Product relatedness and economic diversification in the US: an analysis at the state level.

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Abstract

This paper analyzes the relationship between current industrial structure and the development of new industries in 49 US states in the period 2002-2012. As a measure of product relatedness we used the proximity index proposed by Hidalgo *et al* (2007), and constructed a density measure, following Hausman and Klinger (2007), which captures the degree of relatedness between each state current industrial structure and exported product. Our econometric results provide evidence that US states tend to diversify into new products that use available capabilities from existing economic activities. However, we found that the transfer of capabilities between new and existing industries is strictly bounded at the state level. Furthermore, we show that the degree, to which the development of a new product benefits from available capabilities, depends on its initial level of specialization.

Keywords: product proximity, product diversification, new industries, capabilities transfer, United States

JEL Codes: F14, R11

1. Introduction

The process through which countries or regions specialize in the production of different products or diversify into new products over time, has been from the beginning a matter of concern for economists, both from a theoretical and empirical point of view. For policy makers, the knowledge on this process is an interesting issue for several reasons. First, it may allow them to adopt the required necessary decisions in order to initiate a process of structural economic reform to enable a specific productive structure to foster economic growth. Second, and as it has been demonstrated in the last financial crisis beginning at the end of 2007, diversification into new products may compensate in part, the harmful effects on employment arising from those economies activities that are facing a severe decline.

Economic theories have provided some insights on how countries diversify into new economic activities over time.

[UNDER ELABORATION]

Against this background, in this paper we analyze the relationship between current industrial structure and the development of new industries in 49 US states over the period 2002-2012. To measure current industrial structure or available capabilities in a particular state, around a particular product, we use the density measure developed by Hausman and Klinger (2007). This density measure is constructed on the basis of the proximity index proposed by Hidalgo *et al* (2007). To the best of our knowledge, there are only two studies where the relationship between the set of existing capabilities and the development of new industries is analysed….

The paper is organized as follows. The second section presents the data used in the analysis and the applied methodology to calculate product relatedness and the measure of current industrial structure. The third section describes the results from the regression analysis. The fourth section concludes.

2. Data and Methodology

In order to develop an indicator of current industrial structure at the regional level, we first needed an indicator to measure the degree of relatedness between industries. Although there exists several measures of relatedness, we follow Boschma *et al* (2012) and used the proximity index proposed by Hidalgo *et al* (2007). This index is based on the idea that if two different goods are related, because its production requires either similar production factors, skills, infrastructure or institutions, they will tend to be produced in the same region, while if they are not related they would be less likely to be produced together. Thus, in contrast to other relatedness measures, the proximity index proposed by Hidalgo *et al* (2007) is an outcome-based measure.

The proximity index makes use of the conditional probability of having Revealed Comparative Advantage[1] (RCA) in a specific product *i* given that the country has comparative advantage on product *j*. Specifically, the proximity between products *i* and *j* at time *t* is calculated as,

$$\varphi_{i,j,t} = \min\left\{P(RCAx_{i,t} \mid RCAx_{j,t}),\, P(RCAx_{j,t} \mid RCAx_{i,t})\right\} \quad (1)$$

To calculate the proximity between each pair of products we used data on product exports by country at the 6-digit level (HS2002) from the United Nations COMTRADE database. The trade data is disaggregated for 5,215 products and 139 countries.

Second, for each product and US state we calculated a density measure following Hausman and Klinger (2007). This measure captures the degree of relatedness between each state current industrial structure and exported product, and is calculated as the sum of proximities from product *i* to all products that are being exported with comparative advantage, divided by the sum of proximities of all products to good *i*. Algebraically, density is obtained through the following expression,

$$density_{i,s,t} = \frac{\sum_j \varphi_{i,j,t} x_{s,j,t}}{\sum_j \varphi_{i,j,t}} \quad (2)$$

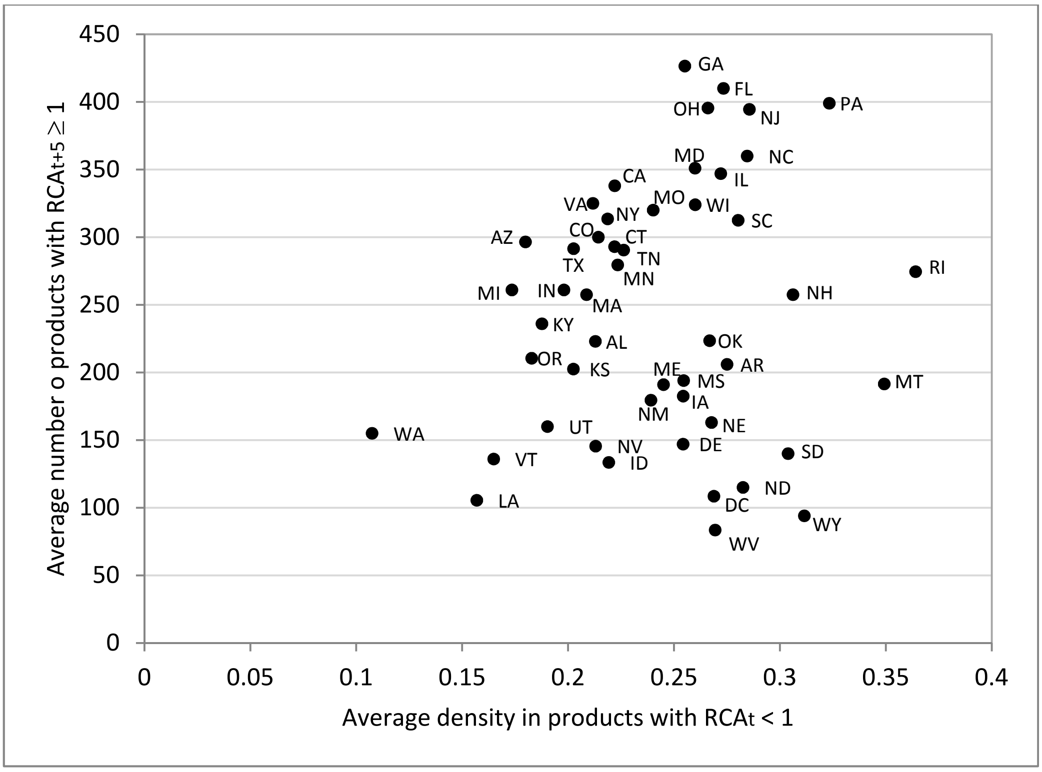
Where $x_{s,j,t}$ takes the value 1 if state *s* has a comparative advantage in product *j* at time *t* and zero otherwise. As it can be appreciated from the formula above, if a state exports all goods related

[1] Following Balassa (1969), a country has a comparative advantage in a certain product if its export share on that product is higher than the share of that product in world exports (RCA > 1).

to product *i* with comparative advantage, density will take value one. However if state *s* does not have comparative advantage in any or few products related to product *i*, density will be zero or close to zero. In order to calculate the density measure, we computed the RCA for each US state and product, combining world product exports data at the at the 6-digit level (HS2002) from the UN COMTRADE database and US states product exports data at the 6-digit level (HS2002) from the USA Trade Online (United States Census Bureau). Density was calculated for each product and 49 US states[2] for years 2002 and 2007.

As a preliminary analysis of the relationship between the current industrial structure and the development of new products, Figure 1 plots in the horizontal axis, the average density of products without a comparative advantage at the initial of the two 5-year intervals considered (2002-2007 and 2007-2012), and in the vertical axis the average number of new products with comparative advantage at the end of the two 5-year intervals. The figure shows a certain positive relationship between the average density in those products without comparative advantage at the initial of the period and the number of new products five years later.

Figure 1. Current industrial structure and the development of new products, 2002-2012.



Source: own elaboration

Notes: see Table A1 for states abbreviations

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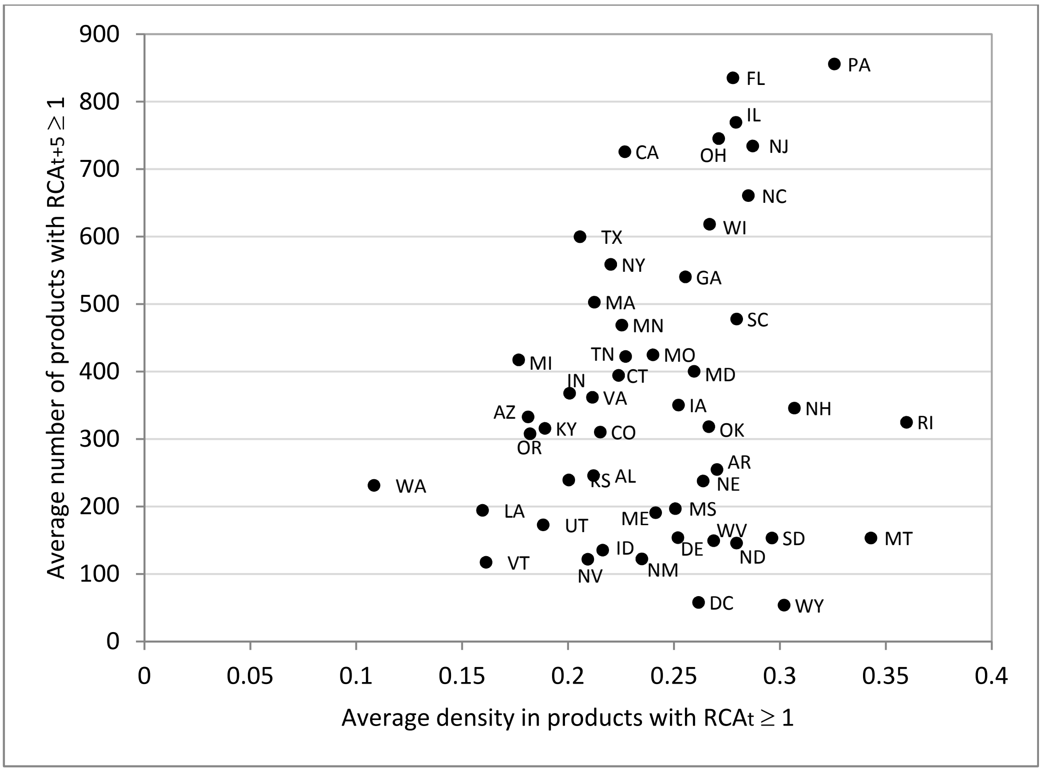
[2] We discarded from the analysis the states of Alaska and Hawaii and included the Federal district of Washington D.C.

Similarly, Figure 2 shows the relationship between current industrial structure around those products that were being exported with comparative advantage at the initial of the two 5-year intervals, and the average number of products that keep its comparative advantage five years later. Again, the figure shows a certain positive relationship between the current industrial structure and the number of products that keep their comparative advantage.

Figure 2. Current industrial structure and keeping existing products, 2002-2012.



Source: own elaboration

Notes: see Table A1 for states abbreviations

Lastly, in Table 1 we report the number of available observations, classified attending to their RCA at the beginning of each and both five-year periods, and to their RCA five years later. The information reported indicates that the unconditional probability of developing a new product with comparative advantage during a five-year period is 5.3%, while the unconditional probability of keeping a comparative advantage is almost 58%.

Table 1. Number of observations.

Initial RCA	Nº of products	$RCA_{t+5} > 1$	Share of products with $RCA_{t+5} > 1$ (%)
Period 2002-2007			
$RCA_t < 1$	224,129	12,518	5.6
$RCA_t \geq 1$	31,749	17,440	54.9
Period 2007-2012			
$RCA_t < 1$	225,920	11,493	5.1
$RCA_t \geq 1$	29,958	18,210	60.8
Both periods			
$RCA_t < 1$	450,049	24,011	5.3
$RCA_t \geq 1$	61,707	35,650	57,8
All products	511,756	59,661	11.7

Source: own elaboration

3. Econometric Analysis

Density, product diversification and product abandonment

To formally test the importance of state density or current industrial structure in the development of new products with comparative advantage, and in keeping a comparative advantage on those products that already were being exported with a comparative advantage, we estimate the following equation on 5-year intervals from 2002-2012,

$$x_{i,s,t+5} = \alpha + \gamma x_{i,s,t} + \beta density_{i,s,t} + \delta_{i,t} + \delta_{s,t} + \varepsilon_{i,s,t} \quad (3)$$

where $x_{i,s,t+5}$ takes value 1 if state *s* has a comparative advantage in product *i* at time *t+5* and 0 otherwise, $x_{i,s,t}$ takes value 1 if state *s* has a comparative advantage in product *i* at time *t* and 0 otherwise, and $density_{i,s,t}$ is the state *s* density around product *i* at time *t*. The *density* variable was normalized by subtracting the mean and dividing by the standard deviation to make the corresponding estimated parameter in units of standard deviations. The parameter γ indicates the contribution of having comparative advantage at the beginning of the period in product *p*, to the probability of keeping a comparative advantage in that product five years later once we control for other determinants. Our parameter of interest β, captures the effect of state density at the beginning of the period on the probability of developing or keeping a comparative advantage five years later. Lastly, $\delta_{i,t}$ and $\delta_{s,t}$, are fixed effects to control for time-varying characteristics of a product and for time-varying characteristics of a state respectively, while $\varepsilon_{i,s,t}$ is the error term. The product-year fixed effects ($\delta_{i,t}$) allow us to control for any time-varying characteristics for product i such as price or productivity shocks or changes on global demand. Also, the state-year fixed effects ($\delta_{s,t}$) control for any time-varying characteristics for state s

Following Hausman and Klinger (2007), and in order to distinguish between the effect of current industrial structure in the development of new products, from keeping a comparative advantage on products that already were being successfully exported, we also estimated the following equation,

$$x_{i,s,t+5} = \alpha + \gamma x_{i,s,t} + \beta_1 (1 - x_{i,s,t}) density_{i,s,t} + \beta_2 x_{i,s,t} density_{i,s,t} + \delta_{i,t} + \delta_{s,t} + \varepsilon_{i,s,t} \qquad (4)$$

In this case, the parameter β_1 indicates the impact of density on the development of new products with comparative advantage, while β_2 reflects the effect of density on keeping a comparative advantage.

We estimated equation (3) and (4) using OLS (Ordinary Least Squares) with standard errors clustered at the state level. While it is well known in the econometric literature, that the OLS linear probability model presents several disadvantages when the dependent variable is binary, probit and logit models may lead to biased and inconsistent coefficients when the model includes a large number of dummy variables (Green, 2004) as is our case. Moreover, the estimation of non-linear models with a large number of observations and control variables is too computationally-intensive and time consuming. Besides, since both, equation (3) and (4), include the lagged dependent variable as an explanatory variable, we also replicated the estimation including the initial RCA instead of $x_{i,s,t}$, to avoid endogeneity problems that may lead to inconsistent estimates. Furthermore, this allows us to compare our initial results with our later analysis in the paper. Since the variable is included in logs, and in order to preserve those products that were not exported at the initial of each 5-year period, we computed the variable using RCA+0.1 for all observations.

The estimation results of equation (3) are presented in column (1) and (2) of Table 2. As it can be appreciated, the comparative advantage at the beginning of the period plays a crucial role in the probability of having a comparative advantage in a product at the end of the period. Both, the parameter estimates for the dummy variable $x_{i,s,t}$, and for the Log($RCA_{i,s,t}$) are positive and highly significant. Specifically, the point estimate for the dummy variable $x_{i,s,t}$ indicates that, having a comparative advantage at the beginning of the period, increases the probability of keeping it five years later by 46 percentage points. For the Log($RCA_{i,s,t}$) variable, the coefficient estimate suggest that a one log point increase in the initial RCA of a product, increases the probability of having a comparative advantage in that product five years later by 13 percentage points. Moreover, it must be noted that this result is always robust to the several specifications on Table 2. Attending to the density variable, the parameter estimate is positive and significant at the 1% level. Its magnitude indicates that a one standard deviation increase in density, raises the probability of having a comparative advantage five years later between 9 and 10 percentage points.

For equation (4), the estimation results are reported on columns (3) and (4). The parameter estimates for the $(1-x_{i,s,t}) \times Density_{i,s,t}$ and for the $x_t \times Density_t$ variable are positive and highly significant. Moreover, and contrary to the findigs by Hausman and Klinger (2007), our results suggest that the impact of density on the probability of developing new products with comparative advantage is relativity larger than the effect of density on keeping a comparative advantage. In particular, a one standard deviation increase in density raises the probability of developing a new product with comparative advantage between 9 and 10 percentage points, and increases the probability of keeping a comparative advantage on a particular product between 8 and 9 percentage points.

On columns (5) and (6) of Table 2, and following the work by Boschma *et al* (2012), we replicate equation (2) introducing density at the country level as an additional explanatory variable. This density variable captures the degree of relatedness between each exported product by state and the current industrial structure in the rest of the country. For each state and product, the variable is calculated as the sum of proximities from product *i* to all products that are being exported with comparative advantage at the country level, divided by the sum of proximities of all products to good *i* in the rest of states. Thus, it allow us to analyze whether the available capabilities at the country level have any effect on the development of new products with comparative advantage and in keeping a comparative advantage on those products that already were being exported with a comparative advantage at the state level. The parameter estimates for the density variable at the state level remains positive and significant at the 1% level, but its size is smaller compared to the initial estimates on columns (1) and (2). Interestingly, the estimated coefficient for the density variable at the country level ($USdensity_{i,s,t}$) is negative and highly significant, and its magnitude is considerable large in absolute value. Specifically, the estimated coefficient suggest that, a one standard deviation increase in density at the country level, decreases the probability of having a comparative advantage five years later between 53 and 55 percentage points. A similar result is obtained when we replicate equation (4) including the density variable at the state level. The results in columns (7) and (8) show that density at the state level has a negative and significant effect on both, the developing of new products with comparative advantage and in keeping a comparative advantage on products that already were being exported with comparative advantage. In fact, a one standard deviation increase in density at the state country decreases the probability of developing a new product between 54 and 57 percentage points, and decreases the probability of keeping a comparative advantage between 51 and 52 percentage points. These findings are contrary to the results in Boschma *et al* (2012) for the Spanish regions, where current density at the country level seems to increase the probability of having a comparative advantage in the future.

The impact of density at the national level on the development of new products in a specific region can be decomposed into two different effects. On the one hand, a certain region within a country may benefit from the existing capabilities or from the current industrial structure in the rest of the country, as far as this capabilities can be easily transferred through different knowledge transfer mechanisms, such as labor mobility, social networking, entrepreneurial spinoffs and the diversification of firms (see Boschma and Frenken, 2011). On the other hand, if product competition is high between regions within a country, a large density at the national level on a specific product may operate as a barrier for the specialization on that product in a particular region. If distance between regions difficult the transfer of capabilities and encourage product competition, the discrepancies between our results and the results obtained by Boschma *et al* (2012) could be explained by the large differences in the size between US states and Spanish provinces (NUTS3 regions), and thus, the large differences in distances between regions within US and within Spain. For illustrative purposes, the US state with the largest area is Texas, with 695,662 square kilometers, which is 1.4 times the total area of Spain and almost 32 times the area of the Spanish province with the largest area.

Table 2.

	Equation 3 (state density)		Equation 4 (state density)		Equation 3 (state and country density)		Equation 4 (state and country density)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$x_{i,s,t}$	0.4586*** (0.0080)	-	0.4599*** (0.0076)	-	0.4573*** (0.0079)	-	0.4564*** (0.0076)	-
Log($RCA_{i,s,t}$)	-	0.1336*** (0.0036)	-	0.1339*** (0.0034)	-	0.1332*** (0.0036)	-	0.1331*** (0.0035)
$Density_{i,s,t}$	0.1022*** (0.0117)	0.0870*** (0.0130)	-	-	0.0932*** (0.0099)	0.0777*** (0.0110)	-	-
$(1\text{-}x_{i,s,t}) \times Density_{i,s,t}$	-	-	0.1036*** (0.0119)	0.0884*** (0.0128)	-	-	0.0835*** (0.0139)	0.0701*** (0.0247)
$X_{i,s,t} \times Density_{i,s,t}$	-	-	0.0872*** (0.0159)	0.0727*** (0.0267)	-	-	0.0916*** (0.0096)	0.0751*** (0.0103)
$USdensity_{i,s,t}$	-	-	-	-	-0.5325*** (0.0588)	-0.5534*** (0.0797)	-	-
$(1\text{-}x_{i,s,t}) \times USdensity_{i,s,t}$	-	-	-	-	-	-	-0.5453*** (0.0607)	-0.5664*** (0.0829)
$x_{i,s,t} \times USdensity_{i,s,t}$	-	-	-	-	-	-	-0.5083*** (0.0612)	-0.5182*** (0.0842)
Nº	511,756	511,756	511,756	511,756	511,756	511,756	511,756	511,756
R^2	0.35	0.36	0.35	0.36	0.35	0.36	0.35	0.36

Notes: State-clustered standard errors are in parentheses. All models include state-period and product period dummy variables. All models were estimated by the stata routine of Guimaraes and Portugal (2010). Statistical significance is indicated by a single asterisk (*) at 10%, a double asterisk (**) at 5% and by three asterisk (***) at 1%.

Density, product diversification and the initial level of specialization

In order to focus the analysis on the effect of current industrial structure on the development of comparative advantage on only those products that, either were not initially exported, or were exported without comparative advantage, we exclude now all those products with comparative advantage at the initial of each 5-year period. Similar to equation (3), we propose the following equation,

$$x_{i,s,t+5} = \alpha + \gamma Log(RCA_{i,s,t}) + \beta density_{i,s,t} + \delta_{i,t} + \delta_{s,t} + \varepsilon_{i,s,t} \tag{5}$$

where again, we computed the Log($RCA_{i,s,t}$) variable using RCA+0.1 for all observations in order to preserve those products that were not exported at the initial of each 5-year period.

Furthermore, and in order to distinguish between the effect of current industrial structure on the specialization of those products that were initially exported without comparative advantage, from the development of new products that were not initially exported, we also estimated the following equation,

$$x_{i,s,t+5} = \alpha + \gamma Log(RCA_{i,s,t}) + \beta_1(1 - z_{i,s,t})density_{i,s,t} + \beta_2 z_{i,s,t} density_{i,s,t} + \delta_{i,t} + \delta_{s,t} + \varepsilon_{i,s,t} \tag{6}$$

where $z_{i,s,t+5}$ takes value 1 if state *s* exports product *i* at time *t* and 0 otherwise. In this case, the parameter β_1 indicates the impact of density on the development of new products with comparative advantage that were not exported at the beginning of each five-years period, while β_2 reflects the effect of density on the specialization of those products that were initially exported without comparative advantage.

The estimation results of equation (5) are presented on column (1) of table 3. Similar to our initial results on table 2, we found that density at the state level favors the development of new products with comparative advantage. The parameter estimate for the density variable is positive and significant, but its magnitude is considerable lower compared with the reported results on column (4) of table 2. The point estimate suggest now, that a one standard deviation increase in density at the state level, increases the probability of developing a product with comparative advantage during a five-year period in 1.4 percentage points. The estimation results of equation (6) reported on column (2), indicate that the effect of density is larger for those products that were being already exported at the beginning of the period than for those that were not being exported. The results indicate that, a one standard deviation increase in density, raises the probability of developing a comparative advantage in 1.4 percentage points and 2.1 percentage points for those products that were no t exported at the beginning of the period and for those that were exported without a comparative advantage respectively.

To further investigate the effect of density on the development of new products depending upon the initial level of specialization, we also estimated the following equation,

$$x_{i,s,t+5} = \alpha + \sum_{j=2}^{6} \gamma_j DRCA_{j,i,s,t} + \sum_{j=2}^{6} \beta_j DRCA_{j,i,s,t} density_{i,s,t} + \delta_{i,t} + \delta_{s,t} + \varepsilon_{i,s,t} \qquad (7)$$

where,

$$\begin{aligned} DRCA_{2,i,s,t} &= 1 \quad if \quad 0 < RCA_{i,s,t} \leq 0.2 \quad and \quad 0 \quad otherwise \\ DRCA_{3,i,s,t} &= 1 \quad if \quad 0.2 < RCA_{i,s,t} \leq 0.4 \quad and \quad 0 \quad otherwise \\ DRCA_{4,i,s,t} &= 1 \quad if \quad 0.4 < RCA_{i,s,t} \leq 0.6 \quad and \quad 0 \quad otherwise \\ DRCA_{5,i,s,t} &= 1 \quad if \quad 0.6 < RCA_{i,s,t} \leq 0.8 \quad and \quad 0 \quad otherwise \\ DRCA_{6,i,s,t} &= 1 \quad if \quad 0.8 < RCA_{i,s,t} < 1 \quad and \quad 0 \quad otherwise \end{aligned} \qquad (8)$$

Thus, the parameter γ_j captures the effect of having a comparative advantage on the *j* interval at the beginning of the period in product *p*, to the probability of developing a comparative advantage five years later, relative to those products that were not initially being exported. The parameter *βj* indicates the contribution of state density at the beginning of the period on the probability of developing a comparative advantage five years later in a product with an initial comparative advantage on the *j* interval, relative to those products not exported.

Once more, the reported results on column (3) of table 3, shows the large impact of the initial level of specialization in the process of product diversification. For example, a product with a low level of specialization at the beginning of the period (0 < RCA ≤ 0.2) have a probability of developing a comparative advantage of 1.6 percentage points higher than a product not being initially exported, while for a product with a larger level of specialization (0.8 ≤ RCA ≤ 1) the probability is of 26 percentage points higher. More interestingly, the results indicate that those products with low levels of specialization (0 < RCA ≤ 0.2 and 0.2 < RCA ≤ 0.4), benefit more from the current industrial structure at the state level, than those products that either are not being initially exported or either are exported with higher levels of specialization (RCA > 0.4). In particular, a one standard deviation increase in density for those products in the interval 0 < RCA ≤ 0.2 and 0.2 < RCA ≤ 0.4, increases the probability of developing a comparative advantage in 0.5 and 1.2 percentage points respectively, relative to those products that were not initially being exported.

Table 3.

	Equation (5)	Equation (6)	Equation (7)
	(1)	(2)	(3)
Log(RCA_t)	0.0864*** (0.0025)	0.0863*** (0.0025)	-
$Density_{i,s,t}$	0.0143** (0.0057)	-	-
$(1 - z_{i,s,t})\times Density_{i,s,t}$	-	0.0138*** (0.0025)	-
$z_{i,s,t}\times Density_{i,s,t}$	-	0.0206*** (0.0025)	-
$DRCA_{2,i,s,t}$	-	-	0.0159*** (0.0015)
$DRCA_{3,i,s,t}$	-	-	0.0731*** (0.0025)
$DRCA_{4,i,s,t}$	-	-	0.1301*** (0.0042)
$DRCA_{5,i,s,t}$	-	-	0.1942*** (0.0055)
$DRCA_{6,i,s,t}$	-	-	0.2630*** (0.0082)
$DRCA_{2,i,s,t}\times Density_{i,s,t}$	-	-	0.0049*** (0.0017)
$DRCA_{3,i,s,t}\times Density_{i,s,t}$	-	-	0.0116*** (0.0028)
$DRCA_{4,i,s,t}\times Density_{i,s,t}$	-	-	0.0036 (0.0053)
$DRCA_{5,i,s,t}\times Density_{i,s,t}$	-	-	0.0086 (0.0057)
$DRCA_{6,i,s,t}\times Density_{i,s,t}$	-	-	0.0062 (0.0092)
Nº	450,049	450,049	450,049
R^2	0.13	0.13	0.14

Notes: State-clustered standard errors are in parentheses. All models include state-period and product-period dummy variables. All models were estimated by the stata routine of Guimaraes and Portugal (2010). Statistical significance is indicated by a single asterisk (*) at 10%, a double asterisk (**) at 5% and by three asterisk (***) at 1%.

4. Conclusions

In this article, and following previous work by Hausman and Klinger (2007) and Boschma *et al* (2012), we investigated the effect of current industrial structure on product diversification for the US at the state level. To measure product relatedness we used the proximity index proposed by Hidalgo *et al* (2007), and we constructed a density measure, following Hausman and Klinger (2007), which captures the degree of relatedness between each state current industrial structure and exported product. Our main results can be summarized as follows.

First, our results corroborate previous findings of the important role of preexisting economic activities on product diversification. We present robust evidence for the fact, that US states diversify into new products that are related to the existing set of products were states present a high level of specialization. This suggest that, in the development of new products at the state level, use is made of existing capabilities from current industries, that may be transferred through different knowledge transfer mechanisms, such as labor mobility, social networking, entrepreneurial spinoffs and the diversification of firms (see Boschma and Frenken, 2011). Also, we found that current industrial structure has a positive and significant effect in preventing states from product abandonment.

Second, the obtained results for the US indicate that current industrial structure at the national level has a large negative effect on product diversification at the state level. This finding is contrary to the results in Boschma *et al* (2012) for the Spanish regions, where current industrial structure at the country level seems to have a positive effect on product diversification at the regional level. This suggest that contrary to the Spanish case, in the US, the mechanisms through which capabilities are transferred between new and existing products operate only at the regional level and a high level of product competition between states exists. Our view is that distance operates as a barrier to the process of capabilities transfers, and thus the large differences in distance between states within the US and between provinces within Spain maybe a plausible explanation for the different results.

Third, when we focus our analysis only on the development of new products (products that either are not being exported or are exported without a comparative advantage) we found that the effect of available capabilities at the state level on product diversification, depends on the initial level of product specialization measured by its level of Revealed Comparative Advantage. Specifically we found that those products with a low level of specialization ($0 < RCA \leq 0.2$ and $0.2 < RCA \leq 0.4$) benefit more from available capabilities, than those products that are not being initially exported and from those products with higher levels of specialization (RCA > 0.4).

From a policy point of view, the applied methodology and the presented results allows to identify the set of products in which a region is more likely to diversify to, and thus determine the products that it will be able to make in the future. Thus, the promotion at the regional level of available capabilities may accelerate the process of development of new and specific economic activities. However and to date, little is known about the mechanisms through which capabilities are transferred between new and existing products, and which of the available capabilities (infrastructures, skills, institutions, social and entrepreneurship networks among others) play a major role on the development of new products. From our point of view, future research is needed on these two specific points, in order to facilitate the design of policies to promote the development of new economic activities.

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