What can we learn from the distribution of trade patterns? 
Evidence for Portugal, Spain, Greece and Ireland*

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Abstract

This paper proposes an empirical framework for analyzing the dynamics of trade specialization, using a symmetric transformation of the standard Balassa (1965) index and the conditional density estimation methods suggested by Hyndman et al. (1996). The framework is implemented using data on the cross-sector export and import specialization of the four initial EU Cohesion countries over the last forty years. We discuss the importance of studying both the external shape and the intra-distribution dynamics of the distribution and why it is interesting to include imports in the analysis. We find a reduction of the overall degree of export specialization in Portugal, Greece and, especially, in Spain. Conversely, Ireland has the strongest export specialization and there is evidence of an increase over time. The export intra-distribution dynamics reveal persistence of the specialization status in the four countries, especially for high values of the index. In all countries, the degree of specialization is higher for exports than for imports and intra-distribution dynamics reveal more mobility of import than of export patterns.

Keywords: International Trade, Balassa Index, Distribution Dynamics

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1 Introduction

The analysis of specialization dynamics in international trade has emerged as a topic of research in recent years, in a context of higher openness and significant changes in trade patterns. One strand of the empirical literature aims at establishing a link between specialization and economic development. The question is whether countries specialize or diversify along their development path. Most papers compute specialization indices on elementary variables such as production, employment or exports and associate them with observed developments in per capita income over time, making use of parametric and non-parametric methods. Conclusions differ markedly across studies, ranging from positive to negative and non-monotonic U-shaped relations between the extent of specialization and economic development. For example, Amiti (1999) provides some evidence of increasing specialization in the European Union (EU) over time, De Benedictis et al. (2008, 2009) use fixed-effects to control for countries’ specificities and conclude that sectoral export diversification increases with income and Imbs and Wacziarg (2003) provide empirical evidence that an initial movement towards sectoral diversification is followed by concentration along the development path.

Specialization dynamics in international trade has been also the object of research of a closely related strand of the trade literature, which focuses on the full distributional analysis of specialization indices. Empirical research on the dynamics of trade patterns using the entire distribution was pioneered by Proudman and Redding (1997, 2000). Since then, several empirical studies analyzed the product specialization of a given country (or group of countries) by estimating the entire (cross-sector) distributions over time. This empirical approach addresses some relevant questions. Firstly, the evolution of a country’s trade specialization cannot be fully captured through the computation of aggregate specialization indices. In fact, in order to identify countries’ specificities it is necessary to examine the changes in the shape of its entire specialization distributions. Secondly, even when the shape of the distribution remains unchanged over time, important results may exist if there are meaningful intra-distribution dynamics, i.e., if sectors switch positions within the distribution.

This paper contributes to the latter strand of research, as it proposes an empirical framework for analysing the dynamics of trade patterns without making a priori assumptions on its functional form or determinants. The framework bases on the full distributional analysis of a trade specialization index of the four initial EU Cohesion Fund beneficiaries (Portugal, Spain, Greece and Ireland) from 1967 to 2004. The pa-

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1 De Benedictis et al. (2009) offer a synopsis of the recent empirical literature on specialization dynamics.
per identifies a set of stylized facts for these countries and has two distinctive features. Firstly, apart from the relative sectoral specialization of exports, it also studies import specialization patterns. Secondly, the analysis of intra-distribution dynamics builds on a consistent estimation of conditional densities and a suitable visual representation, as suggested by Hyndman et al. (1996). The paper also argues that the proposed full distributional analysis contributes to shed some light on a set of applied issues, namely trade specialization and risk diversification, flexibility of economic structures and convergence of consumer preferences.

The paper is organized as follows. Section 2 provides a logical reasoning for the empirical analysis that follows. Section 3 describes the database, the symmetric transformation of the Balassa (1965) index of specialization suggested by Dalum et al. (1998) and the method proposed by Hyndman et al. (1996) to estimate conditional kernel densities. Section 4 is devoted to the export side, taking into account: (i) the external shape of the distribution over time (i.e., changes in the overall degree of specialization); and (ii) the intra-distribution dynamics (i.e., assessment of persistence/mobility of patterns of specialization). In Section 5, we turn to the import side and follow the same approach. Section 6 presents some concluding remarks.

2 What do the distributions of trade patterns reveal?

The analysis of changes in trade patterns using the entire distribution of specialization indices is a recent topic of research in the empirical trade literature. As discussed in Redding (2002), theoretical models of trade and growth state that patterns of specialization are dynamic and evolve endogenously over time. A country’s pattern of specialization at one point in time can be characterized by the simple distribution of a given specialization index, but a full dynamic analysis requires the examination of changes in the entire distribution along multiple dimensions. The dynamic analysis of trade specialization, taking into account the entire distribution of the indices, contributes to shed light on some empirical topics and involves two different, though closely related, sets of issues.

One set of issues refers to the evolution of the external shape of the distribution, which provides information on changes in countries’ overall degree of specialization over time. Changes in overall export specialization depend on whether specialization indices become higher/lower in a limited number of sectors or remain uniformly distributed across industries. Several measures of overall export specialization have been used in the literature, synthesizing and quantifying the information contained in the distribution of

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3See Proudman and Redding (2000) for a discussion.
specialization indices.\(^4\) However, the analysis of the external shape of the entire distribution is preferable as it allows the identification of other statistical features, like multimodality. This provides a more complete picture of the trade pattern of a given country, though without any quantification.

At present, there is no theoretical or empirical consensus about whether should specialization increase or decline over time. An implication of the debate on specialization or diversification of trade patterns concerns the effects of idiosyncratic shocks in the economy. In this context, diversification of exports across sectors and partners is typically regarded as a way to diversify risk.\(^5\) Countries whose exports are largely concentrated in a small number of products, such as natural resources producers or those strongly integrated in international supply chains, face a strong impact if sector-specific shocks occur.

A second set of issues links with intra-distribution dynamics, which provides information on how a country’s degree of specialization in individual industries changes over time. In other words, the analysis of intra-distribution dynamics provides information on the persistence/mobility of patterns of specialization, focusing on changes in the relative position of individual industries and on the probabilities of a sector to move within the distribution.

Different theoretical trade models identify the reasons underlying either persistence or mobility of specialization patterns. For example, sector-specific learning by doing leads to persistence in patterns of international trade, while technology transfers lead to mobility.\(^6\) Hence, whether trade patterns show persistence or mobility over time is mostly an empirical question. In particular, taking a given time horizon, a high probability of transition of an elementary specialization index to values significantly different from the initial ones points to a substantial degree of flexibility in the economy. In practical terms, such flexibility can be interpreted as the ability to reallocate productive factors across sectors in response to shocks. Although a wide set of structural factors explain the degree of flexibility in the economies, the functioning of the labour market and the regulation in the product markets are typically referred as crucial (see Nicoletti and Scarpetta (2003)).

The analysis of intra-distribution dynamics requires the choice of a relevant time horizon. Given the structural nature of changes in trade patterns, persistence tends to be very high in the short-run and to decrease over larger horizons. In addition, intra-distribution dynamics have also a natural link with changes in the external shape of the

\(^4\)The median of the specialization index, the Gini coefficient and the Herfindahl index are examples of such aggregate measures. See, for example, Amiti (1999) or De Benedictis et al. (2009).

\(^5\)See Koren and Tenreyr (2007) for an analysis of the links between volatility and development.

\(^6\)See Proudman and Redding (2000) for a theoretical model of trade dynamics.
specialization distribution. Such changes only take place if some mobility in elementary specialization indices exists.

The analysis of the distribution of specialization indices is typically focused on export patterns. Nevertheless, the import side is equally important and it may provide additional insights on the forces shaping trade patterns. In theoretical terms, the primary determinants of import patterns are consumers’ preferences, income levels and relative prices. However, as a result of the emergence of a new paradigm in the organization of world production, characterized by the international fragmentation of production, a substantial part of imports comprises capital and intermediate goods. Overall, for countries with similar per capita GDP levels, differences in consumer preferences and distinct degrees of participation in the international fragmentation of production are the main forces driving the differences in import specialization. Firstly, individual preferences and the resulting consumption patterns affect the structure of imports and the distribution of sectoral specialization indices because countries produce domestically only a limited scope of goods and varieties. Secondly, imports of parts and components to be incorporated in exports tend to be concentrated in some products, thereby affecting the distribution of specialization indices. This latter effect is stronger in countries whose exports are dominated by sectors with a significant import content, i.e., countries more deeply involved in vertical specialization activities as defined in Hummels et al. (2001). Therefore, given a suited set of countries, the comparison of import patterns can shed light on the progressive convergence of relative consumption patterns. If this effect is dominant, we expect that the distributions of import specialization across countries become closer over the time. On the contrary, a strong import specialization in specific products in a given country can signal important vertical specialization activities.

In the next section, we provide empirical evidence on the dynamics of trade patterns using adequate statistical methods. This type of analysis is better performed in a small and relatively similar group of countries. Firstly, it is difficult to visually compare a large set of specialization distributions over time. Secondly, if the countries under analysis are very heterogenous, useful policy insights can be more difficult to ascertain. Therefore, we selected a set of countries with several similarities: the four initial EU Cohesion Fund beneficiaries. In the sixties, the four countries had similar levels of real GDP per capita below the EU average but progressed at different paces, in particular since the nineties where Ireland grew clearly above the other countries.

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5 The Cohesion Fund, which started in 1994, is a structural instrument to help EU Member States to reduce economic and social disparities and to stabilize their economies. Eligible Member States are those whose gross national product (GNP) per capita is below 90 per cent of the EU average. Four Member States, Spain, Greece, Portugal and Ireland, were eligible under the Cohesion Fund until the end of 2003. The European Commission’s mid-term review of 2003 deemed Ireland (GNP average of 101 per cent) as ineligible under the Cohesion Fund as of 1 January 2004.
In fact, Ireland went through a strong restructuring of the economy in the eighties and continuously increased its trade openness due to a strong integration in international production chains. The Irish trade pattern has also been shaped by strong ties with the UK and the US economies, associated with large FDI inflows (see, for instance, Barry and Bradley (1997)). The analysis spans from 1967 to 2004, thus including a period of increasing trade integration in Europe with falling trade costs. In fact, the degree of openness of these four countries was also relatively close at the beginning of the sample period but evolved differently, as countries acceded the EU in different moments. Moreover, although these countries have different dimensions in terms of population, their international trade is not influenced by substantial natural resource endowments. Overall, this set of countries provides an interesting ground on which to study the evolution of trade patterns over a long period of increasing economic integration in Europe.

3 Methodology

3.1 Data and specialization indices

The analysis is based on the CEPII-CHELEM database, which reports bilateral trade flows for goods in value terms (the unit being the US dollar). The sample period starts in 1967 and ends in 2004, with a product breakdown at the four digits level of the ISIC classification (rev.3), which includes 120 manufacturing products.

The empirical trade literature suggests several methods to evaluate the trade specialization of a given country, most of them aiming at identifying the comparative advantages revealed ex-post by international trade. In fact, the most suited metrics and related theoretical motivations are a rather extensive subject in trade literature, but the most widely used indicator is the Balassa index, as suggested by Balassa (1965).

Assume that the world economy comprises \( N \) countries and \( m \) products. Country \( i \) exports of product \( j \) are \( x_{ij} \) and total exports of country \( i \) are given by \( X_i = \sum_{j=1}^{m} x_{ij} \).

World exports of product \( j \) amount to \( x_{Wj} = \sum_{i=1}^{N} x_{ij} \) and total world exports can be seen either as the sum of all products or as the sum of all countries, i.e., \( X_W = \sum_{j=1}^{m} x_{Wj} = \sum_{i=1}^{N} X_i \). The Balassa index can be written as:

\[
B_{ij} = \frac{x_{ij}}{x_{Wj}} \quad \text{country } i = 1,2 \ldots N; \text{ product } j = 1,2 \ldots m
\]
If the share of sector \( j \) in total exports of country \( i \) is higher than the equivalent share of sector \( j \) in world exports, i.e., \((\frac{x_{ij}}{X_i}) > (\frac{x_{Wj}}{X_W})\), then \( B_{ij} > 1 \) and country \( i \) is classified as having a *revealed* comparative advantage in sector \( j \).

The use of the Balassa index, which follows an asymmetric distribution with a fixed lower bound of 0, a variable upper bound and a variable mean, has been subject to several critiques, leading some authors to propose modified versions.\(^{10}\) This paper uses the transformation suggested by Dalum et al. (1998), because the high asymmetry of the traditional \( B_{ij} \) index complicates the analysis of its distribution. Dalum et al. (1998) labelled this new index as “Revealed Symmetric Comparative Advantage”, which is defined as:

\[
BS_{ij} = \frac{B_{ij} - 1}{B_{ij} + 1}
\]  

(2)

\( BS_{ij} \) ranges from \(-1\) to \(1\) and has a threshold value in \(0\), leaving the rank-order and the specialization status of the sectors within each country unchanged.

All calculations can be reproduced for the import side and the symmetric Balassa (1965) index for imports, \( BS_{ij}^M \), will be the basis of the analysis in Section 5. When \( BS_{ij}^M > 0 \), country \( i \) is a relatively stronger importer in sector \( j \) than the world average.

### 3.2 Kernel estimation of conditional densities

The analysis of international specialization patterns based on the cross-industry distribution of specialization indices raises the issue of persistence vs mobility of the initial patterns. The methods of evaluating intra-distribution dynamics were initiated by Quah (1993) in discrete time, applied to cross-country income convergence analysis, and extended afterwards to a continuous time framework (see Quah 1997). The first application of intra-distribution dynamics to trade specialization patterns, using Markov transition matrices, was due to Proudman and Redding (1997, 2000). Brasili et al. (2000) extended this trade analysis by drawing information from the distributions at time \( t + \tau \), given its value at time \( t \).\(^{11}\)

In this paper, we employ nonparametric kernel estimators for conditional densities, following the methodology described in Hyndman et al. (1996). The estimation of conditional densities is an important topic of research in statistics, and empirical economics papers are progressively making use of these more accurate nonparametric methods. Such methods allow researchers to explore several issues without making a priori as-

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\(^{10}\) Modified versions of the original Balassa index may be found, for instance, in Proudman and Redding (2000) and in Amador et al. (2007).

\(^{11}\) See also Mancusi (2001) that examines the dynamics of technological specialization using patent data.
sumptions about the underlying relationships. The use of a consistent estimator for the conditional densities of export and import specialization indices at time $t + \tau$, given its value at time $t$ is a distinctive feature of this paper. Next, we follow closely Hyndman et al. (1996) and Huynh and Jacho-Chavez (2007) and briefly describe the estimation methodology.

Consider that the $BS_{ij}$ index at time $t$ is a scalar random variable on the space $\mathbb{R}$ designated as $X$ and, similarly, $BS_{ij}$ index at time $t + \tau$ is designated as $Y$. Take a sample denoted by $(X_1, Y_1), (X_2, Y_2), \ldots, (X_N, Y_N)$. The density of $Y$ conditional on $X = x$ can be written as:

$$f_{Y|X}(y | x) = \frac{f_{Y,X}(y, x)}{f_X(x)}$$

Consistent kernel-based estimations of (3) can be written as:

$$\hat{f}_{Y|X}(y | x) = \sum_{i=1}^{N} w_i(x) K_{h_y}(y - Y_i)$$

where $w_i(x)$ is a weighting function and $K_{h}(u) = h^{-1}K(u/h)$. In addition, $h$ is a bandwidth parameter and $K(.)$ designates a gaussian kernel function with the usual properties, i.e., a real, integrable, non-negative even function on $\mathbb{R}$, concentrated at the origin, such that:

$$\int_{\mathbb{R}} K(u)du = 1, \quad \int_{\mathbb{R}} uK(u)du = 0, \quad \int_{\mathbb{R}} u^2K(u)du < +\infty$$

Furthermore, the weighting function is of the form:

$$w_i(x) = K_{h_x}(x - X_i)/\sum_{j=1}^{N} K_{h_x}(x - X_j)$$

which corresponds to local constant weights.

The natural estimator of the conditional density (3), corresponding to the ratio of two kernel density estimators, is:

$$\hat{f}_{Y|X}(y | x) = \frac{\hat{f}_{Y,X}(y, x)}{\hat{f}_X(x)}$$

and, as shown by Hyndman et al. (1996), if $h_x \to 0$, $h_y \to 0$ and $Nh_xh_y \to +\infty$, as $N \to \infty$, then (7) is a consistent estimator of the conditional density (3).

Conditional density estimations and visual representations included in this paper were performed with the hdrcde package by Hyndman and Einbeck (2009). The bandwidths

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\(^{12}\)See, for instance, Huynh and Jacho-Chavez (2007) for an application of kernel conditional densities estimations to firm-level manufacturing data from Ecuador.
were computed using normal reference values as described in Bashtannyk and Hyndman (2001) and a mean-bias adjustment was included, using the method described in Hyndman et al. (1996).

4 Analysis of export specialization

Figure 1 shows the univariate estimated kernel densities of the symmetric $BS_{ij}$ for each country, using a gaussian kernel function in the first and last periods of the sample. The visual inspection of the estimated density points to significant differences in terms of export specialization among the four countries. In the Irish case, the density function is markedly more right skewed than that of the other countries, indicating a higher overall degree of specialization. On the contrary, the density function of Spain is much more symmetric and roughly centered around the demarcation value in the most recent period. Over time, the density estimates of Portugal, Spain and Greece became more symmetric, pointing to a general decrease of the overall degree of specialization in these countries. The opposite happens with Ireland, whose distribution becomes more polarized in the most recent period, with the density concentrating more around extreme values of the index, thus making it more exposed to sectoral specific shocks. Hence, as in previous empirical studies, we find no consensus as to how sectoral diversification evolves as countries develop over time. The first set of results is consistent with De Benedictis et al. (2008, 2009), which found that countries tend to diversify along their path of economic development. On the contrary, our results for Ireland are consistent with the notion that higher income countries tend to specialize their exports as stated in Koren and Tenreyro (2007). It is interesting to remark that the Irish economy is very integrated in international production chains. This results in high relative shares of imports and exports of specific products and contributes to the stronger specialization of Irish exports.

Figure 2 plots the stacked conditional density plots and the highest density regions (HDRs) for the export specialization indices in each country, as suggested in Hyndman (1996). The left-hand panels of Figure 2 show the change in the shape of the distribution of the specialization index in period $t + 15$ over the range of the conditional variable, i.e., the $BS^X$ in period $t$. The HDRs plotted in the right-hand panels are computed from the conditional density estimates and show the smallest region of the sample containing a given probability. The darker-shaded region corresponds to a 50% probability.
HDR and the lighter tone delimits the 95% HDR. The mode of each conditional density is shown as a bullet (•).

Figure 2 points to a significant persistence of the export patterns of these countries over 15-year periods, as the highest probability mass is concentrated along the 45 degree diagonal, implying that specialization indices for each sector tend to remain around the values where they started off.\textsuperscript{14} This persistence is especially strong for the high values of the indexes, pointing to a stability of the products with a high specialization status.\textsuperscript{15} There are some interesting results when we examine the different countries in more detail. In Spain, there is a higher persistence for sectors between high and no specialization status, i.e., with $BS^X$ between 0 and 1, and a higher mobility for sectors where there was an initial strong non-specialization status, i.e., with $BS^X$ near -1, which is compatible with a decline of the overall degree of specialization. In Ireland, the stacked conditional distributions peak in the two extremes and dip in the middle. There is also evidence of a higher probability mass below the 45 degree diagonal for the conditional densities associated with values of the index between $-0.5$ and 0.5.

\textsuperscript{14}We carried out the analysis using 1-year, 5-year and 10-year lags. The results of 1-year transitions show an extremely strong persistence of the sectoral export pattern of all countries, as most of the elements are located very close to the 45 degree diagonal. The results of 5-year and 10-year transitions do not change the overall assessment obtained with a 15-year horizon, but, as expected, the degree of mobility increases as we move to longer horizons. All the detailed results are available from the authors upon request.

\textsuperscript{15}Although using a different methodology, Proudman and Redding (2000) find considerable persistence of international trade patterns of the G5 countries, except in Japan. Brasili et al. (2000) find a difference between advanced and emerging countries in terms of persistence: the former are characterized by a highly persistent trade pattern, while the specialization of the latter is highly mobile.
This feature is more visible in the corresponding HDR and points to a general decline of mid-values of the index, suggesting a polarization of the export pattern in Ireland. Overall, the analysis of intra-distribution dynamics points to a higher degree of mobility of the export specialization of Ireland than that of the other three countries, which may indicate lower barriers to the reallocation of resources in the economy.
Figure 2: Exports - Estimated Conditional Densities - 15-year transitions

(a) Portugal

(b) Portugal

(c) Spain

(d) Spain

(e) Ireland

(f) Ireland

(g) Greece

(h) Greece
5 Analysis of import specialization

The analysis of the sectoral distribution of the import specialization indices of each country provides evidence on the overall degree of import specialization. The estimated univariate kernel densities of the $BS^M$ index are presented in Figure 3. In the 2000-2004 period, all distributions are remarkably centered around the demarcation value of 0, though in different degrees. The convergence of the import basket towards the world average is especially clear in Portugal and Spain, which is the most diversified country in the last period. The same feature is evident in Greece, but in a lesser extent. The density estimates of Ireland appear quite stable over time, with no substantial differences in the shape of the distribution between the two extreme periods. If anything, there is a small shift of the estimated kernel to the left in the most recent period, i.e., in the opposite direction of the other countries.

The comparison of Figures 1 and 3 reveals some interesting differences between the cross-sector export and import patterns. In general terms, there are more differences in terms of product composition on the export than on the import side, both relatively to the world average and between one another. The density functions estimated for exports are markedly more right skewed than those obtained on the import side, indicating a higher overall degree of specialization, in particular in the first period. On the contrary, the density functions of imports, especially in the last period, are symmetric and roughly centered around the demarcation value, pointing to more similar import shares across all countries. These similarities point to closer relative consumer preferences over time. This effect seems to dominate the differentiation coming from the increased import specialization in specific intermediate goods, which is associated with the international fragmentation of production.

In order to examine the intra-distribution dynamics of import specialization, Figure 4 plots the stacked conditional density plots and the HDRs for the $BS^M$ index in each country taking 15-year transitions. Comparing Figures 2 and 4, the degree of persistence of the cross-sector specialization is much higher for exports than for imports in all of these countries. Nevertheless, relevant differences between countries emerge in the intra-distribution dynamics of import specialization. The stacked conditional density plots and the HDRs suggest a higher degree of mobility of the import structures of Spain and Portugal than those of Greece and Ireland. In Spain, the conditional distributions for high and low values of the specialization index are wider and a significant part of the probability mass is concentrated around the demarcation value of 0, which is compatible with a convergence of its import structure towards the world.

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16 As in the export side, a gaussian kernel function was used.
average. This feature is also visible in the Portuguese case, though less markedly, while in Greece a stronger persistence emerges for the highest values of the index. In Ireland, there is some tendency to reduction of the positive values of the index. In addition, the conditional density of $BS^M$ associated with $-1$ shows a high density close to this extreme value of the index but also a second mode near $-0.5$. 

Figure 3: Imports - Estimated Kernel Densities
Figure 4: Imports - Estimated Conditional Densities - 15-year transitions
This paper proposes a nonparametric approach for characterising the dynamics of trade patterns, using the full distributional analysis of the symmetric transformation of the Balassa (1965) index of specialization suggested by Dalum et al. (1998). Conditional density estimation methods suggested by Hyndman et al. (1996) are employed as a visual method to examine the intra-distribution dynamics of trade specialization. It is argued that the proposed full distributional analysis contributes to shed some light on a set of applied issues, namely trade specialization and risk diversification, flexibility of economic structures and convergence of consumer preferences. The proposed framework is implemented using data on cross-sector export and import specialization of the four initial EU Cohesion countries over the 1967-2004 period. In general, the evolutions observed in Portugal, Spain and Greece have several similarities with one another. On the contrary, Ireland has substantial differences in several aspects of the evolution of its cross-sector trade specialization.

Over time, the density estimates of the export specialization of Portugal, Spain and Greece became more symmetric, pointing to a general decrease of the overall degree of specialization in these countries, especially in Spain, which is the least specialized of the four countries. On the contrary, the overall extent of specialization of Irish exports increased from the beginning to the end of the period. At present, the Irish export structure is the most polarised and substantially different from the world benchmark. This can be linked to the large FDI inflows and high integration in international production chains, which have been shaping the Irish export pattern.

The evidence on intra-distribution dynamics reveals some signs of persistence of the export pattern of these countries. Using 15-year transitions, a significant persistence for the high values of the index is evident, pointing to some stability of the products with a high specialization status. Nevertheless, intra-distribution dynamics point to a higher degree of mobility of the export pattern of Ireland than that of the other three countries, suggesting lower barriers to the reallocation of resources in this economy.

In general terms, the density functions of imports are symmetric and roughly centered around the demarcation value, especially in the last period. This points to a more similar sectoral composition of imports across countries than that visible on the export side. This result is compatible with the idea that relative consumer preferences in these countries became closer. The convergence of the import basket towards the world average is especially clear in Spain and Portugal, while the density estimates of the Irish import structure appear more stable over time. As for the intra-distribution dynamics, the estimated transitions over a 15-year horizon reveal more mobility of the
import specialization than that of exports. The results also suggest a higher degree of mobility of the import structures of Spain and Portugal than those of Greece and Ireland.

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