European and Latin American Emerging Markets and Chinese Competition: an empirical analysis of the manufacturing labor demand

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Abstract

The present paper, by estimating the impact of foreign trade with China on Brazil's and Turkey's industrial labor demand and by the use of an empirical econometric model and a dynamic panel data at the industry level, attempts to estimate whether an effect exists between domestic labor demand and import penetration from China. Results suggest that trade with China does not show any robust effect on industrial employment in Brazil and Turkey, this is why no conclusive evidence can be reached, at a more general result, concerning all manufacturing sectors considered as a whole. However, empirical results show a negative and statistically significant effect when considering Brazil's labor-intensive sectors; this result leads us to think that a negative effect between imports from China and labor intensity in Brazil exists, especially in those sectors where labor is referred to as the primary input in the production process.

Key words: *China, Latin America, Turkey, Brazil, Trade, Labor Demand, Employment, Import Penetration*

JEL Classification*: *F14, F16, L60

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1. Introduction

Asian and other developing countries (BRICS) represent the most dynamic areas of the planet, in this new millennium that has experienced a deep change in the world labor market division. Just a few years ago, these countries were in a “developing condition”, while nowadays, they are referred to as the ones experiencing the highest economic growth rates worldwide.

China, the largest countries in the world in terms of population, plays a relevant role in the global economy, due to the deep penetration of its imports, in particular in the manufacturing sector. The striking feature is that Chinese outstanding growth rate led to a different world scenario, somehow threatened by the tough competition coming from this country.

Since the early 1990s, imports from China increased at comparable rates in both the United States and the European Union, and slightly more slowly in Japan. This phenomenon is a consequence of the increasing use of offshore procurement of manufacturing goods or manufacturing offshoring by industrialized countries’ firms.

The aim of this paper is to evaluate the competition effect of imports coming from China on the domestic labor demand in two emerging countries, respectively Brazil and Turkey. In this context, the purpose of this paper is to discover whether the degree of import penetration from China has a positive or negative impact on the level of domestic employment in the manufacturing sector, through the use of an econometric model and a dynamic panel data at the industry level, which makes use of industrial data collected both from the IBGE for Brazil and from TurkStat for Turkey, and commercial data collected from the UN Comtrade database for both countries; please refer to section 3 of the present paper in order to have a comprehensive explanation of the origin and the nature of the data used in the empirical model presented.

The question of whether import penetration from China in the manufacturing sector generates a competition effect with respect to the local labor force, naturally arises from the fact that Brazil, Turkey and China has similar comparative advantages, even if they do not perform their trading activity on the same markets and both the Brazilian and the Turkish manufacturing sector is increasingly affected by Chinese imports in the time frame considered, especially as far as labor-intensive sectors of production are concerned.

It deserves some attention the fact that this empirical paper can be referred to as the first contribution in this strand of literature aimed at analyzing whether the manufacturing sector of two emerging countries such as Brazil and Turkey suffers from Chinese imported goods, by also taking into account the presence of a certain degree of heterogeneity of this impact, linked to the degree of labor intensity present in the different manufacturing sectors.
This work is structured as follows: the following section 2 reviews the relevant literature concerning the impact of trade on the level of employment; section 3 shows the source of the dynamic panel data used in the econometric regressions, the methods used in the import penetration variable construction and the main descriptive evidence of the phenomenon of imports from China for both Brazil and Turkey; section 4 illustrates the empirical strategy performed and addresses the estimation issues. Finally, section 5 and section 6 highlight, respectively, the main results and conclusions reached by the present empirical paper.

2. Review of the Literature

From a theoretical point of view, it is reasonable to think that trade has an impact on the employment level both across and within sectors. However, a rigorous theoretical background always has to be backed by sound empirical evidence and, in the context of this paper, empirical research concerning the effect of trade on the level of employment has found little evidence, especially when taking into account developing countries. Hoekman and Winters (2005) developed an empirical work trying to shed light on the effects of trade on employment.

Currie and Harrison (1997) conducted a study by using industrial data from Morocco and found that the impact of trade liberalization on employment is small in that region. Other relevant empirical works include the one conducted by Revenga (1997) who did not discover any significant relation, from a statistical point of view, between employment and trade reforms or reduction of tariff barriers in Mexico. In 1997, Gustavo Márquez and Carmen Pages examined the impact that trade liberalizations and economic reforms had on employment in Latin America and the Caribbean and could not find any relevant and statistically significant impact. In 2003, David De Ferranti, Guillermo Perry, Daniel Lederman and Maloney found the same result for countries belonging to Latin America and the Caribbean. Similarly, Haltiwanger et al. (2004) did not come to any statistically significant result concerning the relationship between trade liberalization and shifts in the level of employment in Colombia.

Therefore, empirical evidence presented in the works conducted is not conclusive with respect to this field of literature, and still has to be deepened. This paper is not attempting to answer to the question about which trade policies may be implemented or is not trying to analyze the advantages and disadvantages of one policy with respect to another, but rather it is focused on the issue of understanding whether trade with China can explain shifts in the labor demand of two emerging markets represented by Brazil and Turkey.

3. Data Sources and Descriptive Evidence

This paper uses two main categories of data: commercial and industrial data, all expressed in US dollars.
As far as Brazil is concerned, industrial data have been collected from the *Instituto Brasileiro de Geografia e Estatistica (IBGE),* which is considered as the agency responsible for statistical and other types of information in Brazil. These industrial data span from 1996 to 2009 and consider the manufacturing sector with 2 digit and have been converted from CNAE classification, according to section D of the NACE Rev 1.1 classification, which is the statistical classification of economic activities in the European Community. These data include the number of people employed, the wages earned, the value of production and that of the capital stock across all manufacturing sectors according to the time window taken into account.
As far as Turkey is concerned, industrial data were collected from the *Turkish Statistical Institute (TurkStat),* which is the Turkish government agency accountable for producing official statistics about Turkey, covering several fields including its population, resources, economy, society and culture. These industrial data span from 2003 to 2008 and consider the manufacturing sector with 3 digit, according to section D of the NACE Rev 1.1 classification, in order to have a more robust estimation due to the presence of more observations used in the econometric model. These data include the number of people employed, the wages earned, the value of production, the total value of gross investment in tangible goods as a proxy for the capital stock, the producer price index across all manufacturing sectors according to the time window taken into account.
Commercial and trade data for both countries have been collected from the *World Integrated Trade Solution (WITS)* which is a software developed by the World Bank, in close collaboration and consultation with various International Organizations including United Nations Conference on Trade and Development (UNCTAD), International Trade Center (ITC), United Nations Statistical Division (UNSD) and World Trade Organization (WTO). WITS allows to access to the UN Comtrade database, from which I mainly collected trade data concerning exports and imports, by detailed commodity and partner country. These data are about imports and exports of both Brazil and Turkey from and to all countries (All), China (CHN), High Income OECD countries (hiOECD), Low and Middle Income East Asian and Pacific countries

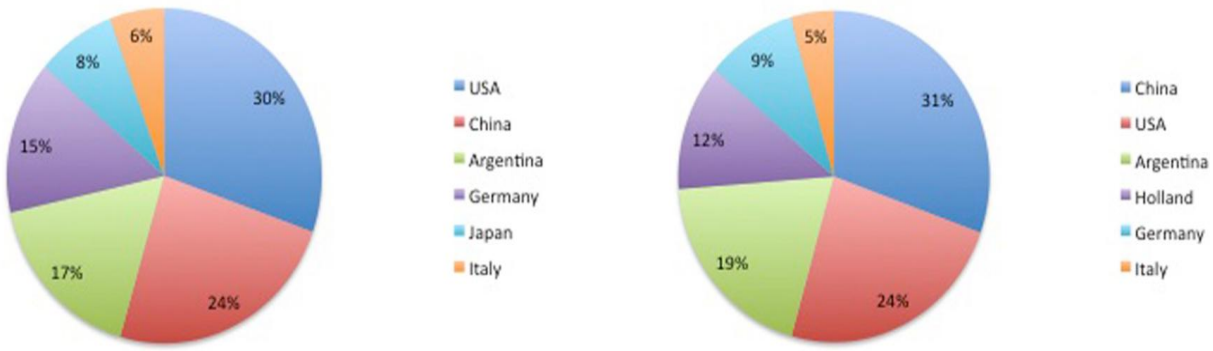
(LDCEAP), Low and Middle Income Latin America and Caribbean (LDCLAC), Low and Middle Income Middle East and North Africa (LDCMNA), Low and Middle Income South Asian countries (LDCSAsia) and Low and Middle Income Economies (lmincome).
All commercial data from WITS were already expressed in US dollars when collected from the database, whereas Brazilian data taken from IBGE and expressed in Brazilian real and Turkish yearly data taken from TurkStat and expressed in the Turkish lira have been converted using the 31st December's exchange rate for every year considered in the database.

Import Penetration Variable	
$\boldsymbol{imppen\_all_{s,t}}$	[Imports from all countries / (Imports from all countries + Value of Production expressed in US dollars)]
$\boldsymbol{imppen\_hi_{s,t}}$	[Imports from high income countries / (Imports from all countries + Value of Production expressed in US dollars)]
$\boldsymbol{imppen\_lmi_{s,t}}$	[Imports from low and middle income countries / (Imports from all countries + Value of Production expressed in US dollars)]
$\boldsymbol{imppen\_chn_{s,t}}$	[Imports from China / (Imports from all countries + Value of Production expressed in US dollars)]

Within the countries composing the BRICS, Brazil is the one which has experienced the highest growth rates in the last decade, as far as foreign trade is concerned (+30% from 2000 to 2008). Also in 2009, despite the international financial crisis, the Brazilian economy experienced only a 24% reduction in foreign trade with respect to

2008, whereas in 2010 (GDP +7,5%) Brazil underwent a strong recovery (+36,6% y/y), leading foreign trade to the highest absolute values in the Brazilian history. The main commercial partners of Brazil are China (12,9%), the United States (12,8%) and Argentina (8.6%), relying on the data stemming from year 2009, as Figure 1 shown below clearly highlights.

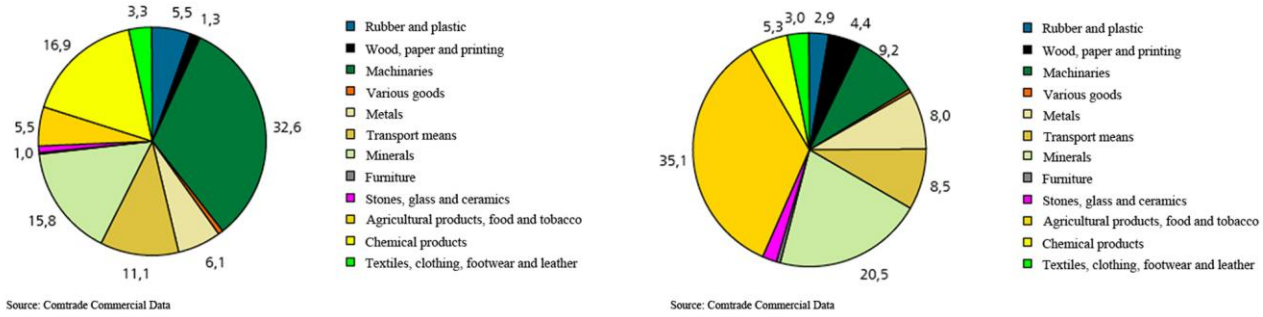
Figure 1: Brazilian Import (left) and Export (right) Shares by commercial partner in 2009



Source: Comtrade Commercial Data

In Brazil, the main industrial sectors are the ones linked with food transformation, the production of bio-carburant, of vehicles (mechanical sector), crude oil extraction and refinement, the crafting of metals and minerals.
Brazilian imports are mainly represented by capital goods, energetic minerals and chemical products, while exports are mainly composed of agricultural products (aimed at feeding and producing biologic carburant), followed by energetic and non-energetic minerals, machineries, transport means and metals, as Figure 2 shown below highlights.

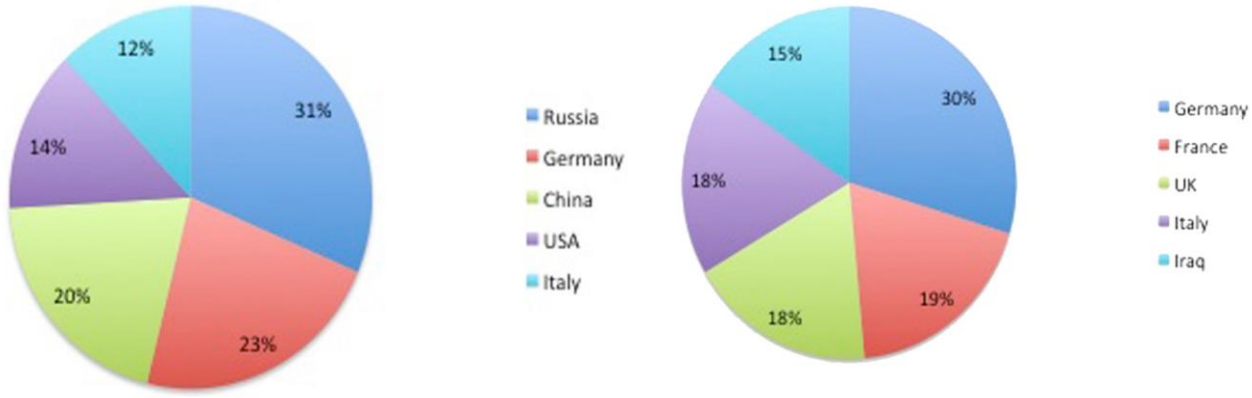
Figure 2: Brazilian Import (left) and Export (right) Shares by economic activity in 2009



Source: Comtrade Commercial Data

Among the European countries which have experienced the highest economic growth rates, Turkey plays an important role, even if it was negatively affected, as well as Brazil, by the international commercial crisis in 2009; this led to a decrease of 37% in foreign trade, whereas in 2010 (GDP +8,9%), the Turkish economy underwent a strong recovery in this sector, experiencing an increase of 40% with respect to the previous year.
The main commercial partners of Turkey in Europe is Germany both on the import and the export side, whereas outside the European boundaries the main partners are represented by Russia and China (main suppliers of energetic raw materials and manufactures) and other middle Asian countries (Iraq, Iran, United Arab Emirates and Saudi Arabia), as shown below in Figure 3.

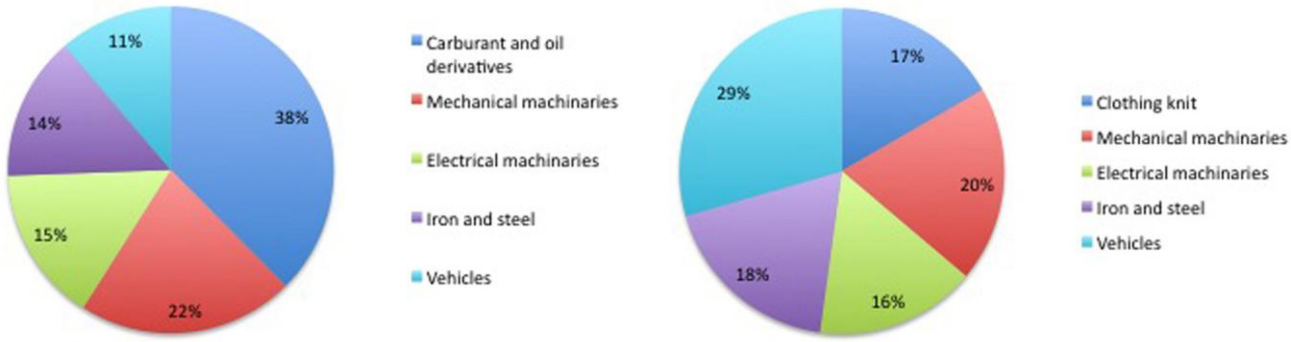
Figure 3: Turkish Import (left) and Export (right) Shares by commercial partner in 2009



Source: Comtrade Commercial Data

In Turkey, the main industrial sectors are the ones linked with metal crafting, food transformation, transport means, chemicals, crude oil refinement and machineries, with manufacturing accounting for 26%, agriculture for 9% and services for 65%.
Turkish imports are mainly represented by carburant, energetic products and metals, while exports are mainly composed of textiles and apparel, besides basic manufactures, transport means and finished food products, as you can note by observing Figure 4 shown below.

Figure 4: Turkish Import (left) and Export (right) Shares by economic activity in 2009



Source: Comtrade Commercial Data

The below-shown Tables 1, 2 and 3 depict the average degree of import penetration both across all manufacturing sectors and considering the distinction between labor and capital-intensive sectors of production in both Brazil and Turkey, in particular highlighting its variation over the time frame considered in the estimation. The below-shown Figures are relevant since, together with empirical results coming from the regressions performed, they provide interesting descriptive evidence concerning the impact of import penetration from China and the dynamics that this paper is trying to analyze.

Table 1: Average Degree of Import Penetration in Brazil and Turkey – All Manufacturing Sectors

All Manufacturing Sectors				
	Brazil		***Turkey***	
	1996	Var%1996/2009	2003	Var%2003/2008
imppen_all	20,02%	-9,27%	85,66%	-5,20%
imppen_chn	0,64%	210,00%	10,26%	-87,36%
imppen_hi	12,09%	-50,69%	59,73%	-21,53%
imppen_lmi	6,87%	-43,29%	19,07%	62,09%

Source: Comtrade Commercial Data, IBGE and TurkStat Industrial Data

Table 2: Average Degree of Import Penetration in Brazil and Turkey – Labor-intensive Sectors

Labour intensive Sectors				
	Brazil		***Turkey***	
	1996	Var%1996/2009	2003	Var%2003/2008
imppen_all	14,29%	-6,25%	70,54%	21,13%
imppen_chn	0,70%	213,60%	7,43%	241,63%
imppen_hi	8,26%	-22,50%	44,87%	-1,85%
imppen_lmi	2,90%	36,43%	14,94%	191,28%

Source: Comtrade Commercial Data, IBGE and TurkStat Industrial Data

Table 3: Average Degree of Import Penetration in Brazil and Turkey – Capital-intensive Sectors

Capital intensive Sectors				
	Brazil		Turkey	
	1996	Var%1996/2009	2003	Var%2003/2008
imppen_all	28,80%	-73,25%	109,69%	-40,64%
imppen_chn	0,47%	193,91%	12,22%	-33,06%
imppen_hi	15,90%	-76,35%	79,32%	-38,37%
imppen_lmi	18,01%	-79,20%	26,40%	-40,23%

Source: Comtrade Commercial Data, IBGE and TurkStat Industrial Data

From the above-illustrated Tables, highlighting descriptive evidence of the variation of the degree of import penetration on the two emerging countries considered, it is relevant to notice, in Table 2, the increasing relevance of import penetration from China in the labor-intensive sectors for both Brazil (+213,60%, Var%1996/2009) and Turkey (+241,63%, Var%2003/2008), differently from what happens if other originating countries are considered. It also deserves some attention the explosive degree of import penetration from low and middle income countries in the labor-intensive sectors of Turkey (+191,28%, Var%2003/2008), as you can clearly observe in Table 2, and that of Brazil from China in the capital-intensive sectors (+193,91%, Var%1996/2009), as illustrated in Table 3.

It is important to point out that the distinction between labor and capital-intensive manufacturing sectors has been assessed by computing the median of the capital-to-labor ratio.

4. The Empirical Model and Estimation Issues

In order to analyze the impact of import penetration from China in the manufacturing sectors considered according to the NACE Rev. 1.1 classification of economic activities, the empirical strategy performed in this working paper makes extensive use of the below-shown equation, which represents the basic equation in the estimation of this empirical model for the dynamic panel data considered.

$$ln\, l_{s,t} = \alpha_0 + \alpha_1 ln\, l_{t-1} + \alpha_2 ln\, w_{s,t} + \beta\, ln\, y_{s,t} + \gamma\, ln\, ky_{s,t} + \mu\, D_t + \delta\, expshare_{s,t} + \varphi\, imppen_{s,t} + \varepsilon_{s,t}$$

As shown above, the regression equation performed using the statistical software package STATA includes the presence of time dummies, which not only capture the effect of the time trend, but also any general trade reforms that may have occurred, any movement in the exchange rate or, more generally, any macroeconomic shock occurred in the time frame considered.
In this paper, the interest is mainly focused on capturing the impact that Brazil's and Turkey's commercial trade with China had on the level of employment in the manufacturing sector, and several regressions have been carried out, each including a different set of explanatory variables in order to avoid collinearity problems in the estimation.
The independent variables that are common to all the different regressions performed in this paper are the ones indicating the log of labor demand *(l)* as the dependent variable, and, as independent variables, we include the first lag of the log of labor demand *(l_{t-1})*, the log of unitary wages and salaries *(w)*, the log of the value of production *(y)*, the amount of capital intensity *(ky)*, computed by the difference between the log of capital stock *(k)* minus the log of the value of production *(y)*, aimed at highlighting the relative stock of capital with respect to the dimension of the specific sector under consideration, and the value of export share of Brazil and Turkey to all countries *(expshare)*.

Taking into account the above-mentioned independent variables, always present in the estimations, we performed three different types of regressions. A first one, denoted as *Regression (1)* in the Tables shown in section 5, includes the value of import penetration from all the countries, variable denoted by *imppen_all*.
A second regression, denoted as *Regression (2)* in the Tables, comprises the value of import penetration from high-income countries *(imppen_hi)* and the amount from low and middle income ones *(imppen_lmi).* Finally, a third regression, denoted as *Regression (3)* in the Tables, includes the value of import penetration from high-income countries *(imppen_hi)* and the amount from China *(imppen_chn)*, with the aim to adopt a general-to-specific approach and isolate the impact of imports from China on manufacturing employment in the two countries considered. Analogously, the same procedure is executed with respect to both Brazil and Turkey.
The econometric tools necessary to develop this dynamic panel data model are represented by the *pooled ordinary least squares (OLS)* method, aimed at estimating the unknown parameters in this linear regression model, a *fixed effects model* for panel data, which assists us in controlling for unobserved heterogeneity when this heterogeneity is constant over time and correlated with the independent variables, and a *generalized methods of moments (GMM)* estimation, the latter introduced by L. Hansen in his celebrated 1982 paper. It is important to highlight that the GMM represents our preferred estimator, not only because it represents the most suitable for the estimation of a dynamic panel data model, but also because it accounts for the endogeneity of our right-hand side variables, instrumenting their differences and levels by means of their past differences and levels, respectively. It is widely known that the prevalence of endogenous regressors in economics makes it imperative to be able to deal with the phenomenon referred to as *endogeneity bias*, as, in many important applications, the orthogonality condition is not satisfied, thus making the OLS estimator become even inconsistent. In this context, we define a regressor to be endogenous if it is not predetermined, i.e. not orthogonal to the error term; therefore, when the equation includes the presence of an intercept, the orthogonality condition is violated and hence the regressor is endogenous if and only if the regressor is correlated with the error term. Moreover, the *generalized methods of moments (GMM)* estimator, which includes OLS as special case, satisfies the properties of consistency, asymptotic normality and

efficiency by minimizing the asymptotic variance through the optimal choice of the weighting matrix.

Firstly, all manufacturing sectors have been considered, without considering any distinction between capital-intensive and labor-intensive ones, as shown in Table 4 and Table 5, respectively. Table 4 and Table 5 depict the estimation, for both Brazil and Turkey, of the impact on labor demand stemming from the degree of import penetration from all the countries in *Regression (1)*, while *Regression (2)* considers a further distinction between the import penetration from high-income and that from low and middle income countries and, finally, *Regression (3)* highlights the estimates when going further into detail, by considering not only the rate of import penetration from high-income countries, but also its value from China. In other words, the more you read the two Tables from left to right, the more you go deeper into detail, from considering the degree of import penetration from all countries to considering the one coming from China.

Table 6, 7 and 8 deepen the analysis of this impact by adding a further distinction and splitting the sectors into two main categories: the labor-intensive and the capital-intensive ones. Regarding Turkey, it was possible to consider both types of sub-categories by considering sectors according to a 3-digit approach, thus augmenting the number of the observations used in the estimation. It was not possible to perform the same approach for Brazil, since the observations obtained by taking into account 2-digit sectors did not allow to perform a robust analysis when considering only capital-intensive manufacturing sectors. A further development of this empirical paper could be represented by considering 3-digit sectors also for Brazil; this is why in the Tables presented only the Brazilian labor-intensive sectors have been used in the estimation.

5. Results

The results coming from the econometric regressions performed in Table 4 and Table 5 suggest that it is not possible to affirm that the degree of import penetration from China strongly affects the level of labor intensity in the two countries considered. More precisely, only when performing a fixed effect model, a statistically significant relation between import penetration and labor demand comes out, and it is likely to be positive with a fixed effects estimator equal to 0.349, as shown in Table 4. This may suggests that, in some cases, the degree of import penetration from China could slightly increase the level of employment due to the openness to new markets and new products which are suitable for domestic consumers. In all the other cases, the correlation turns out to be negative, but the regression coefficients do not show up as statistically significant, and this is why no conclusive evidence can be reached, at a more general result concerning all manufacturing sectors considered as a whole. It is relevant to remember that, in this analysis, the degree of import penetration takes into account both final and intermediate goods together.

From this empirical paper it also comes out that, when deepening the analysis by considering a further distinction between labor and capital-intensive manufacturing sectors, results are likely to improve for Brazil. In particular, if the attention is restricted to Table 6, 7 and 8, we notice how Turkey is not statistically affected from the degree of import penetration, even if a distinction between labor and capital-intensive manufacturing sectors is made, except for the import penetration from low and middle income countries, for which the coefficient, equal to -0,667**, turns out to statistically significant and negatively correlated with the labor demand, as depicted in Table 7. On the contrary, when considering Brazil's labor-intensive sectors, we find out a negative and statistically significant coefficient equal to a value of -2,338*; this result leads us to think that a negative correlation between imports from China and labor intensity exists for this country, especially in those sectors where labor is referred to as the primary input in the production process. As stated before, in this paper the dynamic model with Brazilian capital-intensive sectors of production has not been carried out due to the absence of a significant amount of observations and the consideration of 2-digit manufacturing sectors.

Unexpectedly from the empirical estimates, significant and robust results have been reached as far as the export share to all countries is concerned. From Table 4, it is possible to notice that the export share to all countries is significantly negatively correlated to the level of labor demand; this result can be interpreted in a way that suggests us that, when the degree of exports increases, Brazilian producers tend to move away from labor as the primary input, in search for alternative means in the production process. Same results have been also reached when considering both labor-intensive manufacturing sectors in Brazil and Turkey, as depicted in Table 6 and 8, suggesting the same above-mentioned possible explanation. In capital-intensive sectors of Turkey, on the contrary, the degree of correlation between the export share and the level of employment is strongly positive and this appears as a robust result when observing Table 7 in detail.
It is interesting to notice, from Table 4 and Table 8, that Brazil's labor demand in all sectors is significantly and positively affected by the degree of import penetration from high income countries; this suggests us that the more the Brazilian economy is open to new markets already present in high income countries, the more the Brazilian employment is likely to rise due to increasing needs of Brazilian consumers. In Turkey, it deserves some attention the fact that, considering all manufacturing sectors, the level of import penetration from China decreased over the period stemming from 2003 to 2008 (please refer to Table 1, page 9), while we observe a surge in the degree of import penetration from low and middle income economies and this is why we notice a statistically significant negative coefficient in Table 7.
Moreover, by observing the above-mentioned Tables, it is possible to notice that all the other independent variables considered in the dynamic panel data appear to have a statistically significant impact on the level of labor demand, highlighting a statistically significant and positive correlation between employment and the first lag of the log of labor demand *(l_{t-1}),* the log of the value of production *(y)* and the log of the value of capital intensity *(ky),* the latter only in Brazilian and Turkish labor-intensive manufacturing sectors; according to my expectations, a statistically significant and negative correlation is always found between the level of wages and salaries and the conditional labor demand for both countries.

Table 4: Brazil Estimation

	Regression (1)			*Regression (2)*			*Regression (3)*		
	OLS	**FE**	**GMM-SYS**	**OLS**	**FE**	**GMM-SYS**	**OLS**	**FE**	**GMM-SYS**
l_{t-1}	0.912***	0.355***	0.880***	0.904***	0.345***	0.838***	0.908***	0.336***	0.848***
	[0.0140]	[0.0791]	[0.0491]	[0.0142]	[0.0825]	[0.0487]	[0.0139]	[0.0819]	[0.0475]
w	-0.0902***	-0.257***	-0,0653	-0.104***	-0.254***	-0.108*	-0.105***	-0.264***	-0.109*
	[0.0198]	[0.0870]	[0.0718]	[0.0189]	[0.0873]	[0.0641]	[0.0194]	[0.0878]	[0.0609]
ky	0.0316***	0.0337**	-0,00392	0.0280***	0.0328**	0,00998	0.0296***	0.0318**	0,018
	[0.0104]	[0.0156]	[0.0412]	[0.0102]	[0.0155]	[0.0326]	[0.0107]	[0.0154]	[0.0355]
y	0.0694***	0.361***	0.0764*	0.0746***	0.352***	0.119***	0.0762***	0.352***	0.113***
	[0.0127]	[0.0772]	[0.0463]	[0.0125]	[0.0777]	[0.0460]	[0.0126]	[0.0766]	[0.0429]
imppen_hi				0.102**	-0,123	0,13	0.107***	-0,118	0,147
				[0.0394]	[0.279]	[0.140]	[0.0393]	[0.279]	[0.152]
imppen_lmi				-0,116	0,225	-0,182			
				[0.0724]	[0.157]	[0.137]			
imppen_all	0,0236	0,0692	-0,0195						
	[0.0344]	[0.142]	[0.145]						
imppen_chn							-0,00744	0.349**	-0,15
							[0.0967]	[0.175]	[0.180]
expshare	-0,007	-0.214**	-0,0507	-0,00968	-0.209**	-0,0708	-0,0142	-0.208**	-0,082
	[0.0489]	[0.0915]	[0.0795]	[0.0513]	[0.0811]	[0.0716]	[0.0472]	[0.0819]	[0.0714]
Constant	0.314*	1,054	0,184	0.397**	1,349	0,0871	0.330*	1,512	0,163
	[0.186]	[1.578]	[0.421]	[0.182]	[1.627]	[0.414]	[0.187]	[1.614]	[0.509]
Observations	413	413	413	413	413	413	413	413	413
R-squared	0,989	0,697		0,99	0,7		0,99	0,702	
Number of code		88	88		88	88		88	88
AR1				0,00		0,00			0,00
AR2				0,05		0,06			0,05
HANSEN				0,43		0,52			0,64

Table 5: Turkey Estimation

	Regression (1)			*Regression (2)*			*Regression (3)*		
	OLS	**FE**	**GMM-SYS**	**OLS**	**FE**	**GMM-SYS**	**OLS**	**FE**	**GMM-SYS**
l_{t-1}	0.327***	0.174***	0.287***	0.308***	0.174***	0.284***	0.334***	0.176***	0.299***
	[0.0922]	[0.0542]	[0.0559]	[0.0892]	[0.0537]	[0.0594]	[0.0921]	[0.0545]	[0.0592]
w	-0.932***	-1.097***	-1.009***	-0.955***	-1.108***	-1.003***	-0.924***	-1.092***	-0.972***
	[0.129]	[0.0881]	[0.0689]	[0.125]	[0.0868]	[0.0760]	[0.129]	[0.0941]	[0.0737]
ky	0,00305	-0,0132	0,014	-0,0172	-0,0106	-0,0117	0,011	-0,0153	0,023
	[0.0344]	[0.0316]	[0.0395]	[0.0332]	[0.0317]	[0.0354]	[0.0343]	[0.0317]	[0.0377]
y	0.630***	0.681***	0.681***	0.651***	0.693***	0.686***	0.615***	0.649***	0.647***
	[0.0919]	[0.0608]	[0.0441]	[0.0889]	[0.0575]	[0.0577]	[0.0917]	[0.0569]	[0.0511]
imppen_hi				0,076	0,472	0,0615	0.219**	0,365	0,174
				[0.0993]	[0.682]	[0.241]	[0.0999]	[0.719]	[0.264]
imppen_lmi				1.669***	1.061*	1.950**			
				[0.448]	[0.527]	[0.816]			
expshare	0.0120**	-0.0220*	0.0138*	-0,00903	-0.0263**	-0,0114	0.0156***	-0.0163*	0.0166***
	[0.00556]	[0.0112]	[0.00778]	[0.00708]	[0.00974]	[0.0136]	[0.00550]	[0.00904]	[0.00602]
imppen_all	0.268***	0,588	0,316						
	[0.0975]	[0.508]	[0.263]						
imppen_chn							-1,408	-0,398	-0,738
							[1.046]	[1.435]	[1.236]
Constant	0,341	1.984*	0,365	0,216	1.826*	0,195	0.520*	2.567**	0,758
	[0.255]	[0.968]	[0.532]	[0.260]	[0.927]	[0.478]	[0.290]	[0.911]	[0.632]
Observations	234	234	234	234	234	234	234	234	234
R-squared	0,969	0,951		0,971	0,951		0,969	0,95	
Number of code2d		18	18		18	18		18	18
AR1			0,00			0,00			0,00
AR2			0,52			0,33			0,37
HANSEN			1,00			1,00			1,00

Table 6: Turkey Labor-Intensive Sectors Estimation

	Regression (1)	*Regression (2)*	*Regression (3)*
	GMM-SYS	**GMM-SYS**	**GMM-SYS**
l_{t-1}	0.825***	0.821***	0.831***
	[0.0488]	[0.0472]	[0.0455]
w	-0.153**	-0.167***	-0.168***
	[0.0660]	[0.0646]	[0.0638]
ky	0.0646**	0.0615**	0.0756***
	[0.0276]	[0.0275]	[0.0272]
y	0.135***	0.145***	0.129***
	[0.0415]	[0.0422]	[0.0364]
imppen_hi		-0,00291	-0,0215
		[0.153]	[0.158]
imppen_lmi		-0,0653	
		[0.120]	
expshare	-0.0932***	-0.0938**	-0.116***
	[0.0343]	[0.0368]	[0.0339]
imppen_all	-0,0911		
	[0.131]		
imppen_chn			-0,0905
			[0.151]
Constant	0,475	0,418	0,742
	[0.440]	[0.425]	[0.519]
Observations	254	254	254
R-squared			
Number of code	55	55	55
Robust standard errors in brackets			
***** p<0.01, ** p<0.05, * p<0.1**			
AR1	0,00	0,00	0,00
AR2	0,03	0,03	0,03
HANSEN	0,37	0,62	0,63

Table 7: Turkey Capital-Intensive Sectors Estimation

	Regression (1)	*Regression (2)*	*Regression (3)*
	GMM-SYS	**GMM-SYS**	**GMM-SYS**
l_{t-1}	0.779***	0.803***	0.772***
	[0.0892]	[0.0810]	[0.0822]
w	-0.146**	-0.171**	-0.160***
	[0.0629]	[0.0698]	[0.0606]
ky	0,0252	0,0182	0,00222
	[0.0390]	[0.0403]	[0.0388]
y	0.150*	0,087	0.165**
	[0.0819]	[0.0692]	[0.0689]
imppen_hi		-0,0779	-0,0604
		[0.119]	[0.126]
imppen_lmi		-0.667**	
		[0.319]	
expshare	0.326***	0.275***	0.309***
	[0.0870]	[0.0972]	[0.0949]
imppen_all	-0,098		
	[0.129]		
imppen_chn			-0,163
			[0.156]
Constant	0,323	1.752**	0,161
	[0.729]	[0.884]	[0.673]
Observations	159	159	159
R-squared			
Number of code	33	33	33
***** p<0.01, ** p<0.05, * p<0.1**	c1		
AR1	0,01	0,01	0,01
AR2	0,72	0,80	0,90
HANSEN	0,99	1,00	1,00

Table 8: Brazil Labor-Intensive Sectors Estimation

	Regression (1)	*Regression (2)*	*Regression (3)*
	GMM-SYS	**GMM-SYS**	**GMM-SYS**
l_{t-1}	0.309***	0.329***	0.335***
	[0.102]	[0.102]	[0.111]
w	-0.950***	-0.889***	-0.849***
	[0.177]	[0.174]	[0.175]
ky	-0,0306	-0,0276	-0,0212
	[0.0331]	[0.0326]	[0.0313]
y	0.639***	0.604***	0.570***
	[0.112]	[0.115]	[0.116]
imppen_hi		0,436	0.575**
		[0.272]	[0.274]
imppen_lmi		1,007	
		[1.140]	
imppen_all	0.454*		
	[0.252]		
imppen_chn			-2.338*
			[1.322]
expshare	-0,243	-0,275	-0.379*
	[0.181]	[0.199]	[0.210]
Constant	0,557	0,693	1,194
	[0.685]	[0.743]	[0.799]
Observations	182	182	182
R-squared			
Number of code2d	14	14	14
AR1	0,00	0,00	0,00
AR2	0,08	0,07	0,33
HANSEN	1,00	1,00	1,00

6. Summary and Conclusions

In the recent literature, within the strands dealing with analyzing the impact of openness to trade on the level of employment, this working paper provides evidence of the effects of the degree of import penetration from China on the level of labor intensity in two emerging countries, Brazil and Turkey, taken as representative of two developing economies of Latin America and Europe, respectively, and experiencing outstanding economic growth rates in the last decade. This paper proceeds by estimating the import penetration competition effect on the domestic labor demand by performing several econometric regressions, each with a different set of explanatory variables in order to avoid collinearity problems, according to renown econometric models, such as the *pooled ordinary least squares (OLS)* method, a *fixed effects model* for the dynamic panel data and a *generalized methods of moments (GMM)* estimation. While no statistically significant effect of imports from China on manufacturing employment has been found when considering all sectors together, a robust empirical finding, provided by the present paper, lies in the significance of the negative impact on labor demand stemming from Chinese imports in Brazilian labor-intensive manufacturing sectors. This suggests us that sectors, which are intensive in labor as the primary input in the production process, suffer more in Brazil when the degree of Chinese import penetration concerning manufactured products is significant and relevant. On the contrary, this paper provides evidence that there is no significant impact of Chinese imports on the level of labor demand in Turkey, even if a distinction between labor and capital-intensive manufacturing sectors is made. However, unlike Brazil, the estimates shows us that Turkey is more affected by the degree of import penetration from low and middle income countries.

Moreover, this paper also shed light on the significant and robust results that have been reached as far as the export share to all countries is concerned; from Tables 4, 5, 6, 7 and 8 it is possible to notice that the export share to all countries is significantly negatively correlated to the level of labor demand and this finding, together with the previously-mentioned results, provides additional evidence in this strand of literature, contributing to the further development of the current literature in this field.

From the analysis performed in this paper, also some policy implications can be drawn, leading us to think that policy makers should implement all the tools at their disposal necessary to regulate the access to foreign markets, by taking into account both the effect of imports from China on the level of labor demand and the presence of a surprisingly negative correlation between the export activity of Brazil and Turkey to all countries and the level of employment.
Further developments of the present work could be represented by the use of 3-digit sectors in Brazil according to the NACE Rev 1.1 classification, the distinction between white-collar and blue-collar workers in the empirical analysis, a further separation inside the import penetration explanatory variable including both the degree of import penetration stemming from intermediate goods and that from final goods, the consideration of a longer time frame for Turkish industrial data and the computation of long run effects in the regressions performed by the present empirical paper.

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