Deindustrialization, Domestic Savings, and Labor, in Mexico and Central America

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Abstract

This study analyzes the determination of the deindustrialization process experienced by Mexico and the Central American countries, and the repercussions on employment, domestic savings, investment, and economic growth. The methodology consists of estimating VAR models with panel data from the 1990-2018 period. The results indicate that the percentage occupied by the manufacturing sector in GDP increases in the face of shocks to exports, investment, and the ratio of female to male salaried employment, and does not have a significant response to the increase in remittances. A measure of relative deindustrialization is introduced, defined as the ratio of the value-added of the manufacturing sector to imports, whose responses to shocks to exports and remittances are negative, but its response to salaried employment is positive. Faced with shocks to the ratio of female to male salaried employment, the responses of the domestic saving rate, per capita international reserves, and labor productivity was positive, but the response of the trade deficit was negative. These results show that deindustrialization must be analyzed in the context of the labor market of the countries and consider gender aspects.

Keywords: industrialization, savings, labor market, gender, economic growth

JEL indexes: E21, H12, J16, J24, J48, J71.

1. Introduction

Deindustrialization, measured as the fall in the share of the value-added of the manufacturing sector in GDP, or as the reduction in employment in this sector relative to total employment, continues to receive attention in the economic literature. The interest lies in the evidence that the manufacturing sector generates strong impulses to economic growth, that it is a source of innovations, and of a workforce with skills and qualifications. Extensive literature has elaborated the concept of Kaldor (1967) that the manufacturing sector is the engine of economic growth. An implication of Kaldor's theories is that deindustrialization leads to declines in economic growth and productivity, which has been verified by various authors.

Singh's (1977) study occupies a precursor place in the area of deindustrialization, being the starting point of vast literature. This author argued that the loss of dynamism of the United Kingdom's economy was explained by the reduction in the participation of the manufacturing sector in GDP, resulting from the weakness of national production to compete with imports of manufactured goods. This view that deindustrialization results from external developments have been elaborated by other authors. Rowthorn and Ramaswamy (1998) analyzed the cases of 18 developed countries and found that deindustrialization was associated with their imports of manufactured goods from developing countries. A similar conclusion was reported by Saeger (1997) for a sample of developed countries. In the case of the OECD countries, Tregenna (2016) reported that the economic liberalization that was undertaken by these countries since the early 1990s resulted in a 50 percent drop in the share of industrial employment in total employment, while the share of the manufacturing sector in GDP fell by 10 percentage points.

Like the rest of the Latin American countries, Mexico and the Central American countries have experienced processes of deindustrialization, which have been characterized by their intensity, since the falls in the value-added of the manufacturing sector in GDP have been more severe than those observed in countries in other regions. Likewise, in Latin American countries deindustrialization has had a "premature" character, as Rodrik (2015) calls it, in the sense that developed countries began deindustrialization processes after having reached

high values of GDP per capita, while in Latin American countries the fall in the value-added of the manufacturing sector was observed when the countries still had relatively low levels of per capita GDP. In other words, to replicate the experience of developed countries, Latin American countries should currently show industrialization processes, instead of experiencing reductions in the added value of the sector in GDP.

The importance of analyzing deindustrialization is appreciated when considering the results of an analysis of the development experience of a sample of developed and developing countries by Felipe, Mehta, and Rhee (2015), which concluded that there is no evidence of any country with a labor force in the manufacturing sector below 18 percent of the total that has reached a per capita income of $12,000. It is appropriate to mention the results of Kirsch (2018) showing that, because of deindustrialization, the manufacturing sector lost the ability to drive economic growth, while the service and agricultural sectors have not assumed this role. In fact, low-income countries are reaching the per capita income levels of middle-income countries not because the former have better economic performance, but because the deindustrialization of the latter leads to stagnation tendencies (Tregenna, 2016).

An extensive literature has analyzed the social repercussions of deindustrialization in developed countries, pointing out the adverse implications on individuals and their families (Wilson, 1987; Greenstein, 2019), and on the increase in social conflict (C áceres, 2018); however, studies of the deindustrialization of Latin American countries are still scarce.

The purpose of this paper is to study the causes and consequences of the deindustrialization of Mexico and the Central American countries, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama, by estimating VAR models using a panel of data from the period 1990-2018. The behavior of domestic savings in these countries in response to changes in female and male employment in different sectors is also analyzed. The work emphasizes the analysis of gender differences in industrial, self, and salaried employment, resulting from deindustrialization, which is especially important by virtue of the positive role that the ratio of female and male employment exert on savings and investment.

The following section presents a brief review of selected literature, which is followed by a description of the data and its statistical properties. This is followed by the discussion of the responses of the manufacturing sector's share of GDP to changes in different variables. The determination of domestic savings is also analyzed, given its role in financing investment and in avoiding deindustrialization. Another section examines the degree to which a de-feminization of employment has occurred in the countries. The paper ends with a series of conclusions and recommendations.

2. Review of Selected Literature

In the case of Latin American countries, Palma (2008) pointed out that deindustrialization can be associated with large deficits in the trade account of manufactured goods, which denotes excessive growth in imports as a result of trade liberalization; Frenkel and Rapetti (2012) found that the exchange rate appreciation resulting from capital inflows, as well as the loss of productivity and the increase in real wages, deteriorate the competitiveness of tradable goods, thus promoting deindustrialization. Salama (2012) found that capital inflows led to an appreciation of the exchange rate in Latin American countries. From an analysis of twenty Latin American countries, Brady, Gereffi and Kaya (2008) concluded that the importation of manufactured goods contributed to their deindustrialization.

C áceres (2017a) has explained the deindustrialization of El Salvador because of trade liberalization that led to the excessive importation of manufactured goods, to the detriment of national production and investment in plant and equipment. This author reported that deindustrialization has represented losses in GDP growth of around 4 percent per year and that it has caused losses of female wage employment. In subsequent work, C áceres (2018) showed that the Latin American countries' deindustrialization led to the rise of the underground economy and violence.

It should be noted that deindustrialization has had an impact on the increase in the population that neither studies nor works, the so-called NEETS, in Latin America, due to the closure of companies that could not compete with imports. C árdenas, de Hoyos and Szekely (2015) showed that the openness of Latin American economies is a determinant of the percentage of the young population that is in a NEET situation, a result also reported by C áceres (2021a).

McMillan and Rodrik (2011) demonstrated that trade openness in Latin American countries led to the closure of enterprises and to labor movements from efficient sectors to others with low efficiency, leading to the loss of quality jobs and the contraction of the manufacturing sector.

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Reference can be made to the literature that emphasizes that the causes of deindustrialization reside in variables typical of the internal economy of the countries. Nickell, Redding, and Swaffield (2008) reported that deindustrialization reflected reductions in total factor productivity, and in the prices of manufactured goods relative to the prices of services; they added that the increase in human capital serves as a brake on deindustrialization. Other studies that associate deindustrialization with internal variables are Dollar and Wolf (1993) and Lawrence (2083).

The study of deindustrialization should refer to domestic savings, given the role of savings in increasing investment, which supports increasing the production of the manufacturing sector. Savings has fallen in most Latin American countries in the last three decades, and despite its importance, it is not an issue that has received great attention in the region. Reference can be made to the study by Gutiérrez (2007) on national savings in 9 Latin American countries, and the studies by Grigoli et al. (2014) and Becerra, Cavallo, and Moy (2015), who reported that saving rates in Latin America were lower than those prevailing in countries with similar levels of development. Reference should be made to the important work of the InterAmerican Development Bank on saving in the region (Cavallo & Serebinsky, 2016).

Seguino and Floro (2003) proposed a novel approach to the study of domestic savings based on the role that female and male employment exerts on it. The authors reported, using data from the 1975-1995 period from a sample of 70 countries, that the female to male employment ratio had a positive impact on household savings. This result was explained by the evidence that women have a greater propensity to save than men, and a greater inclination to allocate their resources to the well-being of the household. It can be expected that the increase in female employment relative to male employment will contribute to increasing the decision-making power of women in the allocation of resources in the family budget, and therefore greater amounts of resources will be directed to savings.

Cáceres (2020a) corroborated that the female to male employment ratio is a determinant of domestic savings in a study based on a sample of Latin American countries. This author obtained similar results in countries of the region, in Honduras (2021a), Guatemala (2021b), and Mexico (Cáceres, 2020b), and reported that in these countries the increase in the ratio of female to male employment contributes to the reduction of the deficit in the trade account of the balance of payments since the increase in domestic saving reduces the amounts of external resources required for the financing of investment. Given that investment in plant and equipment protects the manufacturing sector from deindustrialization, it is of interest to analyze the role of female and male employment in increasing savings, investment, and industrialization.

Several studies for developed countries have highlighted the negative social repercussions derived from deindustrialization. These studies have identified adverse impacts on the health and income of workers in industries that have suffered contractions of manufacturing production (Bluestone, 1983; Ostry et al., 2001; Standing, 2014).

Other studies have reported that deindustrialization has increased wage disparities (Bluestone, 1990), and those wages earned by displaced industrial workers from jobs in other sectors, were lower than previously earned wages (Brady & Wallace, 2001). Of special importance is the work of Greenstein (2019), with data from the period 1990-2010 for 11 developing countries, of which seven were from Latin America, that found that deindustrialization had led to the deterioration of the welfare of households. Other studies have shown the role of deindustrialization in increasing violence in the "rust belt" of the United States; Russo and Linkon (2020) have expressed: "In the 1990s. a decade or more after Gary and Youngtown were both hit by deindustrialization, the two cities traded back and forth the embarrassment of having the highest per capita murder rates in the United States. During that period, criminal justice experts determined that most of the murders in the Youngstown area were being committed by young adults who were born between 1977 and 1984, the most intense period of deindustrialization".

These authors have described US deindustrialization as a "cataclysm" and cite figures from Bluestone (2008) indicating that 32 million jobs were lost in the 1970s and 1980s; they also cite Rosen (2008) who reported that between 1994 and 2004 about 700,000 companies closed operations, resulting in 6.1 million lost jobs.

Other studies have analyzed the trajectory of female industrial employment relative to male and have reported that in the period 1970-2000 a high percentage of female employment was observed in total industrial employment, which was called the "feminization" of industry (Standing, 1999). These studies also report that in recent decades there was a drop in female industrial employment relative to males, which is explained by the fact that women are more susceptible to the economic cycle than men, especially in the industrial sector, and that in the face of deindustrialization, they tend to lose their jobs more quickly than men, which has resulted in an

industrial "defeminization".

Greenstein and Anderson (2017) indicate that this process could be overcome by increases in labor productivity, which contrasts with the evidence that women have less participation than men in company training programs, which makes them more likely to be fired. Kongar (2008) analyzed the evolution of the female and male wage differential in the United States, in the context of deindustrialization. This author reported that during the 1980s there was a fall in this differential, which was explained by the increases in the human capital of women, the loss of male employment due to deindustrialization, the adoption of new technologies, and the reduction of gender discrimination. This author reported that in the 1990s this differential increased due to the fact that the entry of women into the service sector led to the devaluation of female and male jobs, but to a greater degree of the former so that the differential increased.

3. Data and Its Properties

The data source is the World Bank's World Development Indicators. The average values and standard deviations of the variables are shown below in Table 1.

Table 1. Mean values and standard deviations of variables

Variable			Mean	Standard Deviation
Exports*			36.2734	15.455
Imports*	46.8000	17.2093		
Investment*	23.3353	6.3344		
Remittances*	6.6852	6.5397		
Services*			58.1788	6.4327
Domesticsavings*			13.3703	10.0146
Manufacture*	6.8234	4.8671		
Agrigulture*	10.2932	6.3344		
Imports*-Exports*			10.5257	7.5229
Manufacture/Services	0.2962	0.0964		
Manufacture/Imports	0.4267	0.2263		
Human Development Index (HDI)	0.6509	0.0824		
Female self employment			42.075	13.0971
Male self employment			40.3203	7.5518
Investment*	23.3353	7.1614		
Female wage employment			57.9147	13.1093
Male wageemployment			59.6694	7.5644
Female/male industrial employment	1.1244	0.4047		
Female/male self employment	1.0338	0.0964		
Female.male wage employment	0.9663	0.1552		
Female/male agricultura employment	0.2196	0.0823		
Female/male service employment	1.7832	0.3013		

*Porcentaje del PIB.

The research method consists of estimating different VAR models that were estimated including qualitative variables to represent the countries, except Mexico, and thus control the fixed effects, which is a common practice in the literature, a recent application is Saadi and Xu (2020). The estimation of these VAR models was carried out with the variables expressed in levels.

3. Results

In the first estimated VAR it is assumed that the most exogenous variable is remittances, (Remittances), followed by exports, (Exports), investment, (Investment), and the ratio of female to male salaried employment, (Wagempfeme/Wagemplmasc), while the most endogenous variable is the share of value-added of the manufacturing sector in GDP (Manufacture).

Figure 1 presents the responses of Manufacture to one standard deviation shocks to the other variables. It is observed that Manufacture falls slightly with the increase in remittances, but this response is not significant. The response of the manufacturing sector is positive and significant to the increase in exports, which would be the result of the increased capacity to import capital and intermediate goods, and the increase in aggregate demand resulting from the increase in exports.

The increase in investment gives rise to a positive and significant response, which reflects that investment represents additions to the the production capacity of the manufacturing sector. It should be noted that Tregenna (2011) has indicated that investment tends to fall in countries that experience deindustrialization.

The percentage of the manufacturing sector in GDP increases with the increase in the ratio of female to male salaried employment; the explanation lies in the fact that the increase in this ratio leads to an increase in domestic savings and consequently to an increase in investment, thus stimulating manufacturing production.

Accumulated Response to Cholesky One S.D. Innovations ± 2 S.E.
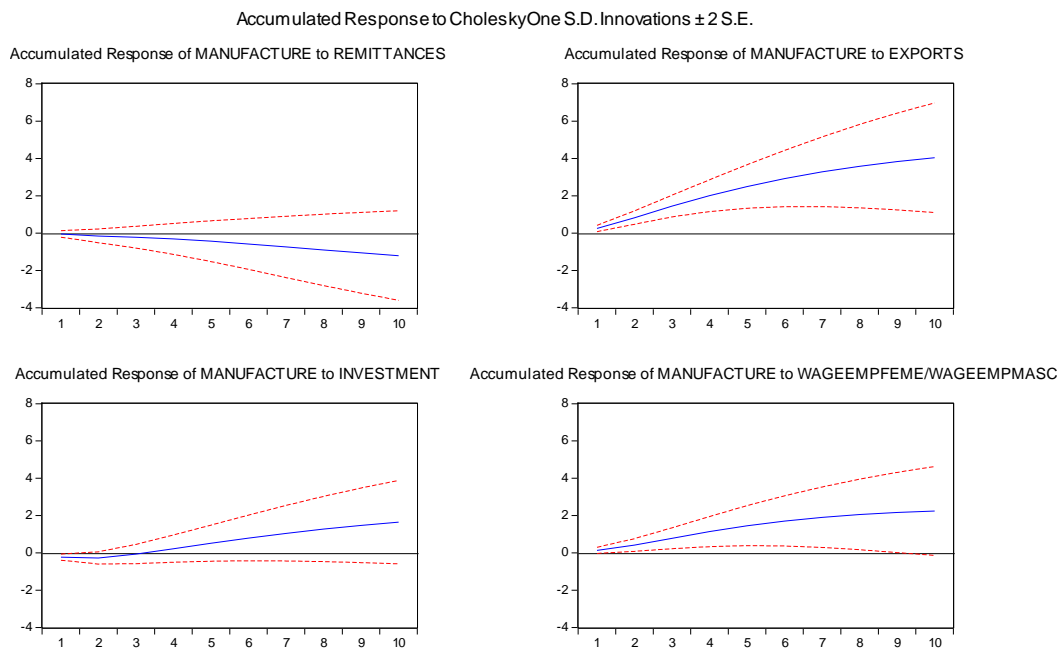
Figure 1. Responses of manufacture value-added to increases in other variables

Another VAR model was estimated including the ratio of the value-added of the manufacturing sector to that of the service sector, in place of the Manufacture variable. The fall in this ratio can be interpreted as relative deindustrialization. The responses are presented in Figure 2.

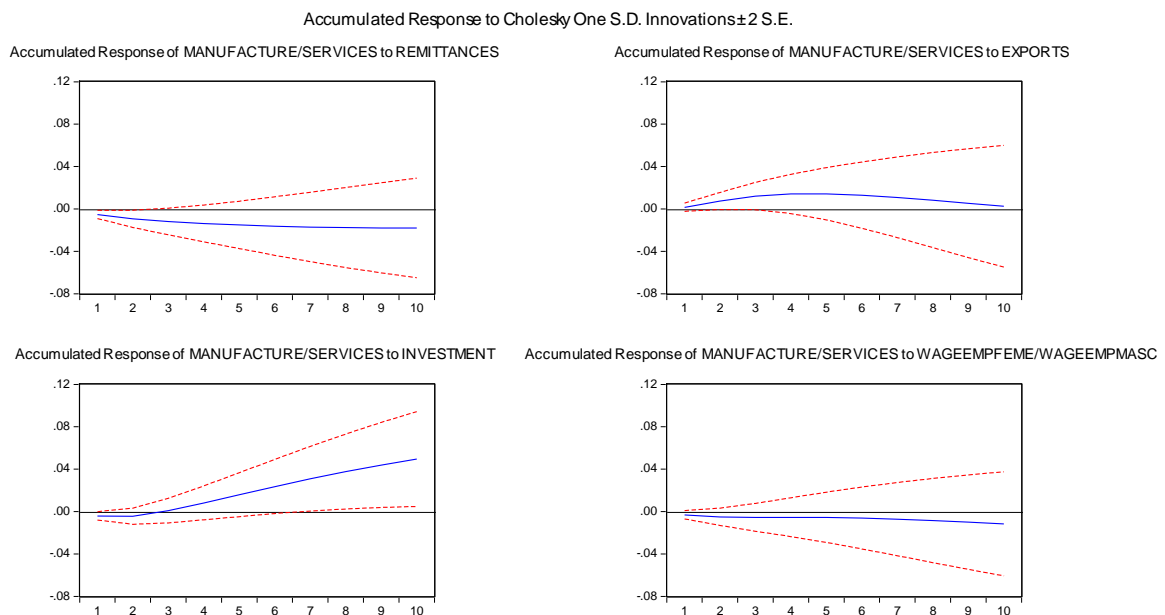Accumulated Response to Cholesky One S.D. Innovations ± 2 S.E.

Figure 2. Responses of the ratio of the added values of the manufacturing to services sectors in the face of shocks to the other variables

The response to the increase in remittances is negative and significant in the first three years, which can indicate that remittances encourage more the consumption of services than domestic manufactured goods. The demand for manufactured goods is met in part by imports, which reduces the dynamism of the domestic manufacturing sector and thus deindustrialization occurs. On the contrary, the demand for services, which are non-tradable goods, is met with the national production of services. This shows that the prematurity of deindustrialization lies in the opening of economies.

There is a positive and significant response to exports in the first half of the period. The increase in investment generates a positive and significant response, indicating that investment stimulates the growth of the manufacturing sector more than that of the services sector. The response to the increase in the ratio of female to male salaried employment is negative and insignificant, implying that the relative increase in female salaried employment gives rise to an increase in the demand for services of greater dimension than the demand for manufactured goods, but this response is not significant.

Another VAR was estimated using the ratio of the value-added of the manufacturing sector to imports, instead of the variable Manufacture, with results that are presented in figure 3. It is observed that the response of this ratio to the increase in remittances is negative and significant, which shows that remittances stimulate the demand for imported goods more than the purchase of domestic manufactured goods.

This result highlights the role of remittances in giving rise to relative deindustrialization when economies are extremely open, as well as the perverse role of openness on productive capacity. For the economies under study, remittances and openness are a harmful combination that undermines the manufacturing industry and hence economic growth. This ratio shows a negative response to the increase in exports, implying that the liquidity generated by exports dissipates in imports.

The response to the increase in investment is positive and marginally significant, which shows that the increase in productive capacity created by investment "shields" national production from imports. The response to the increase in the ratio of female to male salaried employment is positive and significant, indicating that female wage employment imparts resilience to the manufacturing sector in regard to the avalanche of imports. In other words, female wage employment is a variable that protects the manufacturing industry due to the positive impact it has on savings and investment. Therefore, deindustrialization must be analyzed in the context of the labor market and gender.
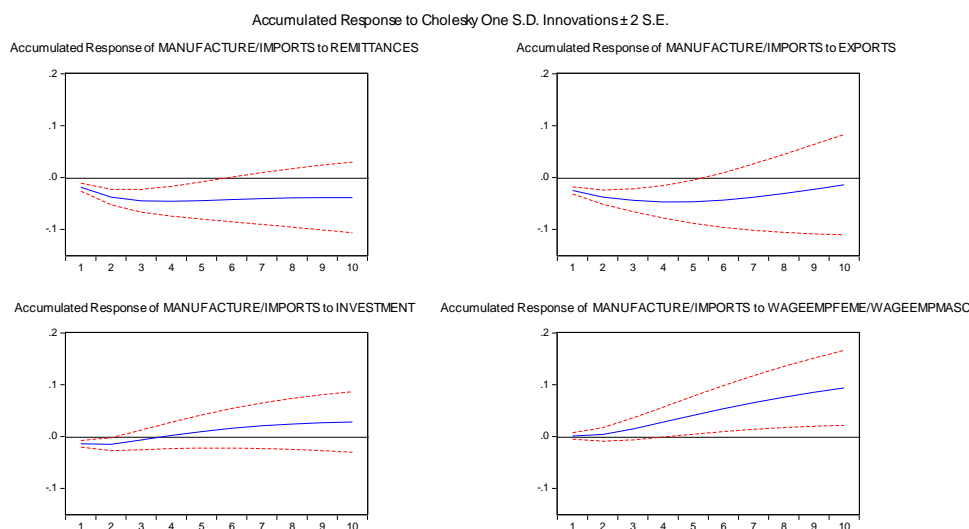

Figure 3. Response of the ratio of value-added of the manufacturing sector to imports to increases in the other variables

Another VAR was estimated including the variable capital intensity per worker, obtained by multiplying the investment rate by labor productivity. This variable is equal to investment per worker and its increasing value would indicate that workers have greater amounts of capital to carry out their tasks. Figure 4 shows that the response of the ratio of manufacture to imports is initially negative, but it becomes positive and significant in the second half of the period and is larger than the response to investment shown in Figure 3. This indicates that the protection that investment offers the manufacturing sector from imports is associated with the amount of physical capital that is available to the labor force.

Accumulated Response of MANUFACTURE/IMPORTS to Cholesky
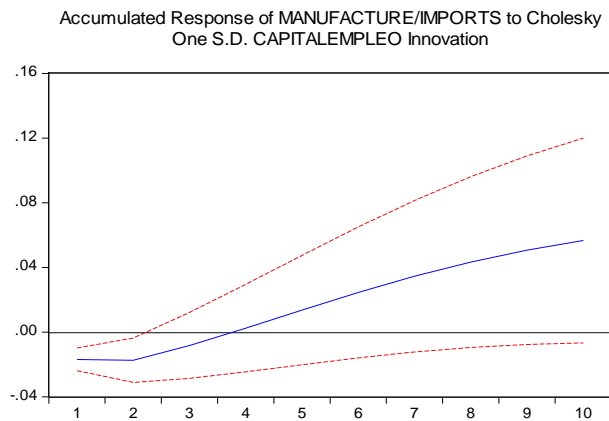One S.D. CAPITALEMPLEO Innovation

Figure 4. Responses of the Manufacture/Imports ratio to increases in the capital intensity of labor

An additional VAR model was estimated with the ratio of female to male employment in the service sector instead of the ratio of salaried employment. It can be seen in figure 5 that the response of the Manufacture/Imports ratio is positive and insignificant, which contrasts with the positive and significant response in the case of the ratio of female to male salaried employment that was presented in figure 3. This indicates that wage employment offers women better capabilities to save than employment in the service sector. Another implication is that society benefits from women participating in the salaried labor market. That is, increasing female wage employment protects the economy from deindustrialization and stagnation, thus protecting and saving female and male jobs in all economic sectors. A case can be made, as well, that society benefits from eradicating barriers that limit the participation of ethnic minorities in the labor market, of persons with disabilities, and of the elderly.

Accumulated Response of MANUFACTURE/IMPORTS to Cholesky
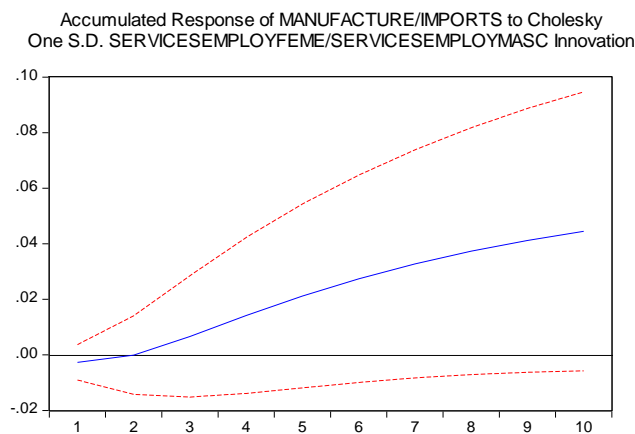One S.D. SERVICESEMPLOYFEME/SERVICESEMPLOYMASC Innovation

Figure 5. Response of the Manufacture/Imports ratio to the increase in the ratio of female to male employment in the service sector

It must be considered the result that the investment rate prevents deindustrialization, as can be seen in graphs 1, 2, and 3. It should be noted that Tregenna (2011) and Bennell (1998) have indicated that economic reform programs in developing countries have led to reduced investment rates. Hence the importance of increasing investment, which in the countries under study show declining trends. Increased investment will require increased domestic savings, which highlights the importance of female employment.

4. Domestic Savings

With a view to analyzing the behavior of domestic savings, this section analyzes the effect of the ratio of female to male employment in the industrial sector on domestic savings. The VAR also analyzes the role of the employment ratio on the deficit in the trade account, Imports-Exports, on an external solvency indicator, per capita reserves, pc reserves, and on labor productivity. The VAR is as follows: (Employment ratio, domestic savings, imports-exports, pc reserves, productivity). The responses of the different variables to a shock to the ratio of female to male industrial employment are shown in figure 6.

Figure 6 shows that the domestic saving rate increases in response to the increase in the ratio of female to male industrial employment. The deficit in the trade account falls, highlighting the role of female employment in stabilizing the external accounts. Per capita reserves show a positive and significant response throughout the period, indicating that the increase in the ratio of female to male industrial employment contributes to increasing the countries' external solvency, due to its role in increasing domestic savings and reducing the deficit in the trade account.

It can be deduced, based on these results, that the ratio of female to male industrial employment is a mechanism of macro-financial prudence, and that the external solvency of a country has an important gender determinant.

It should be emphasized that labor productivity shows a positive and significant response, which implies that the increase in the ratio of female to male industrial employment imparts greater competitiveness to the countries; this means that competitiveness has a gender dimension.

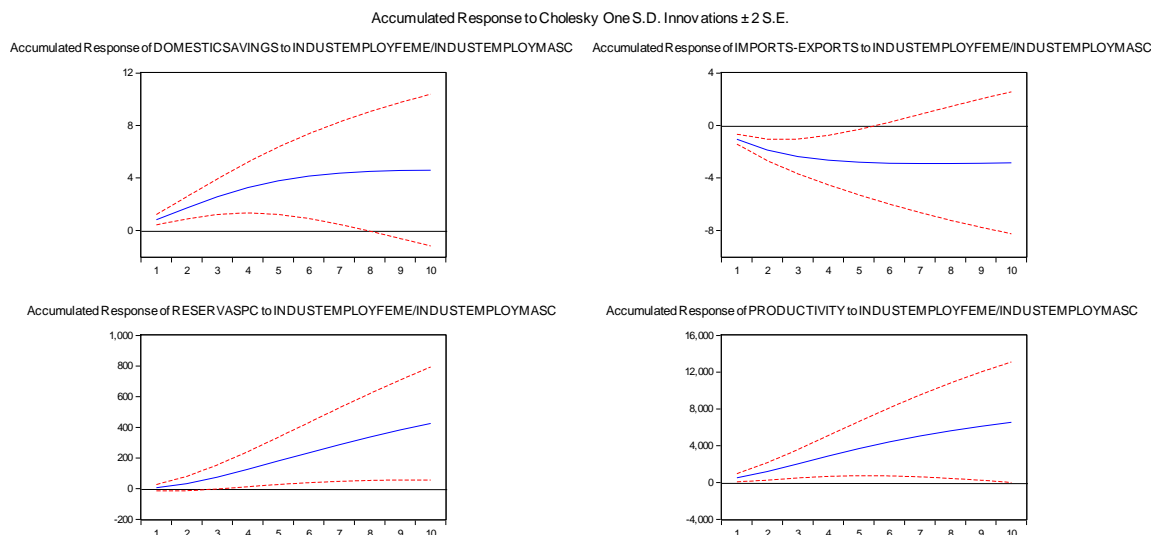Accumulated Response to Cholesky One S.D. Innovations ± 2 S.E.

Figure 6. Responses to increases in the ratio of female to male industrial employment

Another VAR was estimated with the ratio of female to male employment in the service sector, with results shown in figure 7. It is observed that, when this ratio increases, domestic savings have a positive and significant response. However, the response of the deficit in the trade account is negative and significant, which is explained by the fact that the service sector does not produce tradable goods, so the increase in the employment ratio would not be conducive to the increase in exports. The deterioration of the trade account would explain the negative response of per capita reserves. Productivity shows a negative and significant response, which can be associated with the low demand for skilled female labor in the service sector.

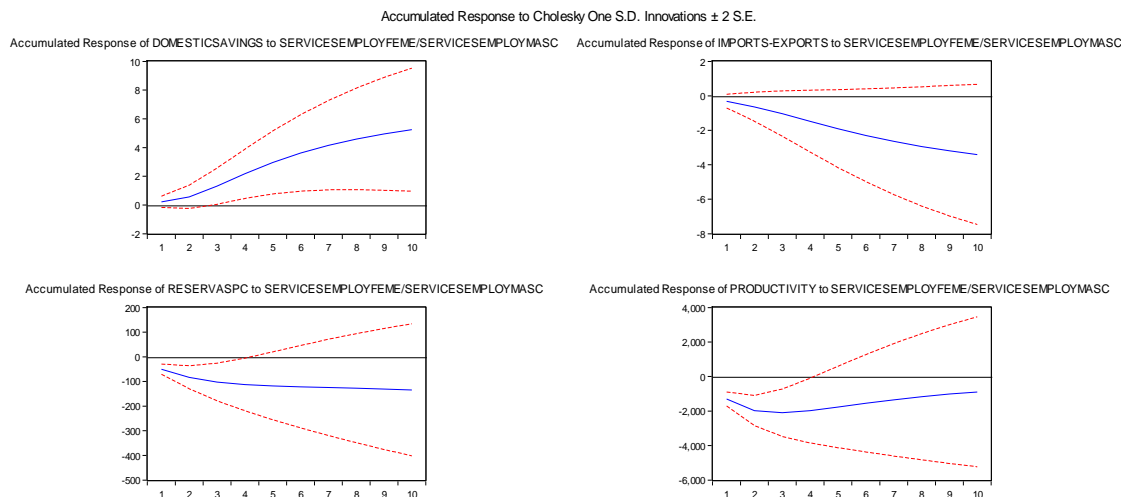Accumulated Response to Cholesky One S.D. Innovations ± 2 S.E.

Figure 7. Responses to the increase in the employment ratio in the services sector

Figure 8 shows the response to increases in the female-to-male self-employment ratio. It is observed that domestic savings have a positive and insignificant response. The responses to the deficit in the trade account and reserves per capita are negative but not significant. Productivity falls in the first two years but becomes insignificant in the rest of the period.
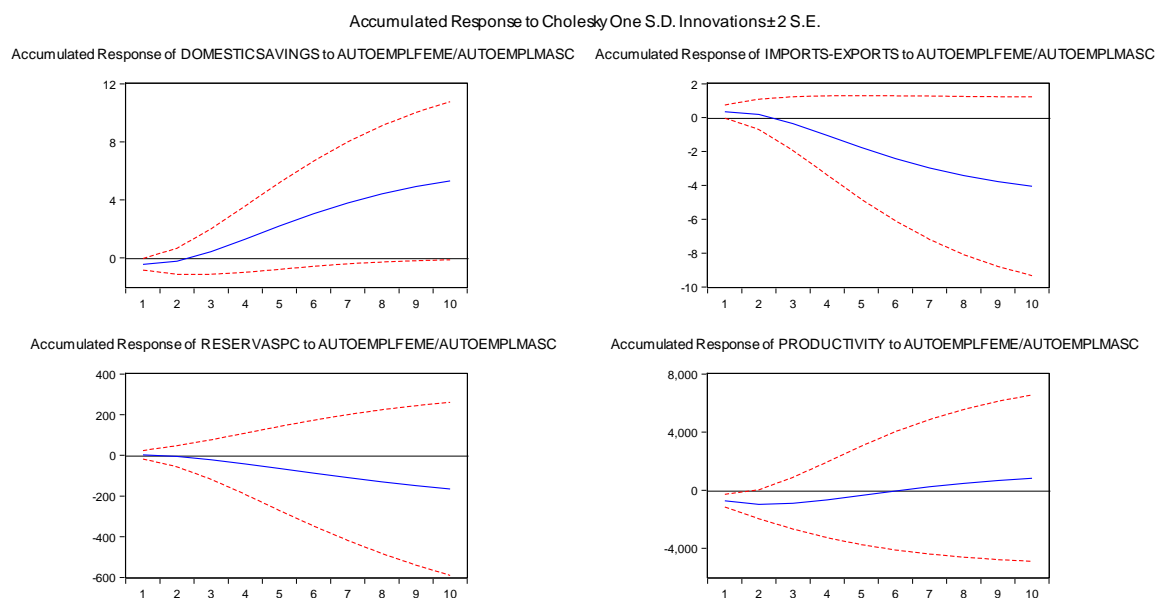

Figure 8. Responses to an increase in the self-employment ratio

These results show the importance that resides in the type of employment that women and men obtain in the labor market: the ratio of female to male employment in the industrial sector increases savings, productivity, and the strength of external solvency; the latter effect does not occur with the employment ratio in the services sector, while the employment ratios in services and self-employment exert negative effects on productivity. It should be emphasized that in the countries under study, the service sector is the largest one in terms of share of GDP and is the main source of female and male employment. The case can be made that these countries are immersed in a services trap.

As well, the so-called middle-income trap can be associated with the existence of high ratios of female to male employment in the services and in the self-employment sectors.

5. Defeminization of Employment?

Results of a VAR model are presented to detect responses of the female to male employment ratios in different sectors. The Human Development Index, (HDI), has been included in these models to appreciate the role that increasing levels of education and health have on employment ratios. Imports are also included to observe the degree to which they affect the de-feminization of employment. The estimated VARs are: (Remittances, Exports, Imports, Services, Manufacture, HDI, Female to male employment ratio).

The results for the case of the industrial employment ratio are presented in figure 9. It is observed that this ratio falls in response to the increase in remittances, which indicates that remittances encourage more male employment than female employment in the industrial sector, which can be associated with the deindustrialization role exerted by remittances. This ratio also falls due to the increase in exports, but the response is only significant in the first four years. There is evidence that in Latin American countries the export sector does not necessarily play a role in the de-feminization of employment (Tejani & Milberg, 2010).

The response to the increase in imports is negative and significant, which implies that imports have a role in the de-feminization of industrial employment. It should be noted that the variables associated with the external sector, such as exports, imports, and remittances, drive the de-feminization of the industrial sector, which can be associated with the excessive openness of the economies. Imported manufactured goods would likely be cheaper than industrial domestic goods, which would lead to a reduction of manufacturing output and of the female labor force in the sector. It is also necessary to consider the role of domestic consumption of imported goods, to which the population may grant special preference due to the fact of being imported.

The responses to the increases in the service and manufacturing sectors are positive and negative respectively, but both are insignificant. The response to the increase in the HDI is slightly positive and significant in the first four years, so it could be inferred that increases of human capital prevents de-feminization in the industrial sector.
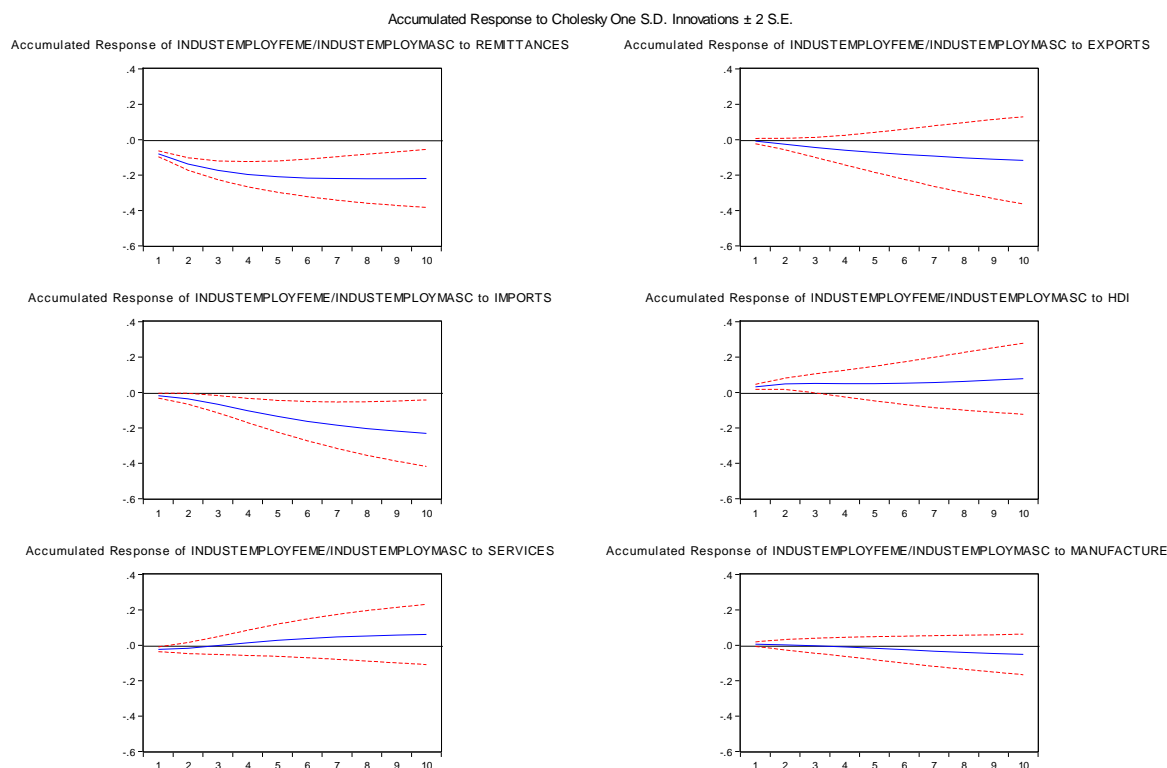

Figure 9. Responses of the ratio of female to male industrial employment to shocks to other variables

Figure 10 shows the responses of the female to male employment ratio in the service sector. The response to the increase in remittances is negative and significant, which again highlights the labor de-feminizing role of remittances. The response to the increase in exports is negative but not significant, which can be associated with the fact that the service sector does not produce tradable goods. This would also explain the insignificant response to the increase in imports, that is, imports do not displace either female or male employment in the service sector.

The increases in investment and in the manufacturing sector give rise to positive and marginally insignificant responses, which indicates that the expansion of these sectors does not favor female or male employment in the service sector. The negative and significant response to the increase in the HDI should be highlighted, which indicates that as the population's levels of education and health increase, women are displaced from the service sector by men, which would imply that the increasing sophistication of the service sector leads to more recruitment of men in the sector. This result has been found in the manufacturing sector of other countries, which has been explained by the growing technological content of the manufacturing sector, which discourages the hiring of women.

Given that the female school attainment rate exceeds the male rate in Latin American countries, there should be no reason for women not to be hired even with the complexity of the service sector. It should be emphasized that this is the largest sector in the countries under study, in which women lose ground in their intention to obtain or maintain employment. In other words, human capital is not sufficient to counteract the "cultural" barriers that women face in the labor market.
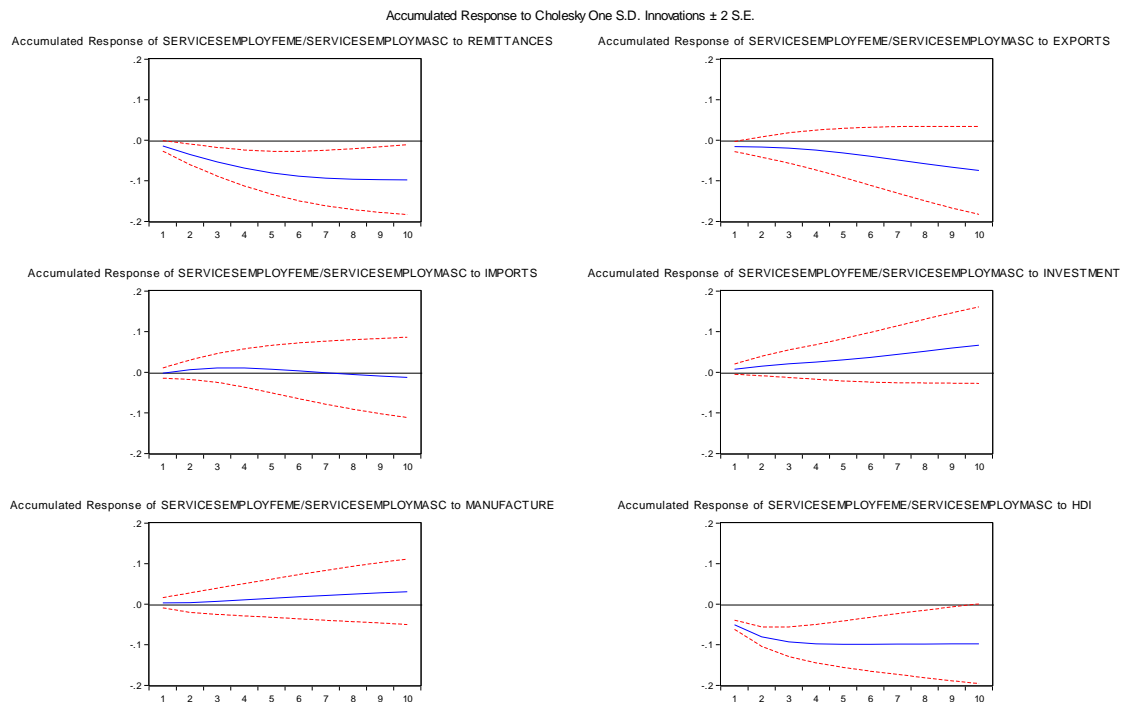
Figure 10. Responses of the female to male employment ratio in the service sector to increases in other variables
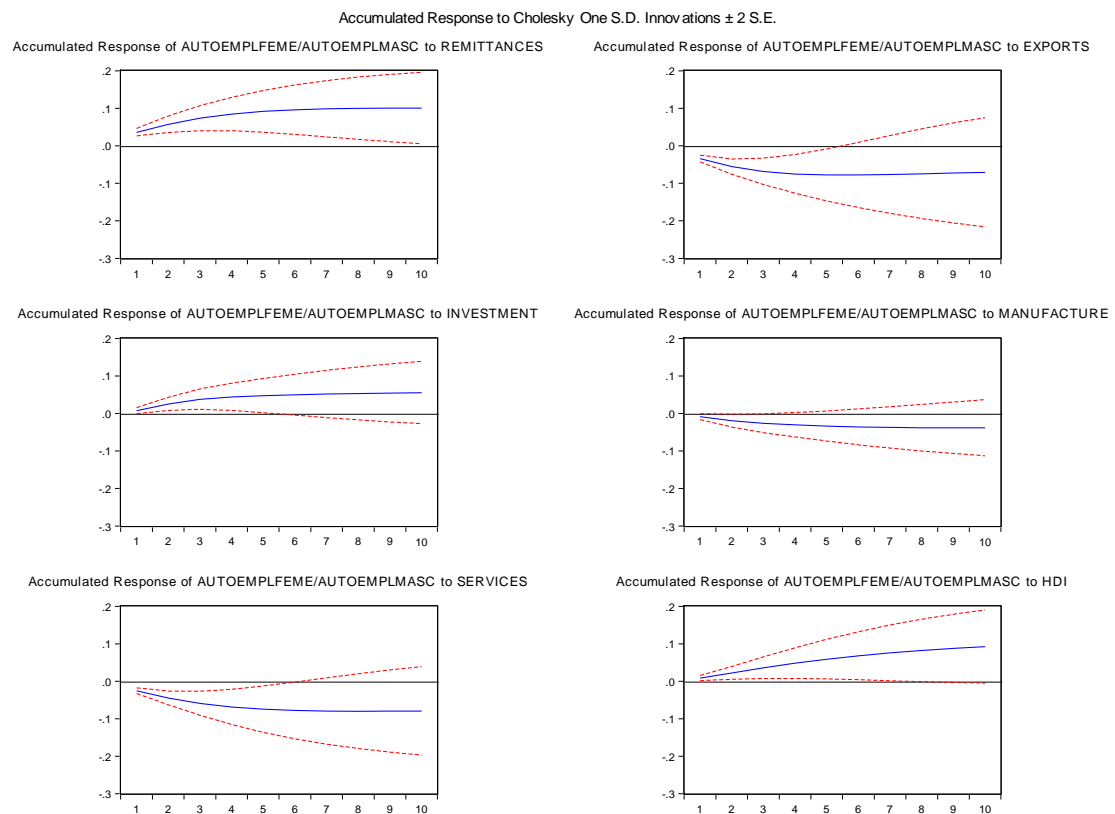

Figure 11. Responses of female to male self-employment ratio to increases in other variables

Figure 11 shows the responses of the female to male self-employment ratio. The responses regarding the increase in remittances are positive and significant, which implies that remittances contribute to the feminization of informality. This could reflect that those women who receive remittances would choose to establish a small business in the informal sector. Or that women who lose their jobs in the industrial and services sector because of

the increase in remittances, would resort to self-employment.

One implication is that the impact of remittances on poverty reduction may be limited in view of the evidence that self-employment does not reduce poverty (C áceres, 2017b). The response to the increase in exports is negative and significant, that is, the growth of the export sector de-feminizes informality. Or it can be assumed that the growth of the export sector requires low-skilled and low-paid labor, which is found in women working in informality; Standing (1999) has pointed out that the feminization of the export sector occurred because women represented cheap and flexible labor.

The response to increased investment is positive and significant. The opposite occurs with the negative and significant responses to increases in the manufacturing and services sectors, which could be interpreted as evidence that these sectors reduce the feminization of informality, as they employ female labor existing in the informal sector. This shows that women work in the informal sector not because of the "flexibility" it offers, or because they want to avoid taxes, as has been pointed out in the literature, because they show inclination or willingness to leave informality in responses to the dynamism of the export, manufacturing, and services sectors where they aspire to obtain better employment opportunities.

It should be noted that the response of the self-employment ratio to the increase in the HDI is positive and significant, which implies that human capital allows men to leave informality more easily than women, which could indicate that women face discrimination, or more obstacles than men, in their intents to leave the shadow sector.
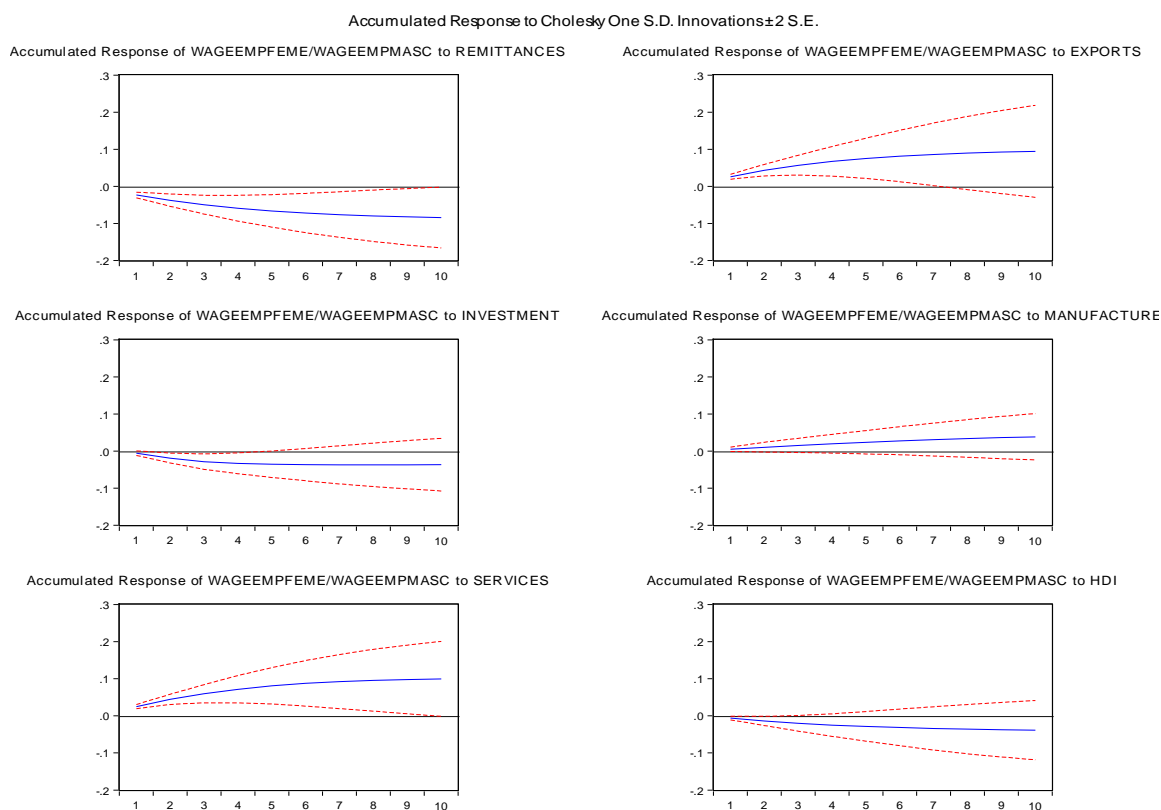

Figure 12. Responses of ratio of female to male salaried employment in the sector in the face of increases in other variables

The responses of the ratio of female to male salaried employment are shown on figure 12. A shock to remittances gives rise to a negative response, indicating that remittances generate male salaried employment to a greater degree than female ones. The opposite is observed in the response to the increase in exports, which implies that the export sector is a source of good jobs for women to a greater degree than for men, which could be associated with the significant presence of the maquila industry in these countries. Conversely, the increase in investment favors wage employment for men to a greater degree than for women, which is in accordance with recent studies that have reported that the productive sophistication associated with investment inhibits the hiring of women in positions of salaried employment, which could be another manifestation of gender discrimination. It should be

noted that the responses of the ratio to increases in the manufacturing and services sectors are positive and significant, that is, in these sectors women have an advantage over men in relation to being hired in salaried employment positions. The response to the increase in HDI is negative and significant, which implies that human capital is not a secure passport that allows women to obtain a salaried job, contrary to the situation of men, to whom their human capital opens up opportunities or doors to wage employment. This can be interpreted as evidence of gender discrimination.

6. Does the Feldstein Horioka Paradox Exist in Mexico and Central America?

Feldstein and Horioka's (1980) paradox derives from the results reported by these authors that domestic investment is exclusively determined by domestic savings and that foreign savings has no role in financing investment. To investigate the existence of this paradox in Mexico and Central America, the following VAR was estimated: (Investment, Domestic Savings, -Current Account Deficit), where the negative of the deficit in the current account represents foreign savings. Figure 13 shows the responses of investment to increases in domestic and foreign savings; it is observed that both responses are positive and significant.

Accumulated Response to Cholesky One S.D. Innovations ± 2 S.E.

Accumulated Response of INVESTMENT to DOMESTICSAVINGS
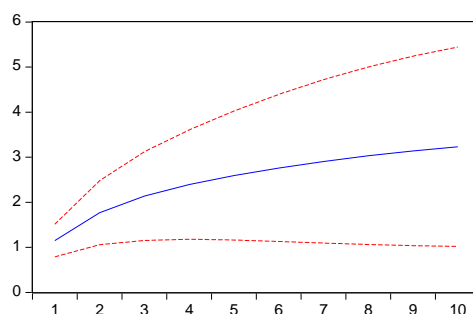
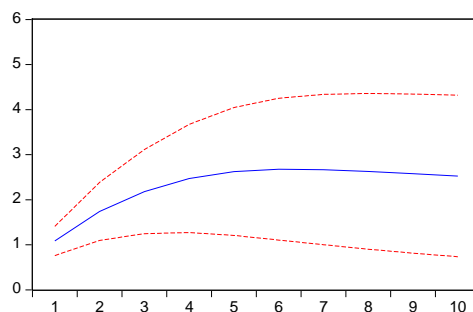Accumulated Response of INVESTMENT to CURRENTACCOUNT

Figure 13. Responses of investment to increases of domestic and foreign savings.

These results allow one to infer that the Feldstein and Horioka paradox does not hold in these countries, since investment is determined by both domestic and foreign savings.

To corroborate the previous results, cointegration equations were estimated based on the Phillips and Hansen (1990) methodology, including qualitative variables to control the fixed effects, expressing investment in terms of domestic and foreign savings rates, with results shown in equation (1) of table 2. It is observed that the coefficients of both types of savings are positive and significant, which shows once again that such a paradox does not exist in these countries.

Given that domestic saving is determined by the female to male employment ratio as seen in graphs 7, 8, and 9, the paradox was investigated using employment ratios instead of the domestic saving rate. It is observed in equation (2) that the ratio of female to male salaried employment has a positive and significant coefficient, and the equation explains 75 percent of the variance of the investment rate, indicating that the labor market and especially gender, have impacts in financing investment.

Equation (3) shows the results using the industrial employment ratio, whose coefficient is positive and significant. The female to male employment ratios in the service sector and in self-employment was also used,

with results showing significant and negative coefficients, as can be seen in equations (4) and (5).

These results show that financing of investment depends on the type of employment women obtain in the labor market. In cases where women work in the informal sector, or in low-quality jobs in the service sector, there will be constraints on financing investment solely with domestic resources, and thus investment would rely on external resources, which may have negative impacts on the external solvency of the countries.

This indicates that a country's external solvency depends on the type of employment to which women have access, and that the promotion of female industrial, and wage employment is a macroprudential policy.

Table 2. Determinants of the investment rate

	Equation number:				
	(1)	(2)	(3)	(4)	(5)
Constant	12.3024	5.9404	11.2462	29.2090	30.3255
	(13.65)	(1.39)	(5.44)	(5.70)	(7.48)
External savings	0.4290	0.3767	0.3196	0.2949	0.3556
	(4.10)	(2.51)	(2.35)	(1.98)	(2.30)
Domestic savings	0.3785				
	(7.75)				
Ratio wage employment		13.9265			
		(3.00)			
Ratio industrial employment			5.0785		
			(3.74)		
Ratio service employment				-5.9587	
				(2.12)	
Ratio self-employment					-10.3653
					(3.00)
R2	0.86	0.75	0.76	0.75	0.75

7. Principal Components Applications

The results obtained with the VAR models show that variables associated with deindustrialization are imports, private investment, and value-added of the services sector all as percentages of GDP. Caceres (2017) has shown that decreasing tariff on imports gives rise to deindustrialization. In the case of Mexico, these variables were subject to principal component analysis, which is a methodology used to compress data. The results are shown in table 3.

Table 3. Principal component analysis

Eigenvalues: (Sum = 4, Average = 1)					
Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	2.559930	1.413960	0.6400	2.559930	0.6400
2	1.145970	0.908444	0.2865	3.705900	0.9265
3	0.237526	0.180951	0.0594	3.943425	0.9859
4	0.056575	---	0.0141	4.000000	1.0000
Eigenvectors (loadings):					
Variable	PC 1	PC 2	PC 3	PC 4	
MXTARIFA	-0.570575	0.149025	0.759027	0.275888	
MXSERVICES	0.486752	-0.511250	0.601958	-0.373284	
MXIMPORTS	0.601577	0.176616	0.138915	0.766560	
MXINVESTMENTPRIVA					
TE	0.274994	0.827781	0.205493	-0.443768	

It is observed that the first principal component explains 64 percent of the variance of the original variables, while the second explains an additional 28 percent. In the first component, the weights of imports (0.6016) and services (0.4867) are relatively high, and the weight of the tariff is negative (-0.5706). These three variables act

to undermine industrialization, and their aggregated value is not offset by the role of the private investment rate, which has a positive, low-value weight (0.2750). Therefore, it is valid to assume that the first component represents deindustrialization; this is corroborated by observing graph 14 which shows that the first component has a negative relationship with the percentage of the value-added of the manufacturing sector in GDP.
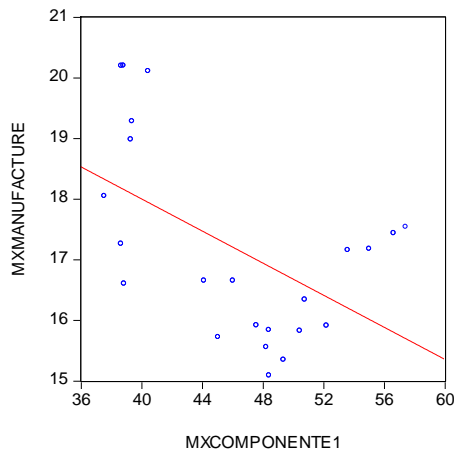

Figure 14. First principal component and participation of the manufacturing sector in GDP
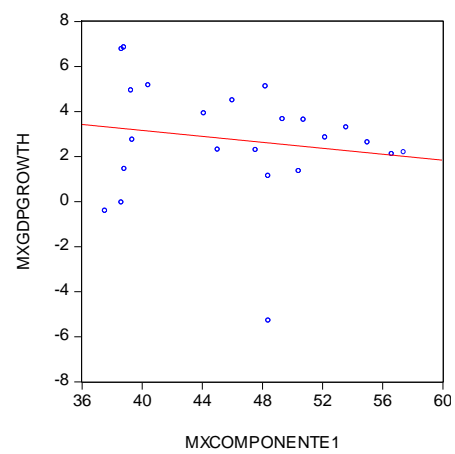
Figure 15. First principal component and rate of economic growth

Likewise, the first principal component has a negative relationship with the rate of economic growth, as can be seen in figure 15.

The opposite is observed in the second principal component, where investment has a high positive weight (0.8277), the weight of the tariff is positive, (0.1490), and the percentage of the added value of the services sector is negative (-0.5112), which favors manufacturing production. This component has a low import weight (0.1766), which also favors industrialization.

This component has a positive relationship with Manufacture and with the rate of economic growth, as can be seen in figures 16 and 17.
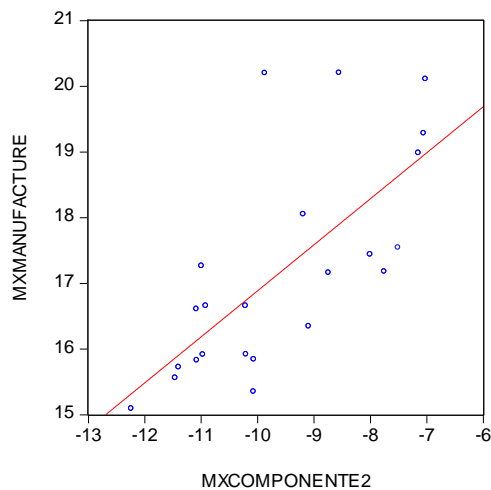

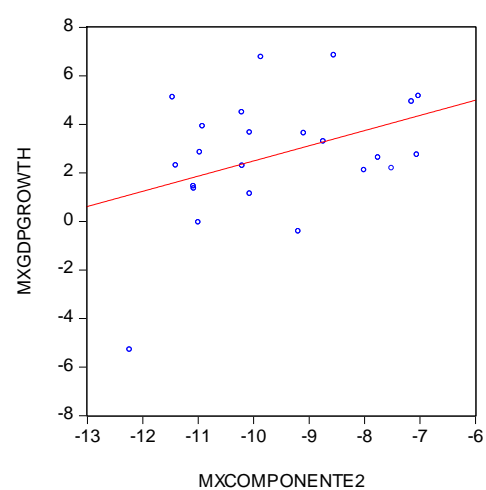Figure 16. Second principal component and participation of the manufacturing sector in GDP

Figure 17. Second principal component and rate of economic growth.

It should be noted that as the first principal component, ie deindustrialization, increases, the female population employed in the industrial sector decreases (figure18).
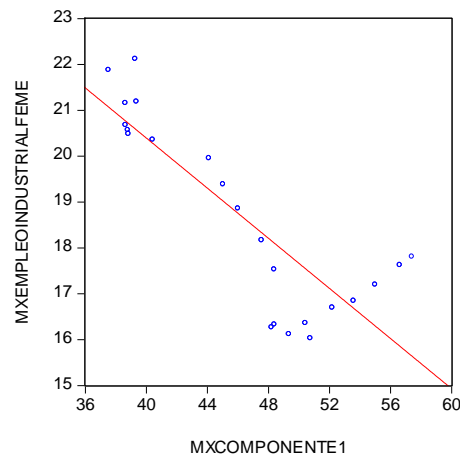
Figure 18. First principal component and female industrial employment rate

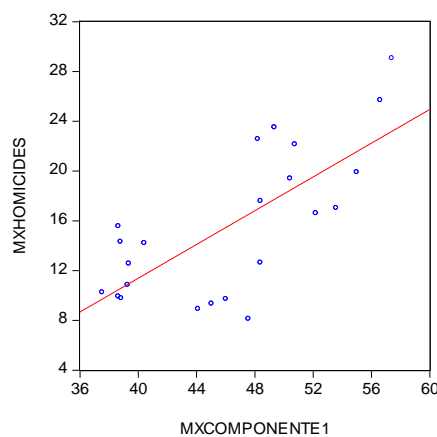Moreover, homicides and suicides increase, as shown in figures 19 and 20.

Figure 19. First principal component and number of homicides per 100,000 inhabitants.
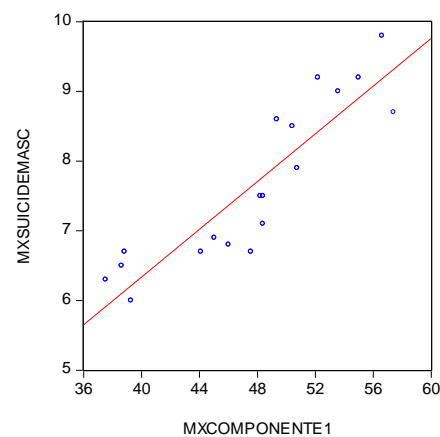
Figure 20. First principal component and number of homicides per 1000 habitants

This evidence means that deindustrialization kills.

8. Catastrophe of Economic Primitivization

Deindustrialization can generate a technological regression caused by the fall in investment in tradable goods giving rise to stagnation tendencies, unemployment and social conflicts. This can be referred to as a process of primitivization, to use Endresen's (1994) term, cited by Tregena (2016). This occurs because of indiscriminate economic openness. Openness inhibits new investments in plants and equipment to produce tradable goods, giving rise to the fall in exports and industrial production. This represents a technological regression that manifests itself in low levels of labor productivity and slow export growth, as observed in some Central American countries.

Labor productivity began to fall in Latin America in the mid-1990s, which has been called a puzzle, given that economic reforms began in that period (Cavalcanti, De Abreu, & Veloso, 2014). In Central America, this panorama is characterized by excessive private consumption fueled by remittances and served largely by imports, thus generating a mirage of modernity, with scant investment in tradable goods, technology, knowledge, and innovation.

The following paragraphs describe an economy that can be found in one of two states: one, the state of Development, (Desarrollo), characterized by high rates of investment and therefore by high rates of economic growth and the generation and acquisition of technology, and another, in the state of Anti-development, (Primitivo), characterized by low rates of investment, deindustrialization, deagriculturalization, and dependence on imports. The transition between the two states is possible, depending on the values of the rates of investment

and imports. There exists an economy consisting of two structures, one, of Development and another, of Primitivization, both determined by investment and imports.

Figure 21 shows that initially, the economy is at point P characterized by a low import rate (Importacion), and a high investment rate (Inversion). It is assumed that the country undertakes a process of liberalization of imports, depicted by the movement along the PA line, characterized by a fall in investment and economic growth. At point A there is an abrupt change, that is, an economic catastrophe, as the economy falls from point A to point B, thus transitioning from the Development state to the Primitivo, or Anti-Development state. In catastrophe theory (Thom, 1977), this drastic change in structure is called a cusp catastrophe.

In the primitive state, the economy shows low economic growth rates in view of high import rates and low investment rates. This state can persist for a long time due to remittances. Rescuing the economy requires reducing imports and increasing the added values of the manufacturing and agricultural sectors, following the line CD in figure 21.

Recovering the economy along the transition path CD, (Recuperacion), can take a long time, not only because of the mirage promoted by remittances that continue spurring the consumption of imported goods but also because of the reluctance to recognize the serious shortcomings of the import-based model. Thus, the economy remains in a comatose state.
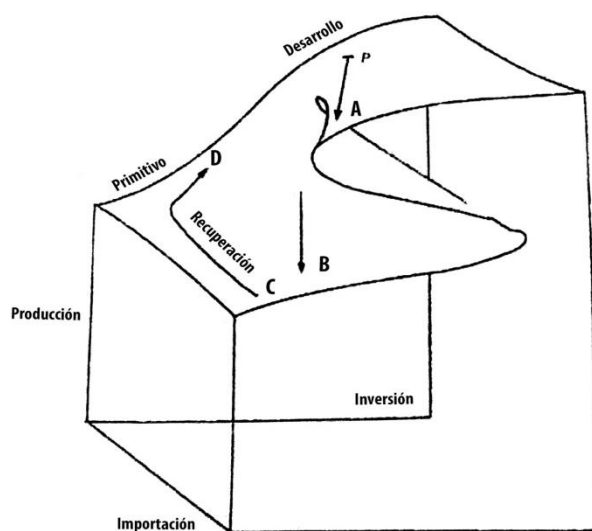

Figure 21. The catastrophe of economic primitivization

That primitivization is a reality is clear when considering that some Central American countries have spent decades exporting people and a change in this orientation is not currently perceived. Moreover, in some countries it is observed that the trade account deficit is larger than the amounts of exports, remittances exceed exports, or domestic savings rates are negative. It is also verified by considering that the recent episodes of economic boom, which resembled the experiences from the second half of the 19th century, were determined by the export of primary products, and were followed by persistent stagnation tendencies once the price of primary products fell.

Another evidence of the Latin American primitive economy is clear when observing that Latin American countries have 8 percent of the world's population but their deaths from the COVID-19 pandemic represent 28 percent of the total global deaths and that their homicide rates represent 33 percent of the global totals. The same is deduced when considering that half of the 25 most violent countries in the world are in Latin America, that every day 10 women are murdered, and that 13 of the 15 countries with the highest rates of femicides are in Latin America (Busso & Messina, 2020). This indicates that productive regression leads to social regression and thus to multiple classes of catastrophes.

9. Spillover Regional Effects from Globalization

Disruption of labor markets caused in one country by deindustrialization leads to adverse repercussions in other countries. This is shown in graph 22. It can be seen in quadrant 1 that the globalization measures implemented in country 1, Global1, for example, in terms of lowering the protection of national industry, give rise to an increase in unemployment, Desempl1. The increase in unemployment generates feelings of anxiety in the affected population, and the experience of not finding a job in conditions like the previous one generates a state of social

disadvantage, Desventaja, alluding to Wilson's work on the deterioration of social relations and economic wellbeing as consequences of unemployment. There is evidence that unemployment leads to drug consumption (Nagelhout et al., 2017; Compton et al., 2014), a relationship shown in quadrant 2. Quadrant 3 shows a positive relationship between the disadvantaged situation of the unemployed and the demand for drugs, Demand 1. With this base, quadrant 4 builds the positive relationship between globalization in country 1 and its demand for drugs. The demand for drugs in country 1 creates the respective supply in country 2; quadrant 5 shows the positive and transnational relationship between the demand for drugs, demanda D1, and its supply, oferta D2.

Given that drug production generates violence in country 2, Violencia 2, (Roberts & Chen, 2013), quadrant 6 shows the positive relationship between drug production, Oferta D2, and the resulting violence. On this basis, the positive relationship between globalization and drug consumption in country 1 and violence in country 2 is derived in quadrant 7. Violence in country 2 leads to a drop in its rate of economic growth, Growth2, a relationship shown in quadrant 8. Using the 45-degree line in quadrant 9, quadrant 10 shows the negative association between the supply of drugs in country 2 and its economic growth rate, while quadrant 11 shows the negative relationship between the globalization of country 1 and the economic growth of country 2. That is, globalization in a given country not only leads to a drop in its economic growth rate but also generates recessive tendencies in another country as a result of the demand for narcotics. And globalization generates violence in both countries.

Quadrant 12 presents the negative relationship between the growth rate of country 2 and its unemployment rate, Desempl 2. Unemployment in country 2 encourages irregular emigration, a relationship that is shown in quadrant 13. On this basis, quadrant 14 shows the negative relationship between economic growth in country 2 and the flow of irregular emigration, while quadrant 15 presents the positive association between drug production and supply in country 2 and irregular emigration in country 2. Of particular interest is the positive relationship between globalization in country 1 and irregular emigration from country 2, shown in quadrant 16.

That is, emigration, violence, and economic stagnation in country 2 are, in part, responses to the globalization policies implemented in country 1. Of course, the situation becomes more serious when country 2 undertakes globalization measures, such as "free trade". In this situation, unemployment would increase even more, increasing violence and the flow of irregular migration.
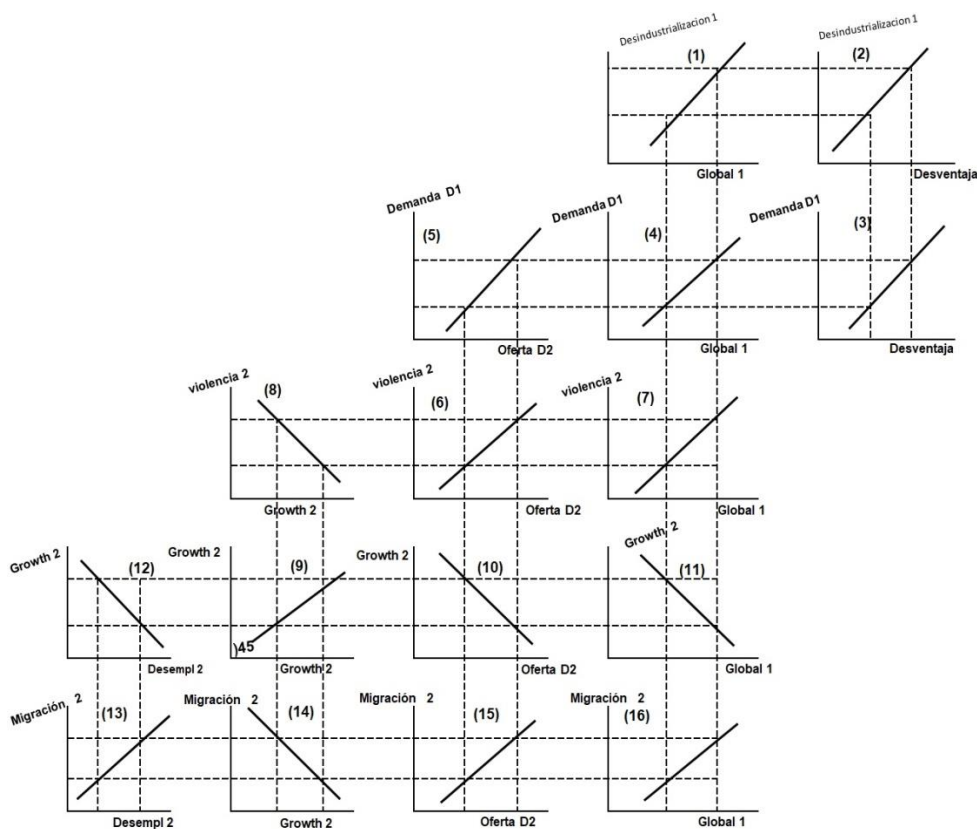

Figure 22. Spillover regional effects from national globalization

The implication from figure 22 is the importance of campaigns to dissuade the population not to incurring drug consumption. As well, the case can be made that economic stabilization measures undertaken by one country can have severe consequences on other countries as the resulting unemployment in the adjusting country would increase the demand for drugs and thus increase the supply from other countries. This is real-life economics, that does not receive the attention it deserves, in a discourse polluted with fake news about the goodness of "free trade" "competitiveness" and "democracy"…

10. Conclusions

The results on the causes of deindustrialization indicate that there is no single cause of this phenomenon: remittances drive deindustrialization, while investment, exports, and the ratio of female to male salaried employment prevent it. Therefore, the study of deindustrialization must take into account the behavior of various variables. Of particular importance are the responses of the ratio of the value-added of the manufacturing sector to imports, which represents a deindustrialization relative to import penetration. It can be seen that this ratio falls categorically with increases in remittances and exports, which means that these variables cause imports to displace the manufacturing industry, that is, people who receive remittances, or who receive income from exports, prefer the consumption of imported goods instead of domestically manufactured ones. The only variable that undoubtedly protects the national industry from imports is the ratio of female to male salaried employment. This result highlights the importance of promoting quality female employment. The high propensity of women to save constitutes a "weapon" that defends the domestic productive capacity.

It should be noted that the now developed countries never implemented the reform measures undertaken by the Latin American countries in the 1990s, as pointed out by Stiglitz (2003), and therefore, their deindustrialization was not premature. When European countries implemented measures to liberalize their foreign trade, the result was the loss of 50 percent of industrial employment, as noted by Tregenna (2016). This author also relates the destruction of the industrial plant of the former socialist countries due to the reduction of import tariffs to close to zero, as a means of imparting "efficiency" to the manufacturing industry (Note 1). On the contrary, the Asian "Tigers" had the vision and wisdom to maintain the protection of the industrial sector.

The "boom" in the economic growth of the countries of South America in the first and second decades of the 21st century cannot be attributed to the reforms but was related to the growth of their exports of primary goods to China; once the demand for these goods waned, the countries entered a period of low growth.

Remedying this situation will not be an easy task, since domestic groups of economic power have great interests in the import business, so the protection of the national industrial sector will hardly have political support. This would represent continuing with a failed model that has no historical basis and rather represents an aberration of economic policy resulting from greed, domestic and external. It also means the continuation of slow economic growth, fiscal weakness, violence, and irregular emigration.

The results of this study show the positive role of increases in the female to male employment ratios in the manufacturing, services, and salaried employment sectors, on the increase in the share of the manufacturing sector over GDP. This indicates that closing gender gaps in employment, in addition to its ethical, justice, and human rights implications is imperative due to its positive macroeconomic implications. It is valid to argue that closing the gender employment gap would contribute to imparting dynamism to the manufacturing sector and therefore to economic growth, which would increase the demand for labor, giving rise to a self-sustained process of employment and growth. Closing gender gaps in employment would also contribute to reducing the deficit in the trade account of the balance of payments, which would contribute to an increase in international reserves, to a reduction in external indebtedness, and therefore to external solvency.

On the contrary, the ratio of female to male self-employment tends to reduce domestic savings and the share of the manufacturing sector in GDP. In other words, the sector that must be de-feminized is that of self-employment, that is, informality.

The results show that in aggregate terms, remittances and imports lead to the de-feminization of the workforce, and to deindustrialization, while exports, investment, and the human development index are related to the feminization of employment. It should be noted that the HDI is a reflection of the social spending of the countries (Cáceres, 2008), so reindustrialization and the mobilization of savings demand increases in social investment. It is necessary to consider the result that the investment rate is a preventive variable of deindustrialization, as can be seen in Figures 1, 2, and 3.

Hence the importance of increasing investment rates, which in the countries under study show declining trends. Increased investment will require increased household savings, which again highlights the importance of female

employment.

Several authors have argued that reindustrialization would not be possible because in globalization there is no space for small-scale national production; however, it is valid to argue that with due protection and with an expanded market in the framework of regional economic integration, such as in Central America, reindustrialization is possible. In other words, increasing production requires establishing protection measures for the productive sector, and renouncing the wild tales that globalization is unavoidable and is a mandate or an obligation. This is especially important considering the supply constraints that the COVID-19 crisis has imposed on developing countries, which demands supporting domestic production.

The first measure to combat deindustrialization is the elimination of the extreme external opening of the economies, which has not had any result, other than deindustrializing the countries, the large deficits in the trade account, which serve as true "black holes" for remittances and other capital inflows; for many countries in the region, globalization has resulted in economic stagnation, junk food galore, silly cartoon motion pictures, grotesque sounds that try to pass as music, and the loss of culture and identity.

The easy way out of the ravages of openness has been irregular emigration. Another less visible, but especially important exit has been to enter the ranks of crime. This is a phenomenon that has its own dynamics; Cáceres (2021) has shown that tariff reduction in Central American countries led to youth unemployment and in turn to self-employment, to the situation of NEETS, to the increase in crime, emigration, and remittances. This author has also shown that the substantial increase in social investment would contribute to dismantling the vicious circles that give rise to economic and social primitivization. And requires a mindset that prioritizes domestic production and hoists the position:

Fuck globalization.

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Note

Note 1. It is relevant to cite The Washington Post of July 11, 2021, on consequences of "free trade", in Haiti: "In 2010, former president Bill Clinton felt compelled to publicly apologize to Haitians for having forced the country in the 1990s to drop tariffs on U.S. agricultural imports, a move that devastated Haiti's rice cultivating farmers. "It may have been good for some of my farmers in Arkansas, but it has not worked" he said. "I have to live every day with the consequences of the lost capacity to produce a rice crop in Haiti to feed those people, because of what I did". Apologies, and compensation, may be in order to other countries.