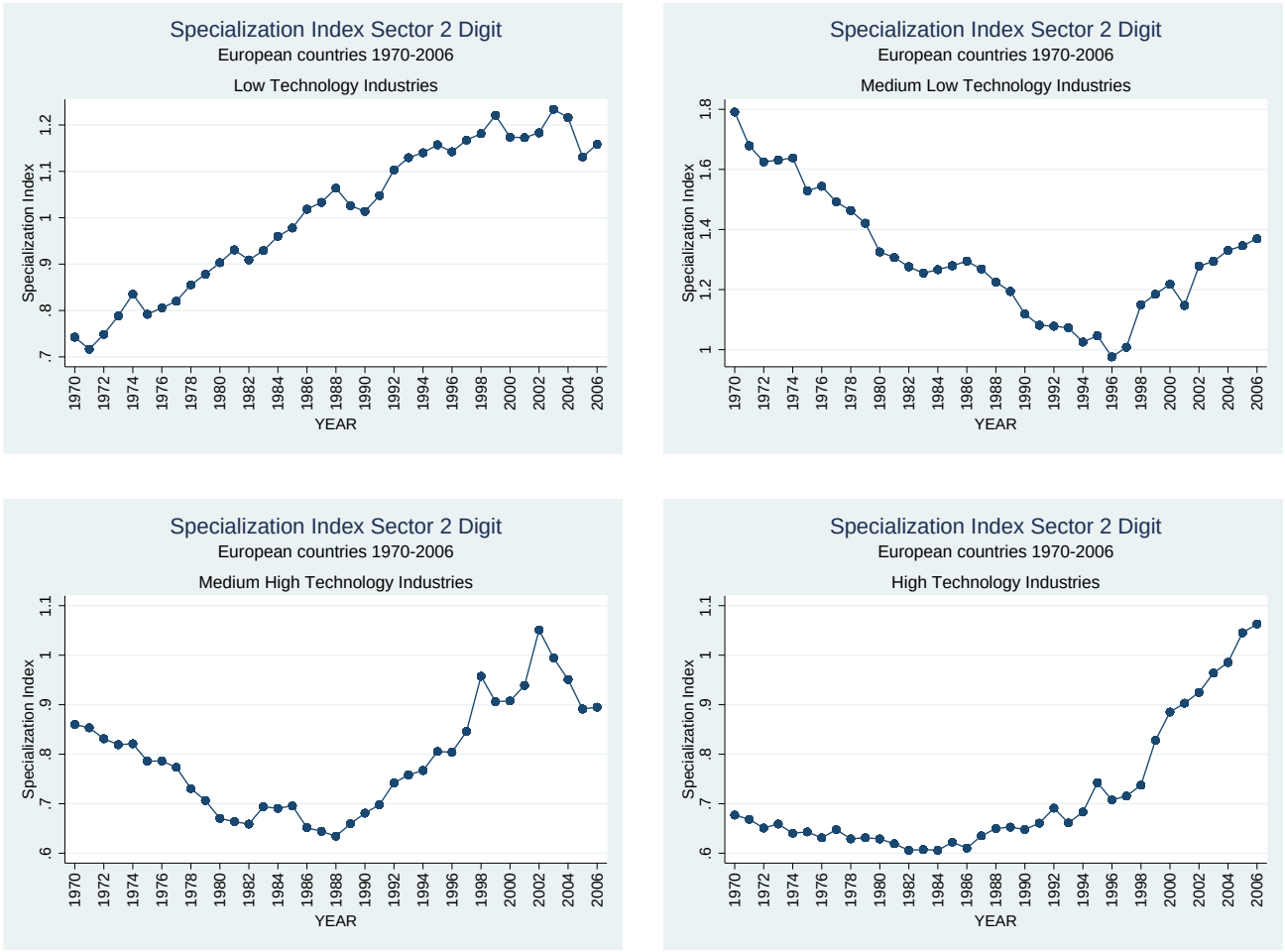



Figure 3: Specialization Index (2-digit sector) by Sector Technology Classification. **Low Technology**: Manufacturing (15t16 "Manufacture of food products, beverages and tobacco"; 17t19 "Manufacture of textiles, textile products and leather"; 21t22 "Manufacture of pulp, paper and paper products; publishing and printing") Non-Manufacturing (45 "Construction"). **Medium Low Technology**: Manufacturing (23 "Manufacture of coke, refined petroleum products and nuclear fuel"; 25 "Manufacture of rubber and plastic products"; 26 "Manufacture of other non-metallic mineral products"; 27t28 "Manufacture of basic metals and fabricated metal products"; 36t37 "Manufacturing n.e.c.") Non-Manufacturing (50 "Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel"; 51 "Wholesale trade and commission trade, except of motor vehicles and motorcycles" 52 "Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods"). **Medium High Technology**: Manufacturing (24 "Manufacture of chemicals and chemical products") Non-Manufacturing (60t63 "Transport and storage"; 70 "Real estate activities"; 71t74 "Renting and business activities"). **High Technology**: Manufacturing (30t33 "Manufacture of electrical and optical equipment"; 34t35 "Manufacture of transport equipment") Non-Manufacturing (64 "Post and telecommunications"). *Source sector classification: OECD.*
See section 2.2. for a description of how the index is constructed. For each country "i" and sector $s = 1, ..., S$ the country specialization index is constructed as: $SPEC_i = \sqrt{(1 - SPEC_{i,1})^2 + (1 - SPEC_{i,2})^2 + ... + (1 - SPEC_{i,S})^2}$ where $SPEC_{i,s} = (\frac{VA_{i,s}}{\sum_s VA_{i,s}})/(\frac{VA_{EA,s}}{\sum_s VA_{EA,s}})$ and $VA$ stands for value added. Sample of countries: Austria, Belgium, Germany, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, the Netherlands and Portugal. The figure plots the average value of the index by technology classification across countries over time.

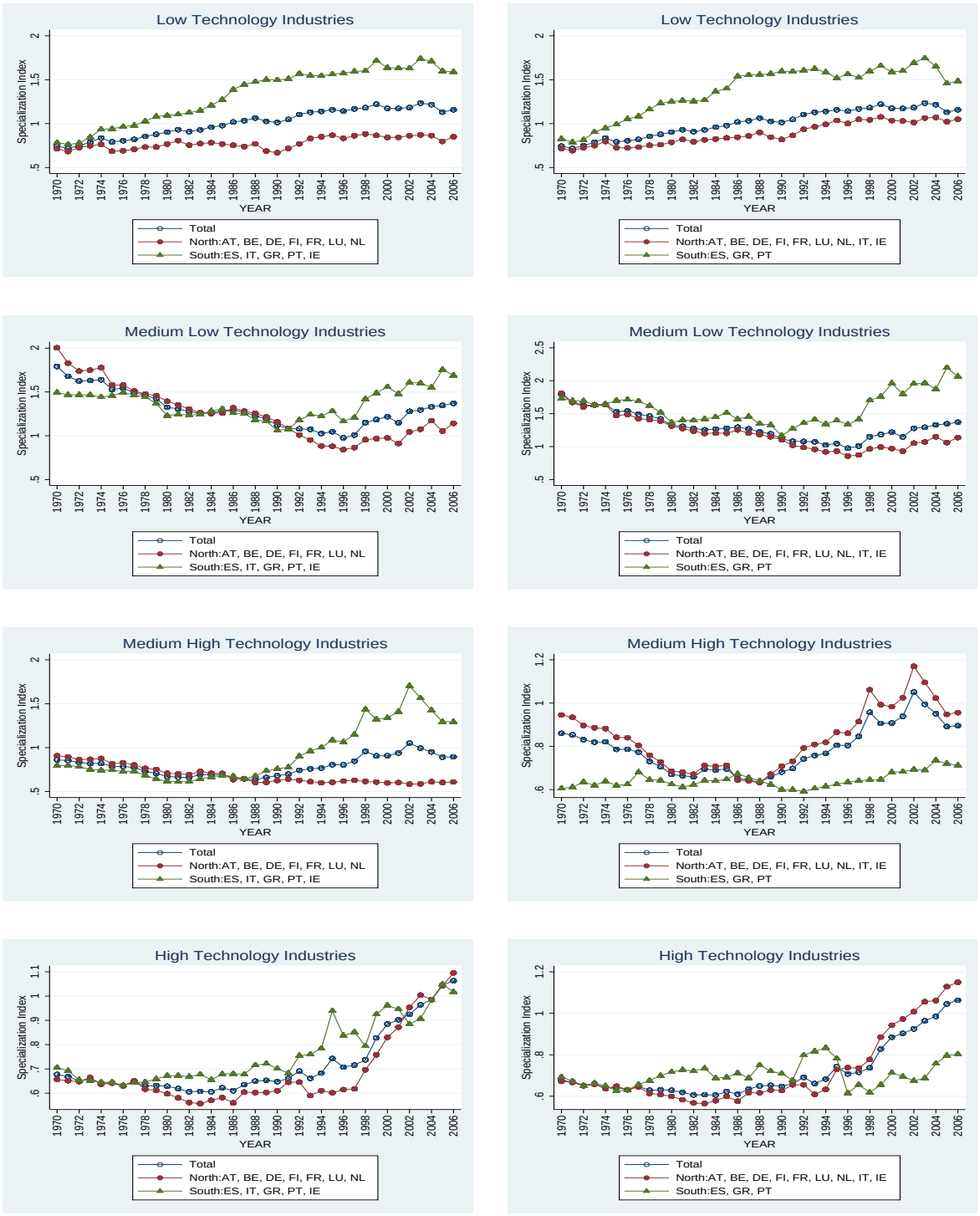



Figure 4: Specialization Index (2-digit sector) by Sector Technology Classification. **Low Technology**: Manufacturing (15t16 "Manufacture of food products, beverages and tobacco"; 17t19 "Manufacture of textiles, textile products and leather"; 21t22 "Manufacture of pulp, paper and paper products; publishing and printing") Non-Manufacturing (45 "Construction"). **Medium Low Technology**: Manufacturing (23 "Manufacture of coke, refined petroleum products and nuclear fuel"; 25 "Manufacture of rubber and plastic products"; 26 "Manufacture of other non-metallic mineral products"; 27t28 "Manufacture of basic metals and fabricated metal products"; 36t37 "Manufacturing n.e.c.") Non-Manufacturing (50 "Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel"; 51 "Wholesale trade and commission trade, except of motor vehicles and motorcycles" 52 "Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods"). **Medium High Technology**: Manufacturing (24 "Manufacture of chemicals and chemical products") Non-Manufacturing (60t63 "Transport and storage"; 70 "Real estate activities"; 71t74 "Renting and business activities"). **High Technology**: Manufacturing (30t33 "Manufacture of electrical and optical equipment"; 34t35 "Manufacture of transport equipment") Non-Manufacturing (64 "Post and telecommunications"). *Source sector classification: OECD.*
See section 2.2. for a description of how the index is constructed. For each country "i" and sector $s = 1, ..., S$ the country specialization index is constructed as: $SPEC_i = \sqrt{(1 - SPEC_{i,1})^2 + (1 - SPEC_{i,2})^2 + ... + (1 - SPEC_{i,S})^2}$ where $SPEC_{i,s} = (\frac{VA_{i,s}}{\sum_s VA_{i,s}})/(\frac{VA_{EA,s}}{\sum_s VA_{EA,s}})$ and $VA$ stands for value added. Sample of countries: Austria (AT), Belgium (BE), Germany (DE), Spain (ES), Finland (FI), France (FR), Greece (GR), Ireland (IE), Italy (IT), Luxembourg (LU), the Netherlands (NL) and Portugal (PT). The figure plots the average value of the index by technology classification and region over time.

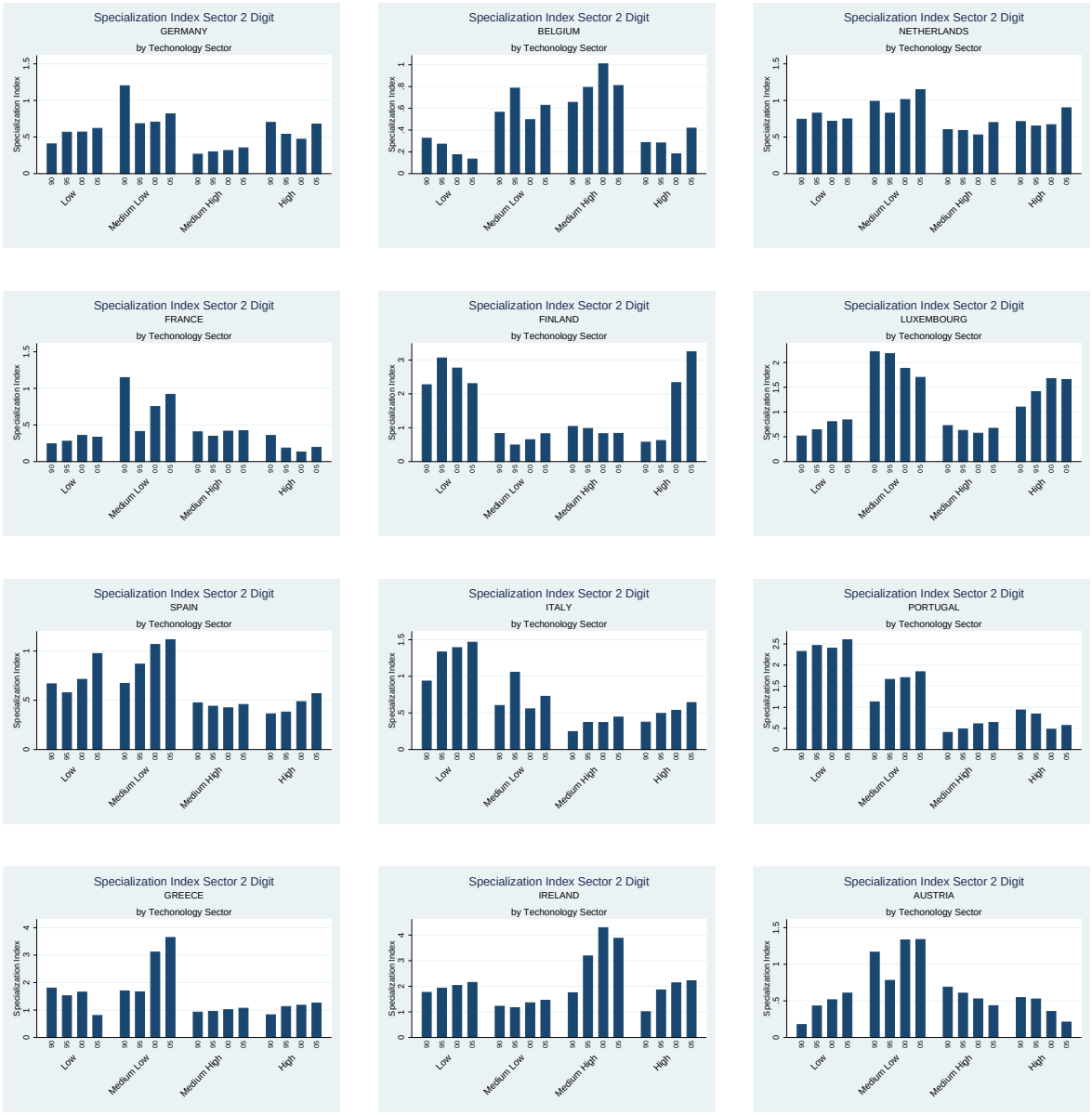


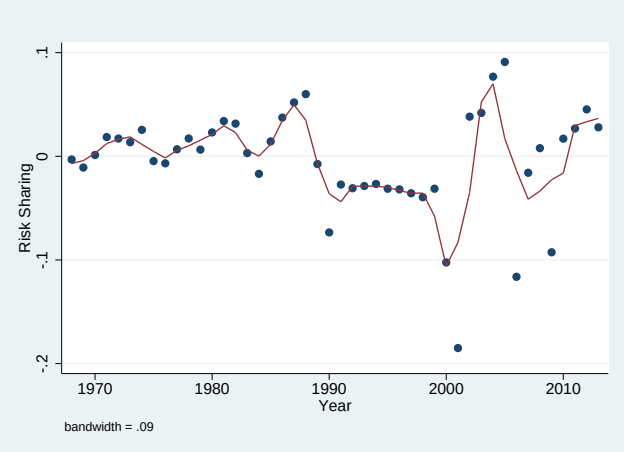

Figure 5: Specialization Index (2-digit sector) by Sector Technology Classification. **Low Technology**: Manufacturing (15t16 "Manufacture of food products, beverages and tobacco"; 17t19 "Manufacture of textiles, textile products and leather"; 21t22 "Manufacture of pulp, paper and paper products; publishing and printing") Non-Manufacturing (45 "Construction"). **Medium Low Technology**: Manufacturing (23 "Manufacture of coke, refined petroleum products and nuclear fuel"; 25 "Manufacture of rubber and plastic products"; 26 "Manufacture of other non-metallic mineral products"; 27t28 "Manufacture of basic metals and fabricated metal products"; 36t37 "Manufacturing n.e.c.") Non-Manufacturing (50 "Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel"; 51 "Wholesale trade and commission trade, except of motor vehicles and motorcycles" 52 "Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods"). **Medium High Technology**: Manufacturing (24 "Manufacture of chemicals and chemical products") Non-Manufacturing (60t63 "Transport and storage"; 70 "Real estate activities"; 71t74 "Renting and business activities"). **High Technology**: Manufacturing (30t33 "Manufacture of electrical and optical equipment"; 34t35 "Manufacture of transport equipment") Non-Manufacturing (64 "Post and telecommunications"). *Source sector classification: OECD*


(a) Period 1960 - 2013

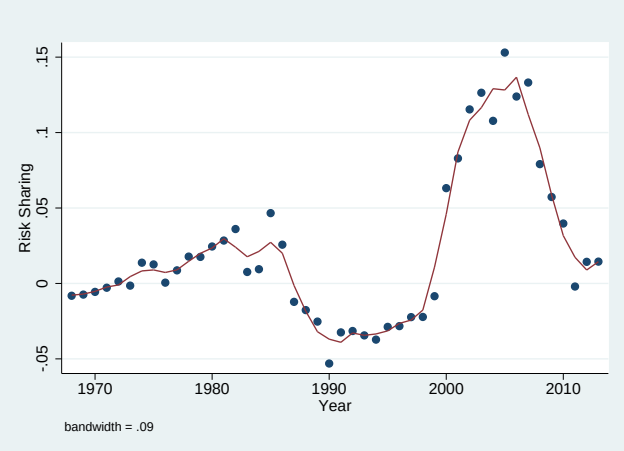
(b) Period 1996 - 2013

Figure 6: Income Risk Sharing over the period. Sample of countries: Austria (AT), Belgium (BE), Germany (DE), Spain (ES), Finland (FI), France (FR), Greece (GR), Ireland (IE), Italy (IT), the Netherlands (NL) and Portugal (PT). The figure plots (1 - $\beta_{k,t}$) where $\beta_{k,t}$ is obtained from estimating the following equation year by year: $\Delta logGNI_{it} - \Delta logGNI_t = \beta_0 + \beta_{k,t}(\Delta logGDP_{it} - \Delta logGDP_t) + \epsilon_{it}$. A LOWESS smoothing "locally weighted scatterplot smoothing" with a bandwidth of 0.15 in panel (a) and bandwidth of 0.4 in panel (b) is applied.


(a) Cross-Section




(b) Time Series




(c) Panel

Figure 7: Risk Sharing by Estimation Technique. Sample of countries: Austria (AT), Belgium (BE), Germany (DE), Spain (ES), Finland (FI), France (FR), Greece (GR), Ireland (IE), Italy (IT), the Netherlands (NL) and Portugal (PT). See section 3.2. for a description of how panels (a), (b) and (c) are estimated. A mean LOWESS smoothing "locally weighted scatterplot smoothing" with a bandwidth of 0.09 and no weights is applied to the three panels.

# B Tables

Table 1: Sector Classification according to Technology Sector

| | Manufacturing | Non-Manufacturing |
|---|---|---|
| Low Technology | 15t16, 17t19, 21t22 | 45 |
| Medium Low Technology | 23, 25,26, 27t28,36t37 | 50, 51, 52 |
| Medium High Technology | 24 | 60t63, 70, 71t74 |
| High Technology | 30t33, 34t35 | 64 |

Notes: **Low Technology**: Manufacturing (15t16 "Manufacture of food products, beverages and tobacco"; 17t19 "Manufacture of textiles, textile products and leather"; 21t22 "Manufacture of pulp, paper and paper products; publishing and printing") Non-Manufacturing (45 "Construction"). **Medium Low Technology**: Manufacturing (23 "Manufacture of coke, refined petroleum products and nuclear fuel"; 25 "Manufacture of rubber and plastic products"; 26 "Manufacture of other non-metallic mineral products"; 27t28 "Manufacture of basic metals and fabricated metal products"; 36t37 "Manufacturing n.e.c.") Non-Manufacturing (50 "Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel"; 51 "Wholesale trade and commission trade, except of motor vehicles and motorcycles" 52 "Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods"). **Medium High Technology**: Manufacturing (24 "Manufacture of chemicals and chemical products") Non-Manufacturing (60t63 "Transport and storage"; 70 "Real estate activities"; 71t74 "Renting and business activities"). **High Technology**: Manufacturing (30t33 "Manufacture of electrical and optical equipment"; 34t35 "Manufacture of transport equipment") Non-Manufacturing (64 "Post and telecommunications"). *Source sector classification: OECD*

Table 2: Number of Observations according to Technology Sector

| | Manufacturing | | Non-Manufacturing | |
|---|---|---|---|---|
| Sector Classification | Observations | Percent | Observations | Percent |
| Low Technology | 1,332 | 27.27 | 444 | 12.50 |
| Medium Low Technology | 2,220 | 45.45 | 1,332 | 37.50 |
| Medium High Technology | 444 | 9.09 | 1,332 | 37.50 |
| High Technology | 888 | 18.18 | 444 | 12.50 |
| Total | 4,884 | 100 | 3,885 | 100 |

Notes: **Low Technology**: Manufacturing (15t16 "Manufacture of food products, beverages and tobacco"; 17t19 "Manufacture of textiles, textile products and leather"; 21t22 "Manufacture of pulp, paper and paper products; publishing and printing") Non-Manufacturing (45 "Construction"). **Medium Low Technology**: Manufacturing (23 "Manufacture of coke, refined petroleum products and nuclear fuel"; 25 "Manufacture of rubber and plastic products"; 26 "Manufacture of other non-metallic mineral products"; 27t28 "Manufacture of basic metals and fabricated metal products"; 36t37 "Manufacturing n.e.c.") Non-Manufacturing (50 "Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel"; 51 "Wholesale trade and commission trade, except of motor vehicles and motorcycles" 52 "Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods"). **Medium High Technology**: Manufacturing (24 "Manufacture of chemicals and chemical products") Non-Manufacturing (60t63 "Transport and storage"; 70 "Real estate activities"; 71t74 "Renting and business activities"). **High Technology**: Manufacturing (30t33 "Manufacture of electrical and optical equipment"; 34t35 "Manufacture of transport equipment") Non-Manufacturing (64 "Post and telecommunications"). *Source sector classification: OECD*

Table 3: Productivity, Specialization and the Euro

| Dependent Variable: | $ln(VA/L)$ | $ln(VA/L)$ | $ln(VA/L)$ | $ln(VA/L)$ | $\Delta ln(VA/L)$ |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| *Sector Specialization* | 0.679*** | 0.740*** | 0.717*** | 0.692*** | 0.039*** |
| | (0.107) | (0.130) | (0.111) | (0.104) | (0.011) |
| *Sector Specialization* $\times$ *Euro* | | -0.124 | -0.152** | -0.140** | -0.013 |
| | | (0.076) | (0.067) | (0.064) | (0.010) |
| Observations | 8,396 | 8,396 | 8,396 | 8,396 | 8,168 |
| $R^2$ | 0.56 | 0.56 | 0.68 | 0.73 | 0.22 |
| F-test (p-value) | | 0.000 | 0.000 | 0.000 | 0.000 |
| Year Fixed Effects | yes | yes | yes | yes | yes |
| Country-Sector Fixed Effects | yes | yes | yes | yes | yes |
| Sector Fixed Effects | no | no | yes | yes | yes |
| Country-Year Fixed Effects | no | no | no | yes | yes |

*Notes:* The dependent variable in columns (1) to (4) is the log of value added (VA) over employment (L). In column (5) the dependent variable is the annual growth rate in value added over employment. For each country "i" and sector $s = 1, ..., S$ the sector specialization index is computed as: $SPEC_{i,s} = (\frac{VA_{i,s}}{\sum_s VA_{i,s}})/(\frac{VA_{EA,s}}{\sum_s VA_{EA,s}})$ and $VA$ stands for value added. *Euro* is a dummy variable that takes the value of one (for countries that implemented the euro) in the year the euro was implemented (1999) and thereafter and zero otherwise. The F-test is a joint test for the hypothesis that the coefficients on *Sector Specialization* and *Sector Specialization* $\times$ *Euro* are jointly significant. Standard errors clustered at the country-sector level are in parentheses. *** , **, *, denote significance at 1%, 5%, and 10% levels.

Table 4: Productivity, Specialization and the South

| | $ln(VA/L)$ (1) | $ln(VA/L)$ (2) | $ln(VA/L)$ (3) | $\Delta ln(VA/L)$ (4) |
|---|---|---|---|---|
| $SectorSpecialization \times Euro \times South$ | -0.285* | -0.103* | -0.109** | 0.037 |
| | (0.165) | (0.055) | (0.050) | (0.045) |
| $SectorSpecialization \times South$ | -0.006 | 0.069 | 0.164 | -0.052 |
| | (0.260) | (0.206) | (0.207) | (0.073) |
| $SectorSpecialization \times Euro$ | 0.048 | 0.052* | 0.031 | -0.064 |
| | (0.145) | (0.031) | (0.030) | (0.042) |
| $SectorSpecialization$ | 0.785*** | 0.572*** | 0.537*** | 0.209** |
| | (0.224) | (0.079) | (0.095) | (0.076) |
| Observations | 8396 | 2,724 | 2,724 | 2,724 |
| $R^2$ | 0.39 | 0.41 | 0.71 | 0.2 |
| F-test | . | 0.000 | 0.000 | 0.022 |
| Year Fixed Effects | yes | yes | yes | yes |
| Sector-Year Fixed Effects | no | no | yes | yes |
| Country-Year Fixed Effects | no | no | yes | yes |

*Notes:* The dependent variable in columns (1) to (3) is the log of value added (VA) over employment (L). In column (4) the dependent variable is the annual growth rate in value added over employment. For each country "i" and sector $s = 1, ..., S$ the sector specialization index is computed as: $SPEC_{i,s} = (\frac{VA_{i,s}}{\sum_s VA_{i,s}})/(\frac{VA_{EA,s}}{\sum_s VA_{EA,s}})$ and $VA$ stands for value added. *Euro* is a dummy variable that takes the value of one (for countries that implemented the euro) in the year the euro was implemented (1999) and thereafter and zero otherwise. South is a dummy variable equal to one for Spain, Italy, Greece, Portugal, Ireland. Column (1) reports the results using the total sample while columns (2) to (4) refer to the period 1995-2006. The F-test is a joint test for the hypothesis that all the coefficients are jointly significant. Standard errors clustered at the country-sector level are in parentheses. *** , **, *, denote significance at 1%, 5%, and 10% levels.

Table 5: Income Risk Sharing

| | 1960-1969 | 1970-1979 | 1980-1989 | 1990-1994 | 1995-1999 | 2000-2006 | 2007-2013 |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Income Risk Sharing | -0.7 | 1.7 | -1.2 | -3.8 | 14.2 | 5.1 | 2.2 |
| | (0.008) | (0.011) | (0.058) | (0.014) | (0.054) | (0.068) | (0.060) |

*Notes:* The table reports the average amount of risk sharing during the time-period considered among the countries included in the sample: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal and Spain. Risk sharing is (1 - $\beta_k$) where $\beta_k$ is obtained from estimating the following equation for the period under consideration: $\Delta logGNI_{it} - \Delta logGNI_t = \beta_0 + \beta_k(\Delta logGDP_{it} - \Delta logGDP_t) + \epsilon_{it}$. Standard errors clustered at the country level are reported in parenthesis.

Table 6: Financial Integration and Risk Sharing

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Stock Measure: | | FDI | Equity | Debt | FDI+Equity |
| $(\Delta logGDP_{it} - \Delta logGDP_t)$ | 1.001*** | 1.024*** | 1.008*** | 1.007*** | 1.015*** |
| | (0.017) | (0.030) | (0.025) | (0.027) | (0.028) |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times Stock$ | | -0.051 | 0.005 | -0.001 | -0.005 |
| | | (0.082) | (0.017) | (0.008) | (0.019) |
| $Stock$ | | -0.000 | -0.001** | -0.000** | -0.001* |
| | | (0.002) | (0.000) | (0.000) | (0.000) |
| Observations | 552 | 439 | 423 | 438 | 423 |
| $R^2$ | 0.94 | 0.94 | 0.93 | 0.93 | 0.93 |
| Country FE | yes | yes | yes | yes | yes |
| Year FE | yes | yes | yes | yes | yes |

*Notes:* Period: 1970-2011. Results are obtained from estimating the following equation:

$$\begin{aligned} \Delta logGNI_{it} - \Delta logGNI_t &= \mu_i + \beta_k(\Delta logGDP_{it} - \Delta logGDP_t) + \\ &\quad \beta_2(\Delta logGDP_{it} - \Delta logGDP_t) \times FI_{it} + \\ &\quad \beta_3 FI_{it} + \delta_t + \epsilon_{it} \end{aligned}$$

Stock refers to the measure of financial integration ($FI_{it}$) used in each column. $FI_{it}$ refers to the gross stocks of external assets plus liabilities scaled by GDP. Column (2) uses foreign direct investment (FDI), column (3) equity, column (4) debt and column (5) private flows which are the sum of FDI and equity. Standard errors clustered at the country-sector level are in parentheses. *** , **, *, denote significance at 1%, 5%, and 10% levels.

Table 7: Financial Integration and Risk Sharing: Assets and Liabilities

| PANEL A: Sample period 1970-2011 | (1) | (2) FDI | (3) Equity | (4) Debt | (5) FDI+Equity | (6) All |
|---|---|---|---|---|---|---|
| $(\Delta logGDP_{it} - \Delta logGDP_t)$ | 1.001*** | 1.027*** | 1.036*** | 0.988*** | 1.034*** | 0.986*** |
| | (0.017) | (0.025) | (0.015) | (0.022) | (0.029) | (0.041) |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times Liabilities$ | | -0.170 | 0.528** | 0.057** | 0.218** | |
| | | (0.173) | (0.144) | (0.016) | (0.069) | |
| $Liabilities$ | | 0.005 | -0.003 | -0.004** | -0.002* | |
| | | (0.005) | (0.003) | (0.001) | (0.001) | |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times Assets$ | | 0.047 | -1.012** | -0.058** | -0.385** | |
| | | (0.318) | (0.300) | (0.019) | (0.134) | |
| $Assets$ | | -0.006 | 0.007 | 0.002** | 0.003 | |
| | | (0.008) | (0.007) | (0.001) | (0.002) | |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times DebtLiabilities$ | | | | | | 0.133** |
| | | | | | | (0.060) |
| $DebtLiabilities$ | | | | | | -0.004 |
| | | | | | | (0.002) |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times DebtAssets$ | | | | | | -0.132 |
| | | | | | | (0.078) |
| $DebtAssets$ | | | | | | 0.003 |
| | | | | | | (0.004) |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times PrivateLiabilities$ | | | | | | 0.283** |
| | | | | | | (0.098) |
| $PrivateLiabilities$ | | | | | | -0.004 |
| | | | | | | (0.004) |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times PrivateAssets$ | | | | | | -0.433** |
| | | | | | | (0.113) |
| $PrivateAssets$ | | | | | | 0.003 |
| | | | | | | (0.003) |
| Observations | 552 | 439 | 423 | 438 | 423 | 422 |
| Country FE | yes | yes | yes | yes | yes | yes |
| Year FE | yes | yes | yes | yes | yes | yes |
| PANEL B: Sample period 1996-2011 | | FDI | Equity | Debt | FDI+Equity | All |
| $(\Delta logGDP_{it} - \Delta logGDP_t)$ | 0.956*** | 1.021*** | 1.013*** | 0.605** | 0.995*** | 0.688** |
| | (0.038) | (0.075) | (0.029) | (0.163) | (0.089) | (0.289) |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times Liabilities$ | | -0.282 | 0.695*** | 0.432** | 0.346** | |
| | | (0.335) | (0.150) | (0.193) | (0.153) | |
| $Liabilities$ | | 0.014** | -0.002 | -0.003 | -0.002 | |
| | | (0.003) | (0.003) | (0.004) | (0.002) | |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times Assets$ | | 0.103 | -1.309** | -0.312** | -0.562* | |
| | | (0.626) | (0.326) | (0.140) | (0.295) | |
| $Assets$ | | -0.013 | 0.007 | -0.000 | 0.005 | |
| | | (0.007) | (0.006) | (0.002) | (0.005) | |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times DebtLiabilities$ | | | | | | 0.520 |
| | | | | | | (0.368) |
| $DebtLiabilities$ | | | | | | -0.002 |
| | | | | | | (0.005) |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times DebtAssets$ | | | | | | -0.539 |
| | | | | | | (0.377) |
| $DebtAssets$ | | | | | | 0.001 |
| | | | | | | (0.004) |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times PrivateLiabilities$ | | | | | | 0.622** |
| | | | | | | (0.258) |
| $PrivateLiabilities$ | | | | | | -0.003 |
| | | | | | | (0.003) |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times PrivateAssets$ | | | | | | -0.582* |
| | | | | | | (0.303) |
| $(\Delta logGDP_{it} - \Delta logGDP_t) \times PrivateAssets$ | | | | | | 0.005 |
| | | | | | | (0.007) |
| Observations | 165 | 165 | 165 | 165 | 165 | 165 |
| Country FE | yes | yes | yes | yes | yes | yes |
| Year FE | yes | yes | yes | yes | yes | yes |

*Notes:* Panel A reports the results for the period 1970-2011 while panel B reports the results for the period 1996-2011. Results are obtained from estimating the following equation:

$$\begin{aligned} \Delta logGNI_{it} - \Delta logGNI_t &= \mu_i + \beta_k(\Delta logGDP_{it} - \Delta logGDP_t) + \\ &\beta_2(\Delta logGDP_{it} - \Delta logGDP_t) \times FI_{it} + \\ &\beta_3 FI_{it} + \delta_t + \epsilon_{it} \end{aligned}$$

$FI_{it}$ refers to financial assets or liabilities scaled by GDP depending on the specification. Column (2) uses foreign direct investment (FDI), column (3) equity, column (4) debt, column (5) private flows which are the sum of FDI and equity and finally, column (6) shows the results aggregating the three different types of flows: FDI, Equity and Debt. Standard errors clustered at the country-sector level are in parentheses. *** , **, *, denote significance at 1%, 5%, and 10% levels.

Table 8: Specialization and Financial Integration

| | Total Specialization Index | | | Medium-Low and High Specialization Index | | |
|---|---|---|---|---|---|---|
| Period: | 1970-2011 (1) | 1995-2011 (2) | 1995-2011 (3) | 1970-2011 (4) | 1995-2011 (5) | 1995-2011 (6) |
| $FDIAssets/GDP$ | -0.056 | -0.003 | 0.210 | 0.007 | 0.084 | 0.300 |
| | (0.152) | (0.133) | (0.219) | (0.223) | (0.203) | (0.320) |
| $FDILiab/GDP$ | 0.022 | -0.026 | -0.234 | -0.055 | -0.107 | -0.334 |
| | (0.113) | (0.093) | (0.210) | (0.169) | (0.144) | (0.320) |
| $EquityAssets_/GDP$ | -0.212 | -0.075 | 0.010 | -0.363* | 0.037 | 0.429 |
| | (0.139) | (0.109) | (0.287) | (0.197) | (0.147) | (0.456) |
| $EquityLiab/GDP$ | 0.073 | -0.016 | -0.182* | 0.189 | -0.000 | -0.333** |
| | (0.076) | (0.021) | (0.094) | (0.117) | (0.033) | (0.152) |
| $DebtAssets/GDP$ | 0.050 | 0.022 | 0.107 | 0.012 | -0.017 | 0.075 |
| | (0.067) | (0.066) | (0.112) | (0.070) | (0.071) | (0.127) |
| $DebtLiab/GDP$ | -0.037 | -0.009 | -0.075 | -0.031 | -0.040 | -0.118 |
| | (0.080) | (0.093) | (0.164) | (0.102) | (0.142) | (0.241) |
| $FDIAssets/GDP \times Euro$ | | | -0.174 | | | -0.181 |
| | | | (0.140) | | | (0.212) |
| $FDIliab/GDP \times Euro$ | | | 0.197 | | | 0.247 |
| | | | (0.191) | | | (0.291) |
| $EquityAssets/GDP \times Euro$ | | | -0.101 | | | -0.394 |
| | | | (0.225) | | | (0.362) |
| $EquityLiab/GDP \times Euro$ | | | 0.158* | | | 0.303** |
| | | | (0.092) | | | (0.141) |
| $DebtAssets/GDP \times Euro$ | | | -0.100 | | | -0.111 |
| | | | (0.093) | | | (0.115) |
| $DebtLiab/GDP \times Euro$ | | | 0.084 | | | 0.112 |
| | | | (0.116) | | | (0.164) |
| Observations | 7,388 | 2,299 | 2,508 | 4,276 | 1,331 | 1,331 |
| $R^2$ | 0.15 | 0.11 | 0.11 | 0.18 | 0.14 | 0.15 |
| Year FE | yes | yes | yes | yes | yes | yes |
| Sector-Year FE | yes | yes | yes | yes | yes | yes |
| Sector FE | yes | yes | yes | yes | yes | yes |
| Country-Sector FE | yes | yes | yes | yes | yes | yes |

*Notes:* The dependent variable in columns (1) to (3) is the sector specialization index. Columns (4) to (6) repeat the analysis for the subsample of sectors classified as medium-low and high technology. For each country "i" and sector $s = 1, ..., S$ the sector specialization index is computed as: $SPEC_{i,s} = (\frac{VA_{i,s}}{\sum_s VA_{i,s}})/(\frac{VA_{EA,s}}{\sum_s VA_{EA,s}})$ and $VA$ stands for value added. *Euro* is a dummy variable that takes the value of one (for countries that implemented the euro) in the year the euro was implemented (1999) and thereafter and zero otherwise. Standard errors clustered at the country-sector level are in parentheses. *** , **, *, denote significance at 1%, 5%, and 10% levels.

# Appendix

# A Tables

| NACE1 | NACE11 | NACE2 | Description |
|---|---|---|---|
| A | | | Agriculture, hunting and forestry |
| | AA | | Agriculture, hunting and forestry |
| | | 1 | Agriculture, hunting and related service activities |
| | | 2 | Forestry, logging and related service activities |
| B | | | Fishing |
| | BA | | Fishing |
| | | 5 | Fishing, fish farming and related service activities |
| C | | | Mining and quarrying |
| | CA | | Mining and quarrying of energy producing materials |
| | | 10 | Mining of coal and lignite; extraction of peat |
| | | 11 | Extraction of crude petroleum and natural gas |
| | | 12 | Mining of uranium and thorium ores |
| | CB | | Mining and quarrying, except of energy producing materials |
| | | 13 | Mining of metal ores |
| | | 14 | Other mining and quarrying |
| D | | | Manufacturing |
| | DA | | Manufacture of food products, beverages and tobacco |
| | | 15 | Manufacture of food products and beverages |
| | | 16 | Manufacture of tobacco products |
| | DB | | Manufacture of textiles and textile products |
| | | 17 | Manufacture of textiles |
| | | 18 | Manufacture of wearing apparel; dressing and dyeing of fur |
| | DC | | Manufacture of leather and leather products |
| | | 19 | Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear |
| | DD | | Manufacture of wood and wood products |
| | | 20 | Manufacture of wood and of products of wood and cork, except furniture |
| | DE | | Manufacture of pulp, paper and paper products; publishing and printing |
| | | 21 | Manufacture of pulp, paper and paper products |
| | | 22 | Publishing, printing and reproduction of recorded media |
| | DF | | Manufacture of coke, refined petroleum products and nuclear fuel |
| | | 23 | Manufacture of coke, refined petroleum products and nuclear fuel |
| | DG | | Manufacture of chemicals, chemical products and man-made fibres |
| | | 24 | Manufacture of chemicals and chemical products |
| | DH | | Manufacture of rubber and plastic products |
| | | 25 | Manufacture of rubber and plastic products |
| | DI | | Manufacture of other non-metallic mineral products |
| | | 26 | Manufacture of other non-metallic mineral products |
| | DJ | | Manufacture of basic metals and fabricated metal products |
| | | 27 | Manufacture of basic metals |
| | | 28 | Manufacture of fabricated metal products, except machinery and equipment |
| | DK | | Manufacture of machinery and equipment n.e.c. |
| | | 29 | Manufacture of machinery and equipment n.e.c. |
| | DL | | Manufacture of electrical and optical equipment |
| | | 30 | Manufacture of office machinery and computers |
| | | 31 | Manufacture of electrical machinery and apparatus n.e.c. |
| | | 32 | Manufacture of radio, television and communication equipment and apparatus |
| | | 33 | Manufacture of medical, precision and optical instruments, watches and clocks |
| | DM | | Manufacture of transport equipment |
| | | 34 | Manufacture of motor vehicles, trailers and semi-trailers |
| | | 35 | Manufacture of other transport equipment |
| | DN | | Manufacturing n.e.c. |
| | | 36 | Manufacture of furniture; manufacturing n.e.c. |
| | | 37 | Recycling |
| E | | | Electricity, gas and water supply |
| | EA | | Electricity, gas and water supply |
| | | 40 | Electricity, gas, steam and hot water supply |
| | | 41 | Collection, purification and distribution of water |
| F | | | Construction |
| | FA | | Construction |
| | | 45 | Construction |
| G | | | Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods |
| | GA | | Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods |
| | | 50 | Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel |
| | | 51 | Wholesale trade and commission trade, except of motor vehicles and motorcycles |
| | | 52 | Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods |
| H | | | Hotels and restaurants |
| | HA | | Hotels and restaurants |
| | | 55 | Hotels and restaurants |
| I | | | Transport, storage and communication |

| | | | |
|---|---|---|---|
| | IA | | Transport, storage and communication |
| | | 60 | Land transport; transport via pipelines |
| | | 61 | Water transport |
| | | 62 | Air transport |
| | | 63 | Supporting and auxiliary transport activities; activities of travel agencies |
| | | 64 | Post and telecommunications |
| J | | | Financial intermediation |
| | JA | | Financial intermediation |
| | | 65 | Financial intermediation, except insurance and pension funding |
| | | 66 | Insurance and pension funding, except compulsory social security |
| | | 67 | Activities auxiliary to financial intermediation |
| K | | | Real estate, renting and business activities |
| | KA | | Real estate, renting and business activities |
| | | 70 | Real estate activities |
| | | 71 | Renting of machinery and equipment without operator and of personal and household goods |
| | | 72 | Computer and related activities |
| | | 73 | Research and development |
| | | 74 | Other business activities |
| L | | | Public administration and defence; compulsory social security |
| | LA | | Public administration and defence; compulsory social security |
| | | 75 | Public administration and defence; compulsory social security |
| M | | | Education |
| | MA | | Education |
| | | 80 | Education |
| N | | | Health and social work |
| | NA | | Health and social work |
| | | 85 | Health and social work |
| O | | | Other community, social and personal service activities |
| | OA | | Other community, social and personal service activities |
| | | 90 | Sewage and refuse disposal, sanitation and similar activities |
| | | 91 | Activities of membership organizations n.e.c. |
| | | 92 | Recreational, cultural and sporting activities |
| | | 93 | Other service activities |
| P | | | Activities of households |
| | PA | | Activities of households |
| | | 95 | Activities of households as employers of domestic staff |
| | | 96 | Undifferentiated goods producing activities of private households for own use |
| | | 97 | Undifferentiated services producing activities of private households for own use |
| Q | | | Extra-territorial organizations and bodies |
| | QA | | Extra-territorial organizations and bodies |
| | | 99 | Extra-territorial organizations and bodies |

Table A.1: NACE Rev 1.1. Industry Classification: One-digit Sectors

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