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The Dragon Menace: Is China Displacing Mexico´s trade with the United States?

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Abstract

The most common statistic used in order to prove China's negative impact on Mexico's trade with the US is the share of US imports precedent from Mexico exporters. This approach suggests that China's expansion in the US market negatively correlates with the growth of the Mexican exports. However, and contrary to conventional wisdom and the ad-hoc shift share approach, our analysis suggest that: 1) even when China displacement effect is not minor, the China expansion in the US market explains at the most one third of the decline in the rate of growth of the Mexican exports to that nation; 2) contradicting the shift share approach that target almost half of the Mexican sectors under the China threat, we localized that almost all the displacement (95 percent) occurred in two sectors, textiles and machinery; and 3) two thirds of the employment losses in the textile industry are explained by long run factors, such as technology, and just one third is due to China's growth in the US market. Moreover, we suggest that the potential for economic gains for Mexico, due to China's economic growth, can offset short-term negative shocks.

Key words: China, Mexico, Export displacement, Trade Competition.
JEL Classification: F13, F14, F23.

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Introduction

The emergence of China's economy as a major player in the international trade arena has several implications. On one hand, several industries in competing countries have been displaced due to their inability to compete with their Chinese counterparts. On the other hand, China's economic growth has brought opportunities for joint ventures and trade partnerships. In one way or another, China's international trade expansion has been impressive; thus affecting bilateral commercial relations among several countries. Mexico is no exception.

On October 2006, China displaced Mexico as the second largest US commercial partner, only after Canada.[1] Previously, in 2003, China replaced Mexico as the second largest source of imports for the United States. Therefore, China has been characterized as a threat to Mexico's economic growth, and there is a consensus among researchers that China's growth has negatively affected the commercial relations between Mexico and the United States.

Moreover, the widespread common wisdom is that the effects in Mexico's economy have been devastating, and that China's economic expansion is hurting the performance of several important industries. Arguments highlighting the magnitude of the menace can be found in newspapers, academic venues, private sector analysis, and government statements. Former Mexico's Economy minister, Luis Ernesto Derbez, warned of a "red tide" from across the Pacific, and recommended launching a "counterattack".

We think that these claims deserve a more careful look. Indeed, Chinese expansion has affected Mexico's economy. But, what is the magnitude of trade displacements with the United States *due to* China's growth in that market? In this paper we offer an account on the issue by exploring four hypotheses:

1) The decrease in the Mexican export to US in this decade is only partially explained by the China's expansion in the US import market. Other factors as the business cycle in the US and internal factors in Mexico explain the major part of the decline.
2) The displacement effect in Mexico-US commercial activities due to China's commercial expansion is localized in a few industries.
3) Even in the sectors where China displacement of Mexican exports is localized, the contraction in the employment is only partially explained by the China

[1] US Census Bureau, Foreign Trade Statistics (http://www.census.gov/foreign-trade/top/index.html#2007).

effect. Most of the total loss of employment is caused by long run factors, such as technological trends.

4) The potential synergies and complementarities among China and Mexico and its potential positive effects go well beyond short term industrial displacements and economic adjustments.

The paper is organized as follows. In section 1 we present a heuristic simple shift share method of assessing the impact of China to the Mexican exports, which we think is a very common mental model of practitioners, among them entrepreneurs and government officials. Under this model, China threat is generalized and the damage is severe.

However, we argue this way of approaching the China competition in the US market overstates the damage in Mexican exports. Therefore, in section 2 we build a simple but theoretical driven model of the drivers of the growth rate of the Mexican exports, among them the potential China displacement effect. In section 3 we estimate the regressions for all 2 digit Harmonized System (HS) fractions and isolate the China effect.

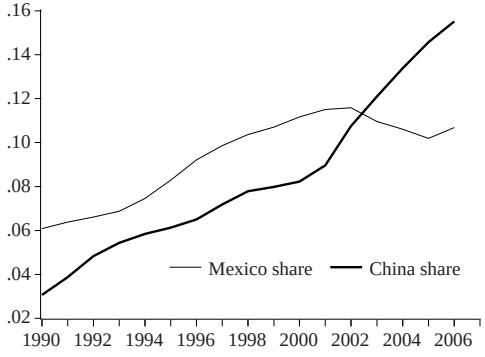
In section 4 we examine and estimate the effect of the export displacement in the Mexican textile industry on production and employment. Finally in section 5 we present a reflection about the potential mutual gains in the cooperation between Mexico and China.

1. An ad-hoc Method of Assessing China's Impact on Mexico's Exports to the United States

Beyond the frequent complains of Mexican entrepreneurs, unions and government officials about the China displacement of the Mexican exports, there is sound evidence that the China expansion in the US market negatively correlates with a the growth of the Mexican exports. However, as we expect to show, the ad-hoc treatment of this evidence leads to overestimate the impact.

The most common statistic used in order to prove the China's negative impact on Mexico's trade with the US is the share of US imports precedent from Mexican exports. Therefore, the gross picture of the displacement effect is depicted by the trend in the Mexican and China exports shares in the total US imports. Figure 1 shows clearly how China exports grew rapidly starting in 2001, when China entered the World Trade Organization (WTO). Almost at the same time, Mexico shares began to turn back a couple of points. Finally, in 2006, China surpassed Mexico as the second largest commercial partner of the US.

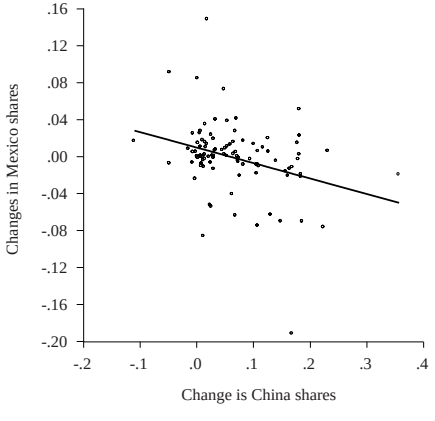
Figure 1
Mexico and China US Imports shares



Source: Authors calculations from US Commerce Department data.

If we take a look at the shares of specific sectors, the displacement effect is still evident. Figure 2 shows the changes in the Mexican and Chinese export shares for all the HS chapters, revealing a clear negative relationship between the changes in the export shares of both countries in the US market. This evidence suggests that in those HS chapters in which China gained penetration, Mexico lost market share. However, the real question is, Does this correlation imply some causality?

Figure 2
Changes in Mexico and China shares in US imports between 2000 and 2006



The simple regression of this cross industry evidence is presented in Table 1. The negative relationship is significantly different from zero, indicating that for each 10% increase in the China share in the US market, Mexico participation is displaced by 1.6%. Moreover, according to the regression, 41 of 99 Mexican export activities should present shares contractions because of the Chinese irruption in the US import market. This means that almost 58% of the Mexican exports to US are under the threat of the China expansion.

Table 1
Change in Mexican Export Shares

Dependent Variable: Change in mexican export shares between 2000 and 2006
included observations: 99 after adjusthments

Variable	*Coefficient*	*Std. Error*	*T-Statistic*	*Prob.*
Constante	0.009682	0.004955	1.954049	0.0536
Change in China export share between 2000 and 2006	-0.1673495	0.050685	-3.30176	0.0013
R-squared	0.101033	Mean dependent var		-0.0013
Adjusted R-squared	0.091765	S.D. dependent var		0.0384
S.E. of regression	0.036635	Akaike info criterion		-3.7556
Sum squared resid	0.130187	Schwarz criterion		-3.7032
Log likelihood	187.9033	F-statistic		10.902
Durbin-Watson stat		Prob (F-statistic)		0.0013

On the light this evidence, it is hard to disagree with the fact that the China expansion in the US import market has had a sizable displacement of Mexican exports to this market, and that almost half of Mexico's economic activities had been damaged in this process. However, we feel this ad-hoc evidence overstate the Chinese impact for several reasons.

First, focusing in the shares might lead us to a zero sum game approach between Mexico and China that not necessarily occurred. For example, if China displaced US producers instead of Mexican exports, total imports increases and Mexico share declines, even when no Mexican export did it. Moreover, it can happen that China exports did not displace Mexico, US or any other country producers, but just created more commerce. This would be reflected in an increase of total US imports leading again to a decline in the Mexico's market share. Thus, we must be very careful in interpreting market share evidence.

Second, in this China story we have not taken into account internal factors that might affect Mexico supply of exports. For example, there are activities in Mexico with large shares in the US market. If these industries are near the full

capacity, a further expansion in the imports will not convey a proportional increase in the Mexican exports and consequently Mexican market share decline. In this case, China was not guilty; the market loss is due to Mexico's internal supply conditions.[2]

Finally, if the income elasticities of the Mexico and Chinese exports are different, economic slowdowns in the US will have a different impact on China and Mexico exports, making possible that the fluctuations in the US market produces changes in the Mexico export shares that are not caused by the China penetration.

In order to account for these factors, we offer a simple model that attempts to disaggregate the potential sources of changes in Mexico's exports to the US market.

2. A Model of the Dynamics of the Mexican Exports

The attempt to isolate the pressure of China expansion on exports of third countries is relatively recent. Among the few contributions in this line of research, Freund (2006) built an econometric model to test the China displacement of individual countries of Latin America using panel data methods. Iranzo and Ma (2006) estimated a highly disaggregate model of the China effect just on Mexico using panel information.

However, we feel no one of these attempts neither specify their theoretical foundations nor include the dynamics of the process. We intend to departure from building a theoretical driven model of the determinants of the dynamics of the Mexican exports.

Let assume, Mexican exporters in each activity are monopolistic competitors facing a negative sloped demand of the following type:

$$X^d = X^d\left(M, \log\frac{P}{P^*}(C)\right) \tag{1}$$

Where X^d stands for Mexican exports, M for total US imports, P for Mexican export prices, P^* for the average export price in the US market, and C for China exports to the US market in that activity. For convenience let assume X, M

[2] Indeed, including the size of the Mexican penetration in the US market, into the regression equation of table 1, the size effect is negative and significant suggesting a convergence or reversion to the mean effect. Incorporating this variable, the China share change coefficient, that measures the displacement, diminishes.

and *C* are in natural logarithms. We assume that Mexican relative price tends to decline if China imports increase. There is some evidence at this respect (i.e. Freund, 2006) and this specification has the advantage that we can work directly just with value data of the imports.

In order to introduce the dynamic of this process, we assume Mexican exporters do not produce as much as it is demanded because there are some adjustment costs of doing that. The total costs exporters must balance are the costs of not matching the demand, and the costs of adjusting the production scale. Under a quadratic specification, the adjustment costs are:

$$\delta_0\left(X - X^d\right)^2 + \delta_1\left(\dot{X}\right)^2 \tag{2}$$

X is the export supply, and the dot operator refers to the time change of the variable. Minimizing total adjustment costs with respect *X*, lead us to the following expression:

$$\dot{X} = -\lambda(X - X^d) \tag{3}$$

The solution of this differential equation is given by:

$$X(t) = e^{-\lambda t}\, X(0) + (1 - e^{-\lambda t})X^d(t) \tag{4}$$

That is, the actual exports are a weighted average between initial conditions and the demand for the Mexican exports. As the exports are denominated in logs, subtracting $X(t\text{-}1)$ in both sides of equation (4) gives us an expression for the growth rate of the Mexican exports:

$$X(t) - X(t\text{-}1) = [e^{-\lambda t}\, X(0) - e^{-\lambda(t\text{-}1)}\, X(0)] + [1\text{-}e^{-\lambda t})\, X^d(t) - (1\text{-}e^{-\lambda(t\text{-}1)}\, X^d(t\text{-}1)] \tag{5}$$

And after some algebraic rearrangements, equation (5) can be expressed as:

$$\Delta X(t) = (1\text{-}e^{-\lambda t})\, \Delta X^d(t) + (X(t\text{-}1) + X^d(t\text{-}1)) \tag{6}$$

Equation (6) discomposes the Mexican exports growth into two elements. The first one is determined by the rate of growth of their demand, which is a function of the total market size and the China exports according to equation 1. The second

one is determined by the gap in the previous period between the supply and the demand of the Mexican exports. This second component reflects the possibility that Mexican suppliers might be restricted by internal conditions that prevent them to match the export demand in any period. Now it is possible to provide an empirical assessment of these relationships.

3. Estimating the China Displacement of Mexican Exports

Equation (6) cannot be directly estimated because we need a specific function for the demand equation. Therefore is necessary to assume a functional form for Mexican exports demand. Let's assume the demand follows a double log function. Also, let approximate the term $(1\text{-}e^{-\lambda t})$ with the average value of this weight between periods *0* and *t*. By making these simplifying assumptions, we arrive to:

$$\Delta X(t) = \beta_0 + \beta_1 \Delta M(t) + \beta_2 \Delta C(t) + (X(t\text{-}1) - X^d(t\text{-}1)) \qquad (7)$$

Equation (7) cannot be estimated directly because the demand for exports in the term $X(t\text{-}1) - X^d(t\text{-}1)$ is not directly observed. However, equation (7) appears like a vector error correction model (VEC) where the change in the actual exports is explained by the long run trajectories of the US imports and the competitors pressure (China, in this case), and the short run movements occasioned by the misbalances between the demand and the supply, that is the dynamic adjustment toward the equilibrium.

Thus, we can apply the method Engle and Granger (1987) suggest for this family of models. The first step in this method is to estimate the demand equation in levels and use the residuals as an estimate of the gap between actual exports and export demand, then the second step is to run the regression estimate equation (7), that is to run the regression between the rate of growth of Mexican exports with the rate of growth of US imports, the rate of growth of US imports precedent from China and the gap estimate.

The objective of this exercise is to detect in which export sectors the coefficient of the China exports rate of growth is negative and significant different from zero, once we controlled by the growth of the US import market and the short run dynamics of the misbalance between demand and supply, mainly due to internal factors.

We run the equation (7) with the method described above for the value imports of the 99 chapters of the HS. In Table 2 we report only the results for those chapters in which the China variable is negative and significantly different from

zero at 10% or less, which we think is a generous cut rate in favor of the hypotheses of a generalized damage because of the China syndrome.[3]

Table 2
HS Chapter with Significant China Displacement of Mexican Exports

HS chapter	*Description*	*China estimated coefficient*	*Error standard*	*T-value*	*P-value*	R^2
1	Live Animals	-0.36646	0.192468	-1.90401	0.0572	0.531
3	Fish, Crustaceans & Aquatic Invertebrates	-0.37388	0.137057	-2.7279	0.0065	0.524
6	Live Trees, Plants, Bulbs etc.; Cut Flowers etc.	-0.23643	0.107639	-2.19647	0.0283	0.378
9	Coffee, Tea, Mate & Spices	-1.034	0.221517	-4.66783	0	0.931
11	Milling Products; Malt; Starch; Inulin; Wht Gluten	-0.22414	0.119877	-1.86972	0.0618	0.379
16	Edible Preparations of Meat, Fish, Crustaceans etc.	-0.27391	0.117003	-2.34108	0.0194	0.776
24	Tobacco and Manufactured Tobacco Substitutes	-0.28598	0.162664	-1.7581	0.079	0.77
25	Salt; Sulfur; Earth & Stones; Limes & Cement Plaster	-0.52343	0.239003	-2.19006	0.0287	0.577
30	Pharmaceutical Products	-0.63222	0.200533	-3.15272	0.0017	0.562
34	Soap etc.; Waxes, Polish etc.; Candles; Dental Preps	-0.54989	0.207327	-2.65226	0.0081	0.603
47	Wood Pulp etc.; Recovd (Waste & Scrap) PPR & PPRBD	-0.10166	0.049664	-2.04687	0.0409	0.515
54	Manmade Filaments, Including Yarns & Woven Fabrics	-0.21153	0.089588	-2.36112	0.0184	0.451
58	Specwov Fabrics; Tufted Fab; Lace; Tapestries etc.	-0.61309	0.323825	-1.89328	0.0586	0.512
60	Knitted Or Crocheted Fabrics	-0.13704	0.075996	-1.80324	0.0716	0.676
61	Apparel Articles And Accessories, Knit Or Crochet	-0.91841	0.34264	-2.68038	0.0075	0.655
62	Apparel Articles And Accessories, Not Knit etc.	-0.80759	0.169642	-4.76056	0	0.781
63	Textile Art Nesoi; Needlecraft Sets; Worn Text Art.	-0.47861	0.262275	-1.82483	0.0683	0.543
75	Nickle And Articles Thereof	-0.33885	0.115452	-2.93499	0.0034	0.552
80	Tinand Articles Thereof	-1.392	0.638297	-2.1808	0.0294	0.425
84	Nuclear Reactors, Boilers, Machinery etc.; Parts	-0.45896	0.234278	-1.95903	0.0503	0.581

The rates of growth of the exports of China prove to be significant in 20 export economic activities regressions from the 99 HS chapters. The R^2 of the equations are in acceptable ranges given the regressions were run in the first difference of the log variables, not in levels. The sectors are localized in very different industries, but they can be summarized as some primary products, some food preparation, tobacco manufactures, chemicals, textiles, metallic products and machinery. These exports represented 21% of the total exports to US in year 2000.

From these estimations we can estimate a total China displacement effect on Mexican exports to the US market. To obtain the sector displacement we just multiply the average growth of the China exports to US in the period 2000-2006 to the estimated coefficient. To obtain an aggregate figure for the whole exports, we take the weighted average taken the initial, 2000 sector's share in the total exports. The results are presented in Table 3.

[3] In order to save space, we do not report the rest of the coefficients. Additionally, they are not the main interest of this paper, we just wanted to control by them in order to obtain a cleaner estimation of the China impact on Mexican exports.

Table 3
Estimated China Displacement Effect

HS	*Chapter*	*Description*	*China estimated coefficient (A)*	*China Annual growth 2000-2006 (B)*	*Effect in the export growth rate (C)*	*2000 Mexico Export Share (D)*	*Contribution (C)*(D)*100*
1	Live Animals		-0.3665	0.33147	-0.1215	0.00300138	-0.03646
3	Fish, Crustaceans & Aquatic Invertebrates		-0.3739	0.19782	-0.074	0.00371162	-0.02745
6	Live Trees, Plants, Bulbs etc.; Cut Flowers etc.		-0.2364	0.1943	-0.0459	0.00033585	-0.00154
9	Coffee, Tea, Mate & Spices		-1.034	0.116	-0.1199	0.00340073	-0.04079
11	Milling Products; Malt; Starch; Inulin; Wht Gluten		-0.2241	0.26603	-0.0596	3.6949E-05	-0.00022
16	Edible Preparations of Meat, Fish, Crustaceans etc.		-0.2739	0.27255	-0.0747	0.0003116	-0.00233
24	Tobacco and Manufactured Tobacco Substitutes		-0.286	0.05324	-0.0152	0.0001487	-0.00023
25	Salt; Sulfur; Earth & Stones; Limes & Cement Plaster		-0.5234	0.16849	-0.0882	0.00123135	-0.01086
30	Pharmaceutical Products		-0.6322	0.10411	-0.0658	0.00030124	-0.00198
34	Soap etc.; Waxes, Polish etc.; Candles; Dental Preps		-0.5499	0.07263	-0.0399	0.00193657	-0.00773
47	Wood Pulp etc.; Recovd (Waste & Scrap) PPR & PPRBD		-0.1017	0.24872	-0.0253	4.0346E-05	-0.00010
54	Manmade Filaments, Including Yarns & Woven Fabrics		-0.2115	0.30359	-0.0642	0.00154464	-0.00992
58	Specwov Fabrics; Tufted Fab; Lace; Tapestries etc.		-0.6131	0.23548	-0.1444	0.00029178	-0.00421
60	Knitted Or Crocheted Fabrics		-0.137	0.4245	-0.0582	0.00062899	-0.00366
61	Apparel Articles And Accessories, Knit Or Crochet		-0.9184	0.1965	-0.1805	0.02572687	-0.46428
62	Apparel Articles And Accessories, Not Knit etc.		-0.8076	0.16444	-0.1328	0.03764296	-0.49990
63	Textile Art Nesoi; Needlecraft Sets; Worn Text Art.		-0.4786	0.22414	-0.1073	0.00502809	-0.05394
75	Nickle And Articles Thereof		-0.3388	0.21514	-0.0729	2.2449E-05	-0.00016
80	Tinand Articles Thereof		-1.392	-0.0099	0.01383	1.9375E-05	0.00003
84	Nuclear Reactors, Boilers, Machinery etc.; Parts		-0.459	0.2588	-0.1188	0.12533749	-1.48872
	Accumulated share					0.21069896	
	Total effect						-2.65445

In this form, we calculate that the total displacement is of the order of 2.7% by year, this means that the amazing expansion of the China exports in the US market during the present decade has lowered the Mexican exports to that market 2.7 percentage points per year.

How large is this effect? Well, Mexican exports grew at 15.8% by year during the period post NAFTA and before China entered the WTO, that is from 1995 to 2000. From 2000 to 2006 the rate of growth of the Mexican exports is 6.3%, a considerable decline of 9.5 points. Therefore, our results points out that 2.7% of that 9.5% can be attached to the China effect, almost one third of the total decline. The other two thirds of the slump in the Mexican export rate are due to other aspects. Suspects are the US recession in the early years of the decade and the internal factors that restricts the supply of exports.

Our estimates also reveal that almost all the China displacement effect in localized in only five HS chapters (60 to 64 and 84) that roughly corresponds to textile and machinery sectors. The 95% of the total displacement effect is originated

in these activities. These findings suggest that the story is more complex than the popular belief of a major and generalized displacement of Mexican exports by China cheaper products.

The differences between using some empirical form of equation (6) instead of the share approach we described before are important. Contrary to conventional wisdom and the ad-hoc shift share approach, we can conclude that: 1) even when China displacement is not minor, the China expansion in the US market explains at the most one third of the decline in the rate of growth of the Mexican exports to that nation; 2) contradicting the shift share approach that target almost half of the Mexican sectors under the China threat, we localized that almost all the displacement occurred in just two sectors, textiles and machinery.

4. The China Displacement Effect on Employment: The Case of the Textile Industry

Producers in China are clearly affecting Mexico's market share in some important manufacturing sectors. As our results suggest, an important case is textiles and apparel.

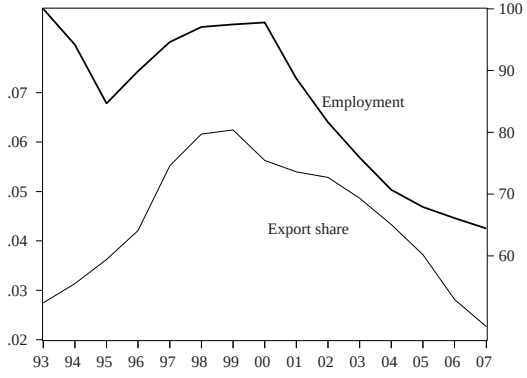
We already calculated the China irruption into the US import market might decrease the rate of growth of the Mexican exports in 2.6% annually, which is one third of the actual decline in the total export growth. Also we concluded that almost all the effect concentrated in just four harmonized system chapters, three of them related with apparel and some textiles (from 61 to 63) and the other to non electrical machinery and equipment (chapter 84).

In this section we take a look to the possible impact of this displacement on employment. We choose to take the case of the textile industry because almost the half of the displaced exports are from this sector, but also because it is a very labor intensive sector, what make us think the China effect on employment must be of larger proportion compared with capital intensive sectors.

We start taking a look at Figure 3 which shows the recent behavior of the employment index in the textile industry in Mexico.[4]

[4] We are taking an equivalent of two digit disaggregation in the National Accounts in Mexico. Obviously the export share presented in figure 4 is just four a sub-sector of the entire textile industry, the apparel sub-sector. However, the Mexican system of information is not very reliable for more disaggregated levels.

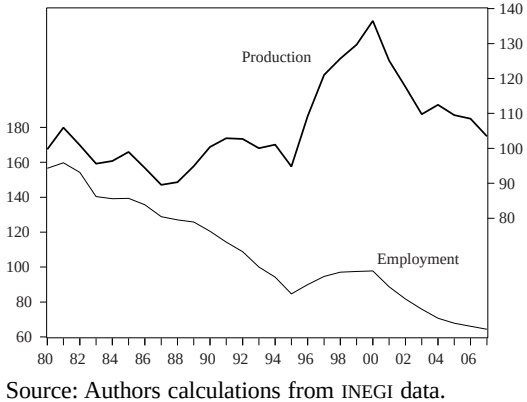
Figure 3
Employment and the Mexican Share of Textile Exports in the US Import Market



Source: Authors calculations from INEGI data.

As it is evident the export share in the US market reached its peak just in 1999, meanwhile employment did it one year later, since then both of them, employment and the export share, followed a continuous decline. It is hard to deny that the picture seems to reveal the entire story; however as in the case with the exports, not all the employment crunch is due to the China emergence in the international markets. Let see why.

Figure 4
Employment and Production in the Mexican Textil Industry



Source: Authors calculations from INEGI data.

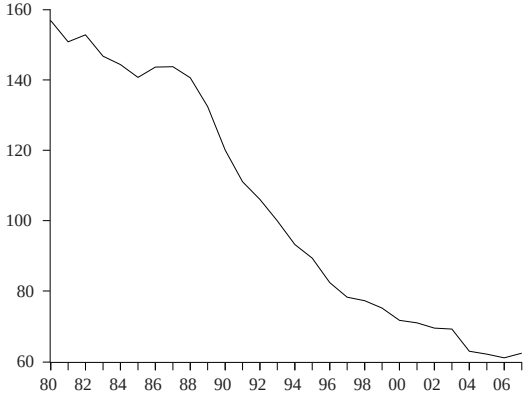
There are some transmission mechanisms we have to deal with in order to make an assessment about the export displacement effect on employment. First, in order to gain some deeper understanding of the long run textile employment, take a look to Figure 4 which presents employment and physical production indexes for the textile industry in the last three decades.

From 1980 to 1988, both, production and employment declined continuously. It was a hard time: Mexico financial crises, recurrent recessions accompanied with high inflation rate, and the beginning of the liberalization of the economy.

Nevertheless, from late eighties to late nineties production rose very rapidly and employment followed their past declining tendency. In the present decade, production and employment decreased.

However, it is clear there is a long run tendency of declining labor requirements that must be determined mainly for technological reasons. Figure 5 presents the ratio of employment and production indexes in this sector. As it is evident, the rate at which labor requirements decline seems to be very similar in the three decades, therefore attaching all the employment crunch to the displacement effect is misleading.

Figure 5
Index of Labor Requirements in the Textile Industry in Mexico



Source: Authors calculations from INEGI data.

In order to make a more rigorous estimation of the effect of the China displacement of the Mexican export in the employment figures, we ran a couple of regressions. The first one intends to catch the direct effect of the dynamics of the Mexican exports to the US market[5] into the growth of the textile production, controlling by the growth of the overall Mexican economic activity which is a proxy variable of the domestic demand growth. We called the "pass-through" equation, because it is a form to pass the decline in the export rate of growth to the growth of the overall textile production.

We propose a Cobb Douglas ad hoc function of the type:

$$q = e^{\lambda t} X_t^{\alpha} D^{\beta} \tag{8}$$

Where q is the physical production index for textiles, X represents the textile exports to US (chapters 61 to 63) and D is a proxy of domestic demand. In this case we took the economic activity index that is an excellent variable to catch the level of activity of the Mexican economy and it is frequently used as a proxy of income.

We added an exponential trend in order to capture long run factors that affect the production of the sector, such as the appearance of substitutes, the re-localization of factories and other aspects. However, it is important that this long run factors are independent of the China expansion in the US market, which we dated mainly in the present decade. Therefore, we must test for not structural change in the constant after the emergence of China in the US market.

Taking logs and taking the first derivate respect time, we can re-express the "pass-through" equation in growth rates:

$$\Delta \log(q) = \lambda + \alpha \Delta \log(X_t) + \beta \Delta \log(D_t) \tag{9}$$

Where the parameter α is the pass-through coefficient from exports to US to physical volume production in the sector.

The second equation is the proper employment regression. In order to interpret the second equation, we propose a production function of a CES type, with labor embodied technological change:

$$q = [\theta (AL)^{-\rho} + (1-\theta) K^{-\rho}]^{-\eta} \tag{10}$$

Assuming perfect competition in the labor market, if the firms maximize profits the labor demand is:

[5] Again, we refer to textile exports contained in the HS chapters 61 to 63.

$$L = \delta\left(\frac{P}{W}\right)^{1/1+\rho} qA^{-1} \tag{11}$$

Where W is the wage rate and P is the textile price. Assuming the technological state of the art $A(t)$ follows an exponential function of the type $A(t) = Be^{kt}$, then taking logs and differentiating respect time we obtain our labor demand specification, which is:

$$\Delta\log(L) = -k + \left(\frac{1}{1+\rho}\right)\Delta\log\left(\frac{P}{W}\right) + \Delta\log(q) \tag{12}$$

Therefore the growth rate in the textile employment is determined by the long run technological change represented by the parameter k, the growth rate in the relative wage, and the growth rate of the production, which by the first regression was determined partially by the export dynamics. We tested some lags in both equations to incorporate some dynamics in the processes.

In Table 4 we presented the OLS estimations of equation (9) and (12).

Table 4
Effect of Textile Exports in Textile Production and Employment

Dependent Variable: Growth rate of textile production				
Variable	*Coefficient*	*Standard Error*	*t-Statistic*	*Prob.*
Constant	-0.0424	0.008786	-4.825897	0.0013
Growth of Mexican textile exports	0.233723	0.029266	7.986245	0
Growth of Mexican economic activity	1.557217	0.154274	10.09383	0
Growth of Mexican economic activity (-1)	-0.609476	0.153593	-3.968121	0.0041
R-squared	0.954707	Mean dependent var		0.005925
Adjusted R-squared	0.937722	S.D. dependent var		0.071938
S.E. of regression	0.017953	Akaike info criterion		-4.94098
Sum squared resid	0.002578	Schwarz criterion		-4.779322
Log likelihood	33.64575	F-statistic		56.20904
Durbin-Watson stat	2.064894	Prob(F-statistic)		0.00001
Dependent Variable: Growth rate of textile employment				
Variable	*Coefficient*	*Standard Error*	*t-Statistic*	*Prob.*
Constant	-0.031209	0.007918	-3.941756	0.0013
Growth rate of textile production	0.616119	0.107158	5.749647	0
Growth rate of textile employment (-1)	0.244304	0.132804	1.839578	0.0857
R-squared	0.749383	Mean dependent var		-0.03715
Adjusted R-squared	0.715968	S.D. dependent var		0.049049
S.E. of regression	0.02614	Akaike info criterion		-4.299663
Sum squared resid	0.01025	Schwarz criterion		-4.15128
Log likelihood	41.69697	F-statistic		22.42619
Durbin-Watson stat	1.370913	Prob(F-statistic)		0.000031

From the first regression it seems that only one fourth of the export growth is fueled into the production index. This "pass-through" coefficient is significantly lower from one because the decline in the exports considered is just in the chapters that presented the largest displacement (apparel), and the displacement is not a generalized phenomenon in all textiles including fiber manufacturing and other textiles manufactures. Also, textiles firms also sell internally or to other countries.

One important feature about the pass trough equation is the constant term. We obtained a significant decline of four percent per year long run trend in textile production. We associate this trend with factors that are not directly determined by the emergence of China in the global arena, but we have to test it.

Therefore, we performed structural change tests to assess if the constant term λ varied in the present decade but it turned not significant, that is the parameter is the same before than after China displacement thus we indeed believe that represents a long run trend.

Regarding the labor demand, we did not include the estimations of the relative salary because they turned not significantly different from zero in different specifications. We also included a Koyck type of distributed lag to allow for adjustment costs in the labor sizes.

The results indicate the short run production elasticity on employment is almost two thirds and the long run elasticity is in the order of 0.8, which is compatible with the unitary elasticity equation (12) predicts.

The constant term, indicates a long run trend of a three percent per year decline in the employment. Again, we tested for the hypotheses for no structural change in the constant term after the emergence of China and we failed to reject the null hypotheses. In other words, the constant term is actually the same across all the decades, before and after China. These results make us believe that the 3% systematic decline in employment indeed reflects long run factors and not the emergency of China in the US market.

Using the parameter estimates we can calibrate the model to obtain a gross figure about the impact in the decline of the textile Mexican exports (chapters 61 to 63) to the textile production and textile employment. We presented our numbers in Table 5.

Table 5
Mean Annual Growth Rates
2000-2006%

Exports to US market		9.80
Production		3.80
	Due to China displacement	2.30
	Other factors	1.50
Employment		6.50
	Due to China displacement	1.90
	Technological change	3.10
	Other factors	1.50

We date the changes in the period 2000 to 2006. During this period, the textile Mexican exports to the US declined 9.8% per year, and the production 3.8%. From our estimates, 2.3% is due to the China displacement and 1.5% to the other factors. Thus, China might contribute a 60% of the total decline in the production in this decade.

Regarding employment, during this period the employment decreased at a rate of 6.5% per year. Although, China displacement of Mexican exports in the US market contributes with only one third of the contraction. In contrast, almost the half of the decline in the employment is explained by long term factors, such as technology.

Two important conclusions arise from these econometric exercises. On one hand, China displacement export produced a severe contraction in the textile physical production. But, on the other hand, the China partial effect on employment is less critical; moreover, most of the employment loss in this industry is explained by long run factors such as technological change. A possible explanation is that the adjustment is translated heavily into the real wages and profit margins of the industry, however we did not explore these alternatives in this paper.

One possible critic to the magnitudes of the effects is that we are using production and employment figures for the whole sector instead of using the disaggregate figures of just the sub sectors that were displaced. And of course if we have these figures the displacement effect on production and employment surely would be much higher.

But, however, our hypothesis is precisely that when we take the whole sector the displacement effect on employment and production seems to be of a lesser magnitude. This make us think that producers adjusted by shifting between different products lines and markets, in order to cushion the original export displacement.

5. A Mexico-China Strategic Partnership

China and Mexico have similar stages of development, so it is not a surprise that we compete for the same market niches. As our results suggest, in some sectors such as textiles China has been more effective than Mexico in expanding into the US market, thus negatively affecting Mexico's performance.

However we believe China's growth also represent an important opportunity that Mexico should not overlook. In fact, we can already observe some of the benefits. To give one example, China's growth has delivered lower prices and more choice for Mexican consumers, inducing competition that, although entail some costs for some sectors, also benefit others.

Also, China is creating commerce, thus new export opportunities for Mexican producers emerge. The real question is not how to protect Mexico from China's threat, but how to take advantage of this opportunity. For the latter to happen, a strategic partnership with China is needed. Mexico has at least two assets that can be valuable in such a deal.

One is proximity with the largest and most advance economy of the world. Derived advantages are related to supply chains that can more efficiently serve the US market at lower transportation costs. This is especially important for the machinery sector. Mexico can use these arguments to promote foreign direct investment from China and to create joint ventures between Mexican and Chinese companies.

The second asset is the level of integration between the Mexican and American economies. More than a decade after its implementation, The North American Free Trade Agreement has been a major driving force for the integration of both economies. Today Mexico enjoys a much better position with the US than China with respect to trade in services, FDI, and private sector partnerships. This represents an advantage that can be of China's interest to use.

Attending rules of origin regulations, it is possible to enjoy some of the advantages of lower trade barriers. Some of the US highest remaining barriers apply to sectors where China enjoys its strongest comparative advantage. Thus, Mexico can offer a potential partner to overcome these limitations.

In order to take advantage of the opportunity, Mexico also has to focus on domestic measures, such as investment in physical and human capital and institutional reforms. China's effect on Mexico's trade with the US is important and should not be disregarded. A third of the total market share loss due to China's growth is still a sizable effect and for some industries the result was quite dramatic. However, ultimately, Mexico's success depends on its own strategy, rather than China's.

Concluding remarks

Our analysis suggests that China's commercial expansion into the US explains no more than a third of Mexico's losses in the same market. These negative impacts are highly localized in a few sectors. The rest of the market share loss is due to other factors related to Mexico's competitiveness levels and China's commerce creation, as well as the slowdown of the US economy. Also, taken the textile industry case as a benchmark, we found that employment only adjusted partially to the displacement of exports due to China. Moreover, most of the employment contraction in this industry is explained by long run factors that are independent of the China expansion in the US market.

This seems to confirm the assertion Nations do not compete with one another in a zero sum game. As we suggested, not all of China's gains translated into Mexico's losses. At the end, the key to Mexico's success in the global markets mainly depends on Mexico itself. Moreover, there are opportunities for both countries to achieve mutually beneficial agreements.

The Chinese seem to understand this. In response to the arguments about the "red tide" destroying Mexican industries, Qiyue Zhang, a spokeswoman for China's APEC delegation, said, "Mexicans will find out that China is more of an opportunity than a threat. The business leaders haven't understood that yet." Maybe it is time to understand it.

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