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CLASSICAL DEMANDS AND INFORMAL SUPPLIES: TWO KEY MISSING PIECES OF MEXICO'S GROWTH PUZZLE

DEMANDAS CLÁSICAS Y OFERTAS INFORMALES: DOS PIEZAS CLAVE AUSENTES EN EL ROMPECABEZAS DEL CRECIMIENTO DE MÉXICO

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Resumen:

¿Por qué se redujo tanto el crecimiento de México después de la apertura comercial? Y por qué es tan limitado crecimiento a pesar de tantas exportaciones? A las narrativas ofrecidas para explicar estos enigmas les hacen falta dos componentes claves: demandas clásicas y ofertas informales. Para crecer más rápido, el país necesita concentrarse no solo sobre su capacidad exportadora, sino también sobre su capacidad para crecer domésticamente y mejorar su productividad al incorporar el trabajo informal. En un mundo globalizado, esto requiere desarrollar nichos de mercado que generen suficiente valor doméstico, así como producir bienes y servicios más innovadores, más atractivos y con demandas más dinámicas.

Abstract:

Why did Mexico's growth declined so much after the economy opened up? And why so little growth despite so many exports? The narratives proposed to explain these puzzles miss two key pieces: classical demands and informal supplies. To grow faster, the country needs to focus not just on its export supply capacity but also on its capacity to grow domestically and enhance productivity by pulling in informal labor. In a globalized world, this requires developing export niches that generate sufficient domestic value and producing goods and services that are more innovative, more attractive and with more dynamic demands.

Clasificación JEL/JEL Classification: 040, 054, F10.

Palabras clave/keywords: growth, import substituting industrialization, global competitiveness, captive demand, informality.

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1. Introduction

After reaching an average of around 6% during the import substitution industrialization (ISI) era, Mexico's post-ISI yearly gross domestic product (GDP) growth collapsed to around 2%, despite the success of the country's trade liberalization in boosting manufacturing exports. This growth puzzle has been exploited as a political football to recommend a return to Mexico's policies of the distant past. The attempts of the academic profession to sort out this puzzle can be roughly grouped around three alternative policy failures: 1) a structuralist-based, Economic Commission for Latin America and the Caribbean (ECLAC)-centric narrative that blames laisser-faire neoliberalism for having dismissed the key industrial policy role of the state (Bértola and Ocampo, 2013); 2) a Solow growth decomposition-based narrative that blames the state for having failed to complete the necessary reforms of the enabling environment (see among many others Bergoeing *et al.*, 2002; Guerrero *et al.*, 2006; Chiquiar and Ramos-Francia, 2009; Levy and Walton, 2009; Hanson, 2010; and Ros, 2015); and 3) a micro-based narrative that blames the state for having induced resource misallocations amongst firms and promoted informality through policy distortions (Hsieh and Klenow, 2009; Levy, 2018).

Each of these three narratives contains obvious seeds of truth: smart industrial policy is back in fashion, worldwide; Mexico's business environment is missing key ingredients for investment and growth, including as regard infrastructure, confidence, and the rule of law; and a heavy policy bias against formality leans against both efficient resource allocation and fiscal solvency. Yet, all three narratives overpromise because all three miss two essential pieces of the growth puzzle. First, they are strictly supply-focused and neglect the role of demand. Second, while at least one of the narratives focuses on informality, it does so strictly at the micro level. Hence, all three ignore the dynamic and macro-systemic implications of a demand-driven, segmented supply.

Take first the structuralist narrative. In attributing the growth and productivity success of the ISI era to the heavy guiding hand of the state, it faces a crucial identification problem as it leaves aside a key feature of import substitution: the capture of domestic demand through trade protection. By raising the price of local manufactures relative to the cost of imported inputs, trade protection allowed real wages to rise, thereby pulling labor from the informal sector and boosting inward-oriented industrialization. At the same time, while most home manufacturers fell short of the required export quality, the

captive local demand allowed firms to invest and raise their productivity by capturing scale and learning economies without worrying about foreign competition. As long as there was sufficient foreign exchange from traditional exports to cover the cost of the imported inputs, the demand was there. And as long as there was a sufficient pool of incoming labor from the informal sector the supply could be there too. Thus, as long as these conditions held, the ISI miracle years of rapid industrialization, impressive productivity gains, fast growth, and steadily improving labor conditions could continue to unfold. Yet, as in the case of the Eastern European socialist economies after the Second World War, the initial fast growth and rapid productivity gains derived from a captive demand for inferior quality goods (what we could call the "LADA" effect, in remembrance of the LADA cars made in East Germany, which could not find buyers outside the Iron Curtain) came eventually to a standstill and then collapsed like a house of cards.

Take now the aggregate productivity narrative based on traditional, Solow-based, growth decompositions. This approach invariably leads to the conclusion that the slow growth of total factor productivity (TFP) was the main factor behind Mexico's slow GDP growth. Moreover, the lagging TFP was rooted in a long list of shortcomings of Mexico's enabling business environment. However, by ignoring the role of demand, this approach provides an incomplete and ultimately misleading view of productivity. With a large informal sector, TFP fluctuations can become endogenous as demand shocks shift labor between a more productive formal sector and a less productive informal sector that functions as a labor buffer. Hence, it is no longer clear whether slow TFP growth causes the slow GDP growth, is a consequence of it, or happens together with it without directly causing it. Unlike in the case of changes in capacity utilization, such endogeneity is structural rather than cyclical. Hence, it is permanent and cannot be simply set aside through "averaging over the business cycle". At the same time, because the Solow (1957) approach implicitly assumes a single good, it faces additional identification problems in an open economy. In particular, does growth come from tradable goods and exports, or does it originate domestically in non-tradable goods? It is, therefore, not clear whether Mexico's slow and volatile TFP growth mainly reflected an external demand problem -the country's inability to overcome global market competition and offset its intensity shifts over time (what we could call the "China effects") -or was strictly a domestic supply problem- an inefficient use of factors of production.

Finally, consider the popular, micro-based, resource allocation narrative of Hsieh and Klenow (2009). Based on individual firm data on sales revenues and factors used, it finds enormous differences in TFPs across firms. Moreover, if the demands for goods are iso-elastic, these differences can be shown to only reflect public policy distortions. Hence, correcting factor misallocations through policy reforms should both be relatively straightforward and have a first-order effect on aggregate productivity, hence on GDP growth. By applying Hsieh and Klenow's framework to Mexico, Levy (2018) comes to the appealing and a priori sensible conclusion that correcting Mexico's distortionary welfare and labor market policies that heavily penalize formal firms should have large beneficial growth implications. However, one first problem with this narrative has again to do with classical demands. As shown by Restuccia and Rogerson (2017) and Haltiwanger *et al.* (2018), assuming iso-elastic demands is unrealistic. However, once this assumption is jettisoned, the differences in TFP productivity across firms can no longer be attributed solely to factor misallocations. Instead, they may reflect differences in demand for the products of individual firms. Thus, informal firms may earn lower sales revenues not because they make inefficient use of their factors but instead because their products are, on average, less attractive and hence fetch a lower price (see Cusolito and Maloney, 2018, for a broader discussion of this issue). If so, eliminating policy distortions may have substantial positive welfare implications yet only limited impacts on aggregate productivity and growth.

A second shortcoming of this narrative is that while its focus on informality is welcome (it obviously explains the huge lower tail in the size distribution of Mexican firms), it views it from a purely microeconomic and static lens that tends to lose track of the bigger picture across time. While the narrative does emphasize the uniform wage implications of labor mobility between the formal and informal sectors, it does not analyze its systemic implications in terms of volumes. Hence, it does not account for the dynamic and systemic TFP impact of changes in the external demand for exports that can shift the allocation of labor back and forth between the formal and informal sectors. Nor does it account for the fact that a large component of the differences in TFPs between formal and informal firms reflects an inherent self-selection bias. Becoming (or staying) informal is a choice made by each entrepreneur largely based on his or her capacities. As a result, informality and the associated resource misallocations tend to be viewed strictly as the cause, rather than the consequence, of changes in GDP. More caution is therefore called for when comparing

the costs and the benefits of correcting policy distortions.

Putting classical demands and informal supplies at the center of the analysis of growth for Mexico brings important changes into perspective. First, it points toward the need for more caution in interpreting history. To the extent that the 6% ISI growth was unsustainable, not replicable, and to a good extent responsible for the 2% subsequent post-ISI growth debacle, contrasting the 6% with the 2% is meaningless. Calculating changes in TFP based on Solow-type estimations may be equally pointless if aggregate TFP is essentially endogenous. Justifying labor market and welfare reforms based on apparent resource misallocations may be similarly misleading.

Second, it also points toward the need for a more dynamic and systemically-oriented perspective. By opening up the economy to foreign competition, trade liberalization should have opened the productivity gap across firms. It should have allowed for a gradual pick-up in productivity in what remained of (or what emerged from) the industrial sector, at least of its tradable component. However, it also undermined the aggregate TFP by reversing the gains made under ISI and inducing a large labor shift back to the low productivity, non-tradable, informal sector.

Third, opening up drastically altered the rules of the growth game by conditioning it to exporters' capacity to compete and innovate in an unforgiving post-ISI global world. Indeed, the evidence suggests that Mexico could not grow faster because, notwithstanding its export success, it was unable to integrate itself within the world's global trade in a way that created sufficient domestic value. To grow faster, the country will therefore need to focus not just on its export capacity (the "export pull") but also on the economy's capacity to create domestic value, pull in labor from the informal sector, and grow more vigorously in response to increases in foreign trade (the "domestic response"). For this, Mexican exports will need to evolve from today's simpler, lower-skills, backward global value chain (GVC) participation toward more complex and innovative forward GVC participation. They will also need to focus more on products and sectors in less highly competitive markets -hence with lower price elasticities of demand and higher margins- or that have higher income elasticities, hence more dynamic demands. In turn, this will also require connecting better with market niches; and not only making products that are cheaper but also more innovative and more attractive, hence that generate higher margins and pay higher wages to workers with higher skills.

The rest of this paper is organized as follows. Section 2 presents a simple model of industrialization with an informal sector, with or without trade protection, which will provide the key benchmarks for the rest of the paper. Section 3 organizes the review of the empirical evidence for Mexico -and when appropriate for the rest of the Latin American (LA) region- around a three-period setting: the ISI years (1960-1982); the post-ISI Crisis and Adjustment period (1982-2000); and the China and Globalization period (2000-2022). The paper makes use of a novel growth decomposition methodology (explained in Appendix 3) based on macro and trade rather than factor use and TFP. This methodology can better identify and sort out demand from supply and identify the location, external or domestic, of growth shortfalls (Ize, 2019a, 2019b; De la Torre and Ize, 2020, 2022). Section 4 concludes by briefly contrasting the main policy implications of this demand-oriented and informality-based perspective with the ones emphasized by the other three growth narratives.

2. A model of industrialization with a large informal sector

2.1 *The setting*

Consider a country where:

- Commodity producers produce at no cost a volume X of export commodities at a world price P_X.
- Formal manufacture producers produce a volume Y_F of consumption goods at the price P_C, using imported intermediate inputs M at the world price P_M, and labor L_F at a wage rate w, under a Cobb-Douglas production function:

$$Y_F = AM^{1-\alpha}L_F^{\alpha}, \tag{1}$$

where A is the total factor productivity of the formal manufacturing sector.

- Workers have the option of staying in an informal (subsistence) sector where they produce and consume a volume Y_H of consumption goods (at the same price P_C) based only on their own labor:

$$Y_H = vL_H \tag{2}$$

where v, the labor productivity in the informal sector determines the informal wage.

- As long as the economy remains perfectly open, the price of the consumption good is set externally:

$$P_C = P_C^* \tag{3}$$

- Instead, under an import substitution regime, import permits limit to a fraction $1 - q$ of total consumption the consumption goods that can be imported. Thus, commodity exporters must use a fraction q of their export income to purchase locally produced goods, sold at a price $P_C > P_C^*$.
- Local manufacture producers then use the foreign exchange from the commodity exporters' purchases to import intermediate goods; hence:

$$P_M M = q P_X X \tag{4}$$

- The total working population is $\bar{L}$, and there is perfect labor mobility at the ongoing wage:

$$\bar{L} = L_F + L_H \tag{5}$$

2.2 *The commodities trap*

Assume for now that firms are perfectly competitive. The first order profit maximization conditions may then be written as:

$$\frac{w}{P_C} = \omega = \alpha A \left(\frac{M}{L_F} \right)^{1-\alpha} \tag{6}$$

$$\frac{P_M}{P_C} = \frac{1}{p_C} = (1-\alpha) A \left(\frac{L_F}{M} \right)^{\alpha}, \tag{7}$$

where P_C is the price of the consumption good in terms of the price of the imported inputs. Substituting the factors ratio from (7) into (6):

$$\omega^{\alpha} = \alpha^{\alpha} (1-\alpha)^{1-\alpha} A p_C^{1-\alpha}, \tag{8}$$

This condition defines an upward sloping relationship between the real wage (and hence marginal labor productivity) and the price of the consumption good, shown as the A curves in Figure 1.

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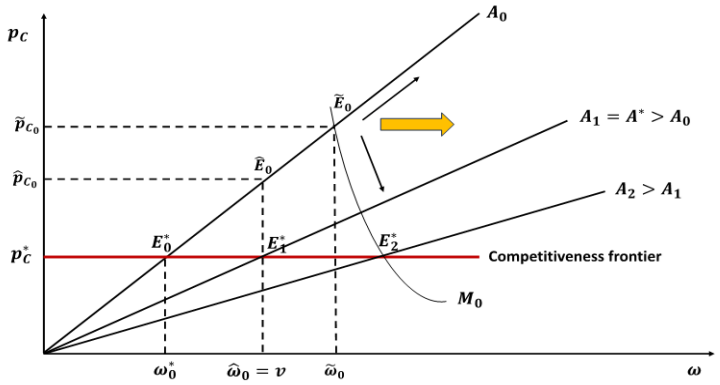
Figure 1
Trade protection, the home price of consumption and the real wage



Source: Authors' elaboration.

As the TFP of the formal manufacturing sector rises, the A curves rotate clockwise. Suppose that initial TFP is A_0. In an open economy, the price of consumption is set externally. Hence, to be able to compete globally (i.e., to export manufactures), the real wage would need to be ω_0^* at the point of intersection, E_0^*, between the horizontal line $p_C = p_C^*$ and the A_0 curve. However, as long as the real wage offered by the formal industrial sector, ω_0^*, remains below the informal wage, v, workers remain informal and industrialization cannot take place. This will be the case as long as the industrial sector's productivity is insufficient to allow it to compete globally:

$$A_0 < A^* = \frac{v^{\alpha}}{\alpha^{\alpha}(1-\alpha)^{1-\alpha} {p_C^*}^{1-\alpha}} \tag{9}$$

In this case, the economy remains in the commodities-informality trap E_0^*, where it only exports commodities, imports but does not produce manufactures, its labor force remains informal, and its growth rate is set by its exports.

2.3 *ISI labor market equilibrium*

Suppose now that the economy is partially closed through import permits, so that commodity exporters must use part of the proceeds of

their exports to consume locally produced manufactures. As a result, p_C rises to $\hat{p}_{C_0}$ in Figure 1, at the intersection of the A_0 schedule and the informal wage, v, and the economy settles in the ISI equilibrium $\hat{E}_0$. At this point, as long as commodity exports (hence, the demand for local manufactures) are insufficient to shift the whole labor force away from the informal sector, formal industrialization will start, but the economy will remain dual, with an informal sector coexisting with the formal sector. Noting the dual labor market equilibria with a hat, to differentiate them from the single labor market equilibria where the informal sector has been fully absorbed (noted with a tilde), the economy will remain dual as long as:

$$\hat{L}_F^D = qp_X X \left(\frac{\alpha A_0}{v} \right)^{\frac{1}{1-\alpha}} \leq \bar{L} \tag{10}$$

The labor market dynamics can be represented as in Figure 2. As long as $\hat{L}_F^D \leq \bar{L}$, an increase in protection (q) raises formal output by pulling in workers from the informal sector at the informal wage. Once $\tilde{L}_F^D = \bar{L}$, informality disappears and further increases in protection raise the formal wage, ω, above the informal wage, v. In Figure 1, the economy will thus shift from $\hat{E}_0$ to $\tilde{E}_0$, at the intersection of the A_0 schedule with the full employment hyperbolic curve M_0 obtained from (4), (6), and (7) as:

$$\omega p_C = \frac{\alpha}{1-\alpha} \frac{qp_X X}{\bar{L}} \tag{11}$$

Several important points are worth stressing. First, as increases in protection (or commodity exports) raise real wages (i.e., as the M_0 and L_F^D schedules move rightward in Figure 1 and Figure 2, respectively), the higher costs of production pull away the ISI economy upward along the A_0 schedule, away from its global competitiveness frontier. Thus, for the economy to become globally competitive, productivity needs to be raised all the way to $A_2 > A_1$, so as to shift from $\tilde{E}_0$ to E_2^* in Figure 1. Closing the productivity gap may, therefore, become harder for economies having experienced a lengthy ISI regime with increasing protection and/or abundant and rising commodity exports. As we will discuss further below, this helps explain why Latin American countries could not manage a successful transition to manufacture exports-led growth the way Asian countries did.

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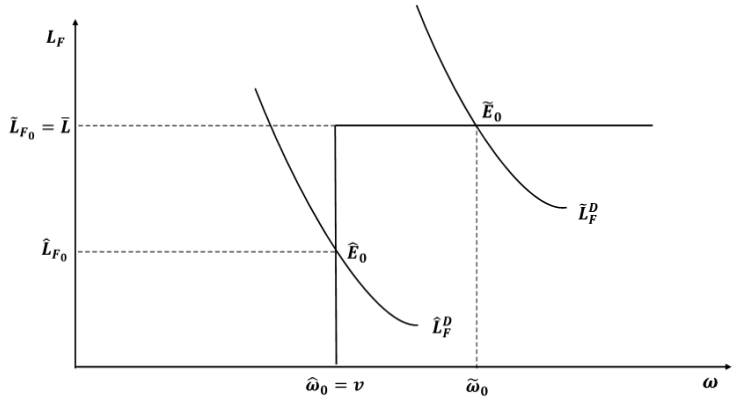
Figure 2
Labor market: Dual vs. single equilibria



Source: Authors' elaboration.

Second, protection may serve different objectives depending on where the economy lies in Figure 2. On the vertical portion of the labor supply schedule (with informality), increasing protection will raise the size of the formal industrial sector, possibly bringing it closer to its global competitiveness frontier through learning and scale effects that improve productivity. On the horizontal portion (where informality has disappeared), increasing protection may serve a redistribution objective by raising real wages.

Indeed, as rising protection or commodity exports push the local wage above the informal wage, workers become better off under ISI than under the commodities trap. Instead, because the price of local consumption goods keeps rising (or their quality deteriorates), commodity exporters' welfare worsens increasingly in relation to what it would have been under the open commodities trap economy. Thus, at least in this perfectly competitive economy where there are no monopolistic rents, one would expect the income distribution to improve under ISI, both because the real purchasing power at the lower tail of the distribution improves and that at the upper tail worsens.

This being said, the strict stepwise relationship between the real wage and informality, such that the real wage remains constant as long as there remains some informal labor, may look extreme and can easily be smoothed out. Suppose that instead of a single type of labor, there are two types, perhaps one relatively more skilled than the other. In this case, an increase in protection could raise the

demand for skilled labor above its supply, hence pushing the skilled labor wage up. If so, the average wage (skilled and unskilled) should also start rising. With more labor categories, the average wage could thus become a smoothly rising function of protection (or commodity exports) and be inversely related to the informal labor share in the economy. In the narrative for the rest of the paper, we will, therefore, associate increases in protection a bit more loosely with both higher wages and lower informality.

2.4 *ISI welfare and growth*

How would the aggregate welfare and growth of a closed ISI economy compare to that of the open economy? To check this, let Y be the economy's GDP, expressed in terms of consumption goods. Y should equal the sum of the value added by the informal sector, ωL_H, the formal industrial sector, ωL_F, and the commodities sector, $\frac{qp_X X}{p_C} + \frac{(1-q)p_X X}{p_C^*}$:

$$Y = \omega\left(L_H + L_F\right) + \frac{qp_X X}{p_C} + \frac{(1-q)p_X X}{p_C^*} = \omega\bar{L} + \frac{qp_X X}{p_C} + \frac{(1-q)p_X X}{p_C^*} \tag{12}$$

Instead, the economy's GDP under the commodities trap would be:

$$Y^* = v\bar{L} + \frac{p_X X}{p_C^*} \tag{13}$$

Consider first the static welfare implications. As shown in Appendix 1, protection is "inefficient" because it lowers GDP (it destroys value). Protection taxes commodities exports while promoting domestic industrialization and raising wages. Thus, while it improves workers' welfare, it reduces commodities exporters' welfare, and the latter more than offsets the former. Hence, unless industrialization produces positive externalities by pushing the economy closer to its global competitiveness frontier through scale and learning effects, instead of industrializing, it would be more efficient to tax commodity exports and use the proceeds to import consumption goods and give these away to workers (see the proof in Appendix 1).

Consider next the growth implications. In this simple model setting without investment and capital and in the absence of changes in

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TFP and for a given labor supply, the rate of growth of the economy will be determined by the growth of commodity exports. As shown in Appendix 1, protection is again inefficient: it promotes the growth of the formal industrial sector (and in a model with capital would no doubt promote investment in that sector); but it reduces the growth response of the economy as a whole to an increase in the growth of export commodities. There is, therefore, an apparent inconsistency between the rapid observed growth of Mexico under the rising protection of the ISI years and the lower growth predicted by our model.

This inconsistency could be resolved if the rapid growth was a reflection of manufacturers' success in raising their TFPs. However, should this have been the case, the rise in productivity should have rotated the A schedule clockwise in Figure 1, gradually reducing the price of the locally produced goods until the formal sector's productivity reached A_2. At that point, the productivity gap would have closed, and local manufacturers should have started to export at the world price. Clearly, this did not happen.

This second inconsistency can be resolved in two ways. First, the downward shift toward the competitiveness frontier could have been systematically offset by an upward shift away from the frontier associated with increases in protection or commodity exports: the economy could then have followed the orange arrow trajectory in Figure 1, with steady prices and no real exchange rate appreciation. Second, even if the downward shift had dominated the upward shift sufficiently to bring the economy down to its competitiveness frontier, the quality of the domestically produced goods could have differed from that of imports because the local manufacturers lacked the know-how, sophistication, or motivation to match the quality of their foreign counterparts. In either case, the domestic goods would have remained globally uncompetitive, notwithstanding the strong increases in productivity. Protection, therefore, allowed local manufacturers to capture domestic economies (of scale or learning) by selling to a captive clientele without having to worry about the foreign competition, thereby granting them the benefits (at least for a while) of high productivity gains and rapid growth. But at the same time it prevented local manufacturers from reaching their global competitiveness frontier because it raised their costs of production or prevented them from reaching the required export quality. In either case, it continued to block their access to foreign markets.

In turn, this enduring wedge between home and foreign goods can help explain both what happened during the ISI years in terms of inflation and what happened with trade liberalization in terms of

real GDPs. The relatively good inflationary record notwithstanding the increases in protection may be explained (at least during the early ISI years of the *Desarrollo Estabilizador*) by both a mix of productivity gains and lower-quality goods with steady prices. Similarly, the GDP gains predicted by our model when protection is reversed would a priori appear to be inconsistent with the initial GDP losses incurred by the Mexican economy when it liberalized its trade (more on this below). However, this inconsistency could be resolved again by addressing quality differences. If the productivity gains obtained under trade protection were strictly associated with lower quality goods, the flood of better quality imports under trade liberalization would have wiped out local producers' capacity to compete no matter how productive they had become in producing "LADA cars".

2.5 *Open growth*

Given its cost and quality impacts on production, the ISI regime can therefore also become a trap and coming out of it requires opening up. In the short run, absent any changes in A, trade liberalization should drive the economy in Figure 1 from the ISI equilibrium, $\hat{E}_0$, back to its pre-ISI starting point, E_0^*. This would imply a massive de-industrialization and labor shift back from the formal to the informal sector. Leaving this new equilibrium would only be possible for firms that manage to raise their TFP from A_0 to $A_1 \geq A^*$, so as to reach E_1^*, at which point they could start exporting. With a perfectly elastic external demand for exports and a constant returns production function, full industrialization (the complete absorption of the informal sector) would be reached immediately. From there onward, additional increases in productivity, $A_2 > A_1$, would raise the formal wage over and beyond the informal wage.

A more realistic dynamic would assume imperfect competition and imperfectly elastic demands faced by each firm. Suppose the representative firm faces a partially elastic demand such that:

$$y_F = BY^{*^{\varepsilon}} p_C^{-\eta}, \varepsilon > 0; \eta > 1, \tag{14}$$

where p_C is now the price of the individual good relative to a broader world consumption basket; B is a scale factor that depends on world demand and the quality of the good; Y^* is the income of the foreign purchasers of the good, ε is the income elasticity and η the price elasticity of their demand. The firm's mark-up, τ, being the inverse of the demand elasticity ($\tau = \frac{1}{\eta}$), the usual condition for the

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existence of an equilibrium with market power $\tau \in [0,1]$ implies $\eta \geq 1$. The profit maximization conditions can thus now be written as:

$$\omega = \alpha \frac{\eta - 1}{\eta} \left(\frac{M}{L_F} \right)^{1-\alpha} A p_C \tag{15}$$

$$p_M = (1 - \alpha) \frac{\eta - 1}{\eta} \left(\frac{L_F}{M} \right)^{\alpha} A p_C \tag{16}$$

As long as an informal sector exists the real wage in the formal sector, ω, must equal the informal wage, v. In this case, the formal sector's production function (1), the demand schedule (14) and the two first-order conditions (15) and (16) form a system of four equations in the four unknowns p_C, Y_F, M, and L_F, which can be solved for the formal labor demand, formal output and the price of the good as:

$$L_F = NBY^{*\varepsilon} \left[\frac{\eta - 1}{\eta} \right]^{\eta} A^{\eta - 1} \left[\frac{\alpha}{v} \right]^{1 + \alpha(\eta - 1)} \left[\frac{1 - \alpha}{p_M} \right]^{(1-\alpha)(\eta - 1)} \tag{17}$$

$$Y_F = NBY^{*\varepsilon} \left[\frac{\eta - 1}{\eta} \right]^{\eta} A^{\eta} \left[\frac{\alpha}{v} \right]^{\alpha \eta} \left[\frac{1 - \alpha}{p_M} \right]^{(1-\alpha)\eta} \tag{18}$$

$$p_C = \frac{\eta}{\eta - 1} \left[\frac{v}{\alpha} \right]^{\alpha} \left[\frac{p_M}{1 - \alpha} \right]^{(1-\alpha)} \tag{19}$$

where $Y_F = N y_F$ and N is the number of firms in the economy.

Including firms' earnings, GDP, expressed in terms of world prices, may now be written as:

$$Y = p_X X + v \bar{L} + \tau p_C Y_F, \tag{20}$$

where p_M, p_X, and p_C are now the prices of intermediate imports, commodities, and local manufactures in terms of the price of the world consumption basket. For simplicity, informal labor is also assumed to produce a good whose price is constant in terms of the world consumption basket, so that the informal wage, v, is also constant in terms of that basket.

Differentiating (20) for a given η and τ while using (18) gives the GDP growth rate:

$$\frac{dY}{Y} = \frac{p_X X}{Y}\frac{dp_X X}{p_X X} + \frac{v\bar{L}}{Y}\frac{d\bar{L}}{\bar{L}} + \left\{\left[\frac{v\left(\bar{L}-L_F\right)}{Y}\frac{dv}{v} + (1-\tau)\frac{p_C Y_F}{Y}\frac{dA}{A}\right] + \tau\frac{p_C Y_F}{Y}\left(\frac{dB}{B} + \varepsilon\frac{dY^*}{Y^*} + \frac{dN}{N}\right)\right\} \tag{21}$$

The first two terms on the right-hand side of the above expression account for factors' contribution to growth (since there is no capital in this model, the only factors are commodities and labor).[1] The third term accounts for the economy's TFP. It includes the usual supply-based productivity factors for both the formal and informal sectors (A and v) but it also includes demand effects (τ, ε, B, and Y^*) and an entrepreneurial connection factor between supply and demand, the number of firms (N) with a market niche for exports. A boost in external demand (or in the number of exporting firms) raises TFP because the resulting rise in exports (which is accompanied by a rise in formal labor and imports of intermediate goods) raises formal firms' output and earnings.

Although labor's marginal productivity remains unchanged at the informal wage, a labor shift from the informal sector to the formal sector raises aggregate TFP because the formal sector is more productive than the informal sector. By producing goods with more efficient technology and selling them globally with demands that are not perfectly elastic, formal firms generate additional output that translates into additional value due to positive mark-ups. And it can indeed be easily verified with (18) and (19) that, provided that $Ap_C > 1$, the less elastic the demand for these goods (i.e., the higher τ), the more the country's GDP rises.

[1] The lack of capital accumulation could arguably be viewed as a major limitation of the model in this paper in as much as it deals with growth dynamics. Yet, because the model focuses on demand dynamics rather than Solow-type, supply-oriented factor accumulation, the absence of capital is less problematic than it might appear at first sight. Introducing capital would complicate our model but bring little additional insight.

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Ap_C is the income-based TFP. With (1), the condition $Ap_C > 1$ may be re-written as:

$$\frac{p_C Y_F}{M^{1-\alpha} L_F^{\alpha}} > 1 \tag{22}$$

This condition will hold if formal firms are sufficiently efficient and innovative: their income should exceed what would be expected based only on the quantities of labor and intermediate inputs they use.

In this setting, factor reallocations can, therefore, play a key role in driving changes in aggregate TFP, leading to boosts in GDP, as in Hsieh and Klenow's approach. But these reallocations have nothing to do with removing policy distortions. They are instead the result of external demand shocks associated with increases in external income (Y^*), changes in the demand for the goods the country is exporting (B), changes in demand elasticities (ε or η), or increases in the number of export market niches (N). The resulting TFP and growth fluctuations are "structural": they are linked with a dual labor market that functions as a buffer and produces changes in aggregate output and productivity without any change in prices or wages (check equation 19). Thus, unlike endogenous TFP fluctuations caused by changes in capacity utilization along the business cycle, these are external, demand-triggered fluctuations in TFP that cannot be "cleaned out" and removed from the data through simple averaging over the business cycle. Instead, they may happen at any time and are not inherently reversible.

External demand-triggered changes in TFP would also happen in the absence of an informal sector, but to a much lesser extent and for a different reason. To see this, solve the above four equation system again, but this time allow the wage, ω, to be freely determined and instead formal labor to remain equal to its full employment value, $\bar{L}$. In this case, formal output would now be given by the following expression:

$$Y_F = [NB]^{(1-\alpha)\beta} Y^{*\varepsilon(1-\alpha)\beta} A^{(1-\alpha+\eta)\beta} \bar{L}^{\alpha\eta\beta} \left[\frac{(1-\alpha)(\eta-1)}{p_M \eta}\right]^{(1-\alpha)\eta\beta}, \tag{23}$$

where $\beta = 1/(1-\alpha+\alpha\eta)$. Comparing (18) with (23), it can be immediately seen that the formal output elasticity in response to a demand shock, B, will be higher in the dual economy than in the single labor sector economy if $(1-\alpha)\beta < 1$, which will always be the

case for $\eta \geq 1$.[2] Hence, in dual economies such as those of Mexico and most of Latin America, the higher supply elasticity response to world shocks should result in higher GDP volatility.

3. Six decades of growth

Reflecting data availability, the empirical analysis in this section covers up to six decades of growth, divided into three sub-periods: the ISI years (1965-1981); the Crisis and Adjustment period (1982-2000); and the China and Globalization period (2001-2022). Mexico's growth patterns are compared with three groups of peer countries: the 14 largest Latin American countries except for Venezuela (the LA group); the 14 other emerging economies (the CG group) whose per-capita GDP in 1990 was within the range most similar to that of the LA group; and six Eastern European countries (the EE group).[3] To help enhance key trends and ensure consistency with the growth decompositions based on macro and trade that will be presented later below (see the methodology in Appendix 3), ten-year backward-looking moving averages will be used when needed. In such exercises, for normalization purposes, growth (and its decomposition components) will be expressed relative to the world (a country growing at the same speed as the rest of the world will thus have a zero-growth rate).

As we will see, the evidence broadly corroborates the main thesis of this paper: that informality and demand forces have played a major role in Mexico's growth patterns over the last six decades. They explain the ISI miracle as well as the unavoidability of its collapse. They explain the severity and duration of the post-ISI growth downturn. Moreover, they explain the pains and hazards of growing in a globalized, competitive world. This being said, the match between the evidence and the model presented in the previous section has to be viewed as impressionistic renditions of broad linkages and patterns rather than as scientific proofs of precisely formulated hypotheses.

[2] Notice that the higher elasticity of the dual economy works in both directions. Informality amplifies output expansions by providing the missing labor under positive demand shocks. But it may also amplify output contractions by absorbing excess labor under negative demand shocks, hence limiting downward real wage adjustments.

[3] See the LA and CG groups' composition in Appendix 2. The Eastern European countries include Hungary, Poland, Romania, the Czech Republic, the Slovak Republic, and Slovenia.

The section is divided into five sub-sections, which: 1) contrast the good ISI performance with the disappointing post-ISI results; 2) link these contrasts with the macro and trade-based growth decomposition presented in Appendix 3; 3) illustrate the unsustainability of ISI in Mexico and explore the contrast with South East Asia's smooth exit from ISI; 4) explore the costs associated with overcoming the ISI legacy during the Crisis and Adjustment period; and 5) focus on the pains of growing in the post-ISI, China-dominated, globalized world.

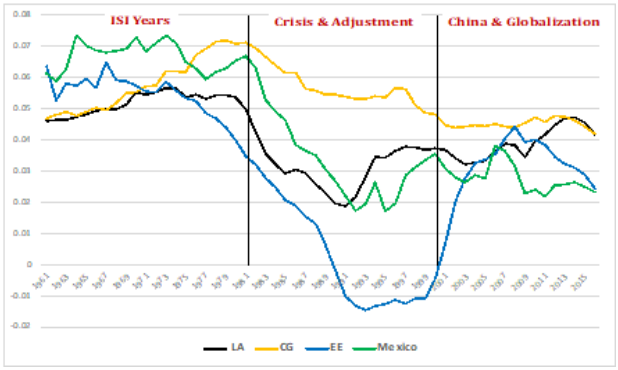
3.1 *From the easy ISI to the hard post-ISI: growth, informality and welfare patterns*

During the ISI years, Mexico grew substantially faster than the rest of LA (Figure 3). Instead, during the Crisis and Adjustment period, Mexico's growth collapsed, much like LA's and EE's; yet, CG continued to grow at a fast pace. This section argues that this highly contrasted post-ISI response is explained by domestic dynamics brewing deep within the ISI period rather than by unfavorable world shocks, as suggested by Bértola and Ocampo (2013).[4]

Similarly to the average for LA but in deep contrast with CG, Mexico's industrialization (measured as manufacturing value added as a percent of GDP) developed at a very early stage during the ISI period (Figure 4a). Yet, industrialization was mainly inward-looking: Mexico and other LA countries remained basic commodity exporters (Figure 4b). The similarity between Mexico and the rest of the region ceased during the post-ISI period. While Mexico turned into a very successful manufacturing exporter, other LA countries sharply deindustrialized, and their exports remained focused on commodities (the Southern American countries) or shifted toward services (the Central American countries). This sharply differentiated impact of trade liberalization can be largely traced back to comparative advantages. The early end of Mexico's oil boom during the early eighties made it quite evident that the country should not count on commodities to sustainably support its growth. It should instead capitalize on its unique geographical advantages sitting next to the largest and wealthiest consumer market in the world.

[4] See Lustig (1998) for a detailed narrative and analysis of economic and political events in Mexico from the 70s to the 90s; and Baer (1972) and Irwin (2020) for more general reviews of import substitution regimes.

Figure 3
GDP growth: Mexico vs. LA, CG, and EE



Notes: All observations are calculated as ten-year backward-looking moving averages of yearly growth rates. To facilitate historic comparisons between the three sets of countries, this figure is derived from the Maddison Project Database instead of the World Bank's Word Development Indicators (WDI).

Source: GGDC (2023a).

Figure 4
Industrialization: Mexico vs. LA, CG, and EE

a) Manufactures value added as share of GDP

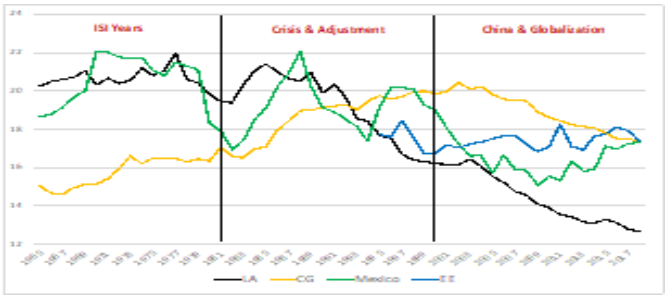


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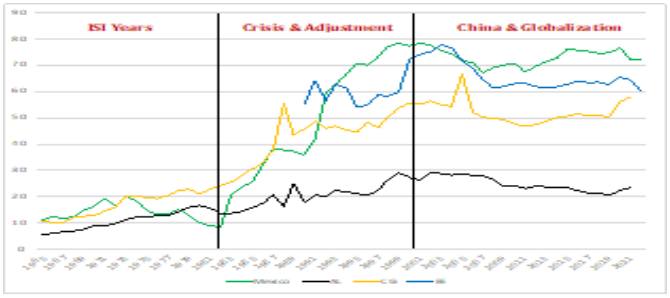
Figure 4

b) Manufactures as share of total exports



Source: WDI (World Bank, 2023a).

Mexico's real wage and economy-wide labor productivity were deeply procyclical, rising very rapidly during the ISI years. They then collapsed during the post-ISI Crisis and Adjustment period, and recovered, albeit not yet fully, during the China and Globalization period (Figures 5a and 5b). The income distribution (measured through the GINI index) went through a broadly similar cycle. While ISI period data are too spotty to draw firm patterns during this period, the GINI clearly worsened during the Crisis and Adjustment period before recovering during the China and Globalization period (Figure 5c).

The industrialization, real wage, employment, and distribution patterns observed during the ISI cycle are, therefore, all consistent with the dynamics highlighted in the industrialization model of the previous section.[5] As long as sufficiently abundant commodity exports and appropriately tight import permits provided sufficient room to manage the balance of payments constraint, trade protection continued to promote a labor shift from the informal sector (rural or urban) to the formal manufacturing sector. This enabled inward-looking industrialization and raised the real wage. At the same time, by allowing for scale and learning economies, the captive local demand enabled local manufactures and labor productivity to grow rapidly.

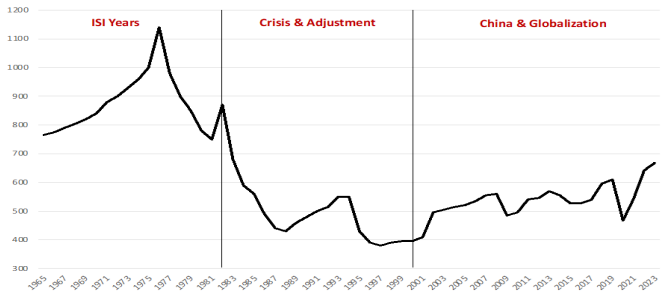
[5] The rise in labor productivity during the ISI years is consistent with the narrative of McMillan and Rodrik (2011), according to which a labor shift from the less productive agricultural sector to the more productive industrial sector was the key behind the rapid growth in productivity. Surprisingly enough, however, these authors did not also make the connection with the key role played by trade protection.

However, once fiscal pressures started to build up and capital outflows further pressured the balance of payments (more on this below), import permits were no longer able to equilibrate the current account. As the balance of payments turned unmanageable, trade liberalization became unavoidable. It led to an opposite pattern of steep falls in real wages and a worsening income distribution. Given the quality wedge referred to in the previous section, it also depressed GDP, hence reducing aggregate labor productivity. While industrialization started to decline as a share of GDP, it recovered in the case of Mexico thanks to its proximity to the United States (US), which allowed manufacture exports to rise rapidly.

Figure 5

Mexico: Labor market indicators and income distribution

a) Real wage



b) Labor productivity

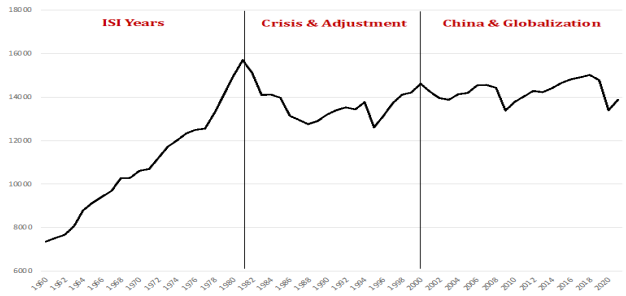


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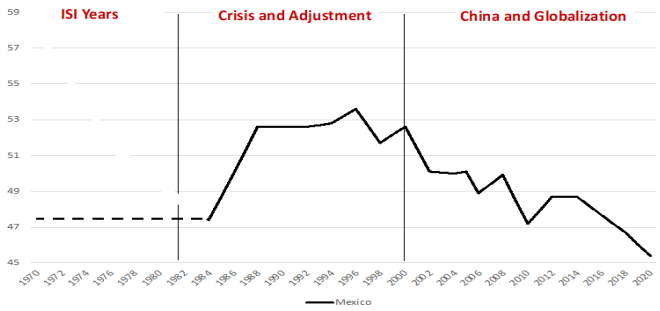
Figure 5

c) GINI



Notes: Labor productivity is obtained as GDP divided by the working-age population. The real wage is obtained as the hourly nominal wage in the industrial sector in Mexico City, deflated by the consumer price index. The GINI series is intrapolated using historical data for 1984 and 1989 as given in Londoño and Szekely (1997) and put together for later years with the higher frequency data provided by the World Bank since 1992. GINIs for the ISI years are not shown because the data is too erratic and fails to provide a clear trend

Source: Archivo Histórico (INEGI, 2023) and WDI (World Bank, 2023a).

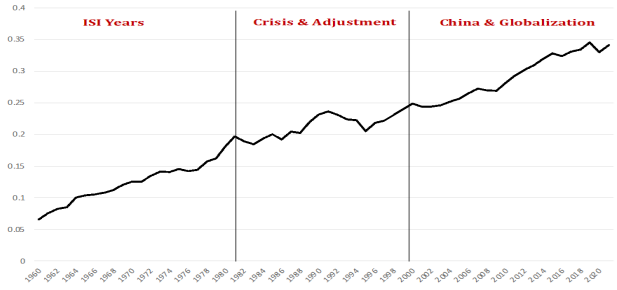
Regarding informality, the only data available on a yearly basis since 1960 is the number of workers insured by the Mexican Social Security Institute (*Instituto Mexicano del Seguro Social*, IMSS), which formed the core of the formal sector. Dividing this series by the working-age population provides a first approximation to the formality rate and, hence, to its complement, the rate of informality. As shown in Figure 6a, the formality rate has followed a steeply upward trend that would suggest a steady decline in informality as the economy developed. However, this is not consistent with survey data for recent years, which shows a rather steady rate of informality. The discrepancy most probably reflects the accumulation in the IMSS accounts of workers who became formal for only short periods of time. Instead, as shown in Figure 6b, based on yearly rates of change, the rate of formality has fluctuated in a more meaningful way around this upward trend. During the ISI years, formal employment grew at very high rates before growing at much slower rates during the Crisis and Adjustment period and recovering partially during the China and Globalization period.

Figure 6c shows that the rates of growth of formality (informality) have been closely related to the yearly growth rates of real GDP.

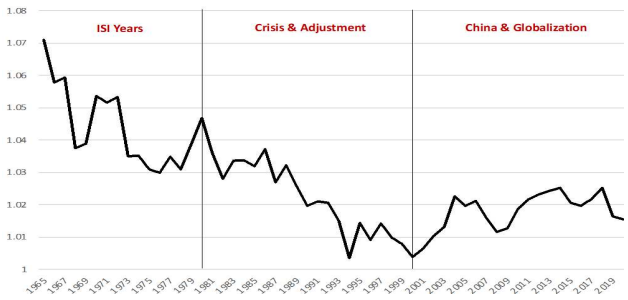
Thus, higher GDP growth has been indeed associated with systematic labor transfers from the informal to the formal sector. But formality increased by more under booms than it decreased under busts, a downward rigidity that is consistent with the labor market distortions that penalize labor dismissals. Thus, after accounting for the statistical distortions associated with the trend in the formality *level* and for the impact of labor market rigidities, the shorter-term *rate of change* relationship between growth and informality also does match that described in the model of the previous section.[6]

Figure 6
Mexico: Employment formality
(as % of working age population)

a) Levels



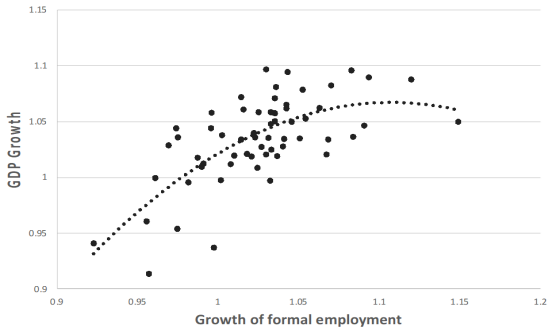
b) Yearly growth rates



[6] The close linkages between the formal and informal wages (Levy, 2008) confirm the buffering role of the informal sector from the price (rather than quantity) side.

Figure 6

c) Formality growth vs. GDP growth



Notes: Figure 6a shows the number of IMSS beneficiaries divided by the working age population. Figure 6b shows the ten-year backward moving average of the yearly rate of change of the series in Figure 6a. Figure 6c plots the rate of GDP growth together with the rate of growth of formality, calculated as % of the working age population.

Source: Memoria Estadística (IMSS, 2023) and WDI (World Bank, 2023a).

Figure 7

GDP and TFP growth

a) TFP growth: Mexico vs. LA and CG

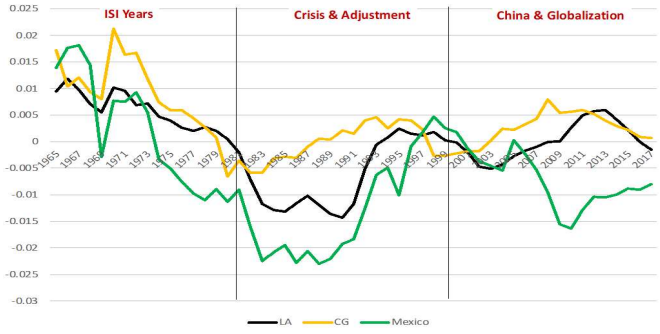
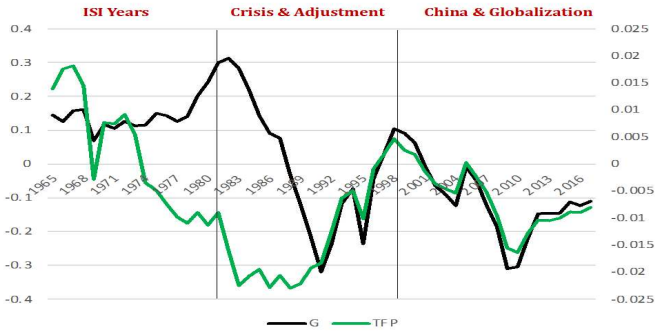


Figure 7

b) Mexico: GDP and TFP growth



Notes: The rates of TFP and GDP growth are calculated as ten-year backward-looking moving averages of yearly data.

Source: GGDC (2023b) and WDI (World Bank, 2023a).

As for other countries enjoying trade protection in each of the three peer groups, Mexico's high GDP growth was enabled until the mid-70s by high TFP growth (Figure 7a). However, the TFP gains started trending downward in the early to mid-70s and collapsed during the 80s.[7] Thus, Mexico's growth during the late 70s and early 80s was no longer fed by productivity increases but instead by the large investments of the oil boom (Figure 7b). These patterns are again consistent with the narrative coming out of the model presented in the previous section: while trade protection initially promoted rapid, domestically-induced TFP gains, these eventually ran out of steam. And they turned negative after Mexico liberalized its trade.

3.2 *From the easy ISI to the hard post-ISI: a macro and trade growth decomposition*

To track better the drivers of growth during ISI and beyond, a macro and trade perspective (instead of productivity and factor accumulation) is needed. Growth can be decomposed based on an accounting

[7] While the Penn World Data for Eastern European countries only started in 1970, they also experienced very high TFP gains during the ISI years; see Vonyó and Klein (2017) for a discussion of the TFP and investment data for the 1950-1980 period.

identity that focuses on the growth of exports and imports (all expressed in growth rates relative to the world):

$$GDP \equiv Exports + (Imports - Exports) + (GDP - Imports)$$

Defining the growth of GDP as G, that of exports as EP (exports pull), that of the trade account as EL (external leverage), and the residual as DR (domestic response), the imports minus exports, the above identity can hence be written as:

$$G \equiv EP + EL + DR$$

Thus, as explained in more detail in Appendix 3, GDP growth reflects the sum of three driving forces: the "exports pull" (EP); the use of external finance or "external leverage" (EL); and the response of GDP growth to the flow of incoming imports or "domestic response" (DR). The EL term reflects domestic demand; the EP term may reflect external supply or external demand, and the DR term domestic supply or domestic demand.

Figure 8
Growth variance decompositions: External vs. domestic growth

a) LA

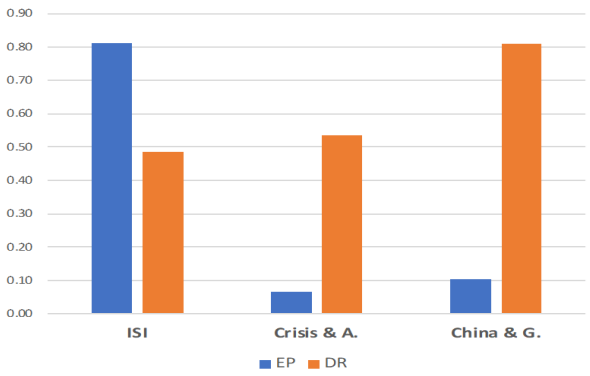
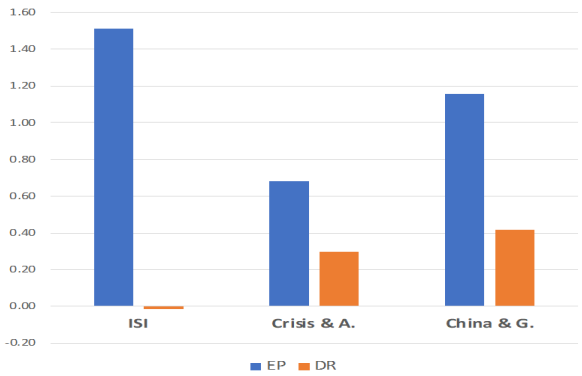


Figure 8

b) CG



Source: Author's own calculations, based on methodology presented in Appendix 3 and data from WDI (World Bank, 2023a).

Based on a variance decomposition of the growth decomposition *between the countries of each group* (i.e., how each component of the growth decomposition contributes to explain the sum), Figure 8 contrasts the growth of the LA and CG regions across the three periods of our study. The most striking feature of the figure is that while the growth of CG countries remained externally oriented, that of LA countries was externally driven during ISI (under trade protection) but became domestically driven after trade was liberalized. That growth during ISI was mostly driven by exports, even in LA countries, is consistent with the model of the previous section. Even though industrialization was inward-oriented, its growth depended on the availability of foreign exchange (i.e., commodity exports).

Thus, the LA countries that grew faster were the ones that *exported more*, as commodity exports (the EP term) conditioned the growth of their domestic industrial sector. However, once trade was liberalized, the dependency on commodity exports ceased; instead, growth started to be affected by the economy's domestic response to trade (the DR term). Unlike in CG countries, the integration of LA countries' trade with the rest of the world was "imperfect" in that GDP growth did not respond "efficiently" to the incoming flows of imports. As a result, growth became DR-driven rather than EP-driven: the LA countries that grew faster became the ones that *imported less* (given their rates of growth), rather than those that *exported more*.

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3.3 *ISI's unsustainability*

Below, we will return to this key paradox. We need first to understand why the ISI growth miracle became unsustainable. For this, it is useful first to look at Mexico's year-to-year growth decomposition (Figure 9). During the ISI years, growth dynamics can be broken down into two very distinct sub-periods. During 1965-1976, the steady decline of the EP component of growth suggests that the country's capacity to keep growing based on commodity exports was becoming exhausted (Figure 9a). Growth could only be maintained because the decline in EP was offset by a rise in DR. The latter, in turn, was most likely associated with a gradual tightening of import permits that allowed domestic manufactures to keep expanding.

Historical series on import permits, the likely linchpin of the ISI regime in Mexico, are unfortunately not readily available. However, the economy's commercial openness may be used as a rough proxy (Figure 10a). And indeed, up to 1970 (the year of transition from the *Desarrollo Estabilizador* to the *Desarrollo Compartido*, following the *matanza de Tlatelolco* and the incoming Echeverría administration), the balance of payments was maintained in equilibrium thanks to prudent fiscal management (Figure 10b). Thus, during this period the economy was growing rapidly yet becoming increasingly closed, which is consistent with the increasing use of import permits.

Figure 9
Mexico: Key features of the growth decomposition, selected periods

a) External vs. domestic supply during ISI years

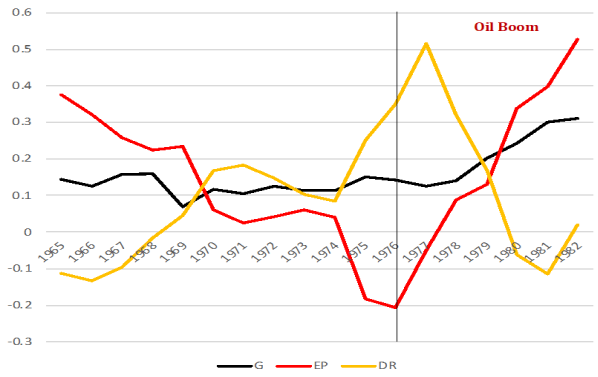
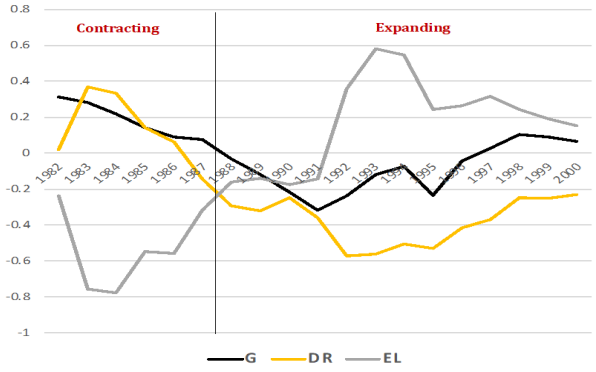


Figure 9

b) Contracting vs. expanding demand during Crisis and Adjustment



Source: Author's own calculations, based on methodology presented in Appendix 3 and data from WDI (World Bank, 2023a).

The *Desarrollo Compartido* and the oil boom (1977-1982) radically altered this dynamic. During 1970-1976, the loss of the fiscal equilibrium and the heavy public spending destabilized the current account (Figures 10a and 10b). The oil boom temporarily relaxed the balance of payments constraint, boosting both exports and imports, and allowing growth to rise further. However, the boom eventually destabilized the current account much further, leading to the 1982 crisis. Post-ISI growth dynamics became then driven by demand (Figure 9b): a huge contraction from 1982 to 1991 (a fall in EL partly compensated by a rise in DR) triggered by the debt crisis, followed by an equally large expansion (a rise in EL partly compensated by a fall in DR) triggered by inflation stabilization policies during the *Pacto de Solidaridad*.

Mexico's inflation started to rise in the early 70s with the expansionary fiscal policies of the Echeverría administration (Figure 11). It got a further kick with the public spending of the oil boom under the López Portillo administration. By the time of the debt crisis of 1982, the vicious circle between price inflation and exchange rate depreciation had already become well established; as a result, inflationary dynamics worsened for more than a decade. Similar dynamics affected the rest of the LA region. Thus, while Mexico's inflation was initially below CG's, it overtook it as early as in the mid-70s and kept rising from there on. And although the fiscal excesses of the Echeverría administration arguably reflected a crisis of legitimacy not directly related to the ISI regime, those of the López Portillo administration

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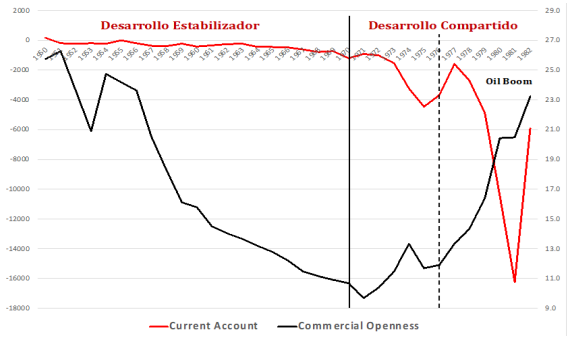
were the direct consequence of the need for a rapid expansion of commodity exports as the key to keep the ISI growth miracle going. But in both instances, by closing the door to imports, the strict trade protection of the ISI years exacerbated the inflationary impact of domestic demand shocks. Thus, in one way or another, the inflation problem in Mexico (and in the rest of the region) was the child of the ISI years, rather than the result of external shocks, as claimed by the structuralist narrative.

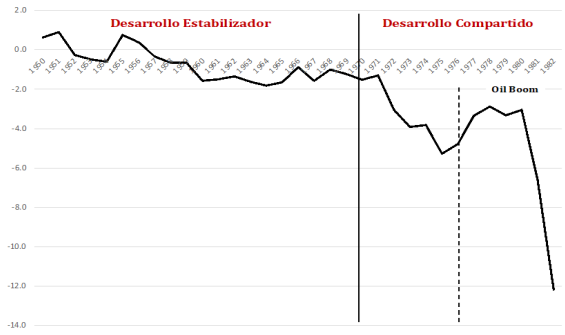
Figure 10

Mexico: Key features of the macroeconomic stance, 1950-1982

a) Balance of payments



b) Fiscal balance

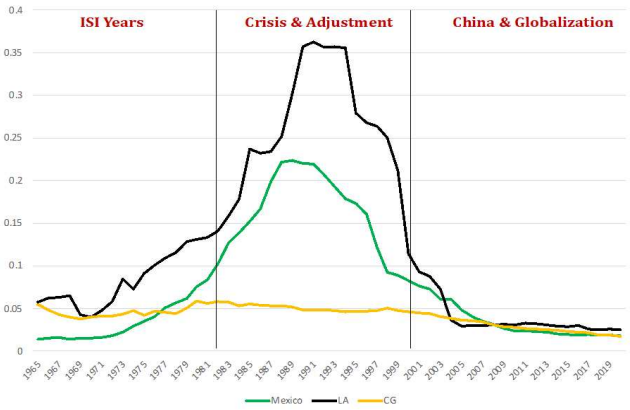


Notes: The current account is expressed in current US dollars. The commercial openness is obtained as imports plus exports over GDP. The fiscal balance is that of the public sector as a whole (as % of GDP).

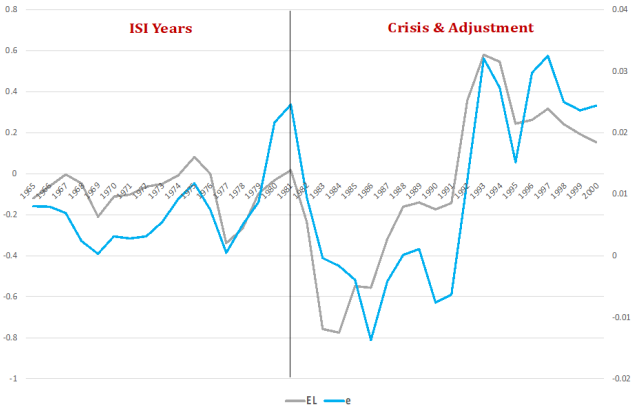
Source: Martin (2023).

Figure 11
Inflation, demand and the real exchange rate: 1965-2000

a) Inflation: Mexico vs. LA and CG



b) Mexico: Demand and the real exchange rate



Notes: The inflation and real exchange rates are calculated as the log of 1 plus the ten-year backward-looking moving average of yearly inflation rates or real exchange rates against the US dollar using GDP deflators as price indices.

Source: WDI (World Bank, 2023a).

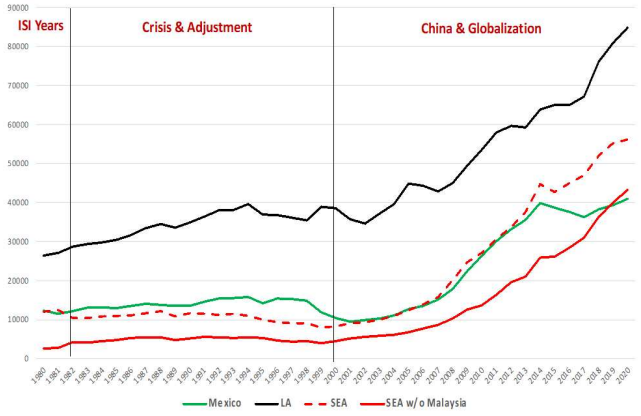
Why did Mexico (and the rest of LA) fail to achieve a smooth transition out of ISI into exports-led growth, the way South Asia did? As noted in recent academic research, firms' incentives to innovate and learn new technologies vanish once they fall too far below

the foreign competitiveness frontier, even more so when they enjoy comfortable rents in a protected environment.[8] LA's inability to transition reflected this problem; the wide availability of commodities no doubt exacerbated it. As Figure 12a shows, per capita commodity exports were far higher in one region than the other, particularly when setting aside Malaysia, a clear outlier. Thus, the need to rapidly find a way out toward the exports of manufactures was far more intense in Southeast Asia, which helps explain the much more export-oriented policy emphasis in one region than in the other. Instead, by contributing to the rise in real wages in the manner described in the model of the previous section, the rising protection and commodities abundance further distanced the Latin American countries from their global competitiveness frontier. Hence, it made the labor market implications of trade liberalization even more problematic.

Figure 12

Exports: Selected indices

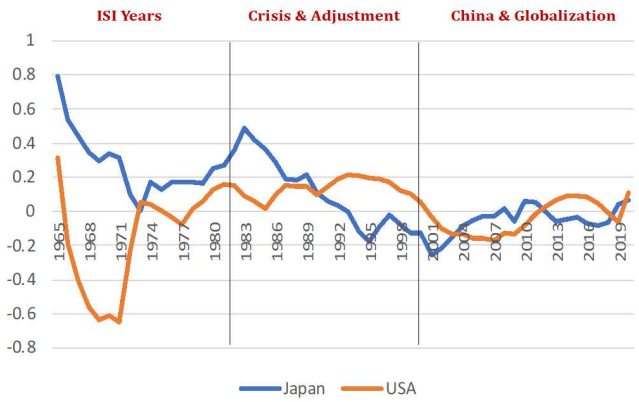
a) Per capita commodity exports: Mexico, LA, and CG



[8] See Aghion *et al.* (2005), Goñi and Maloney (2017), and Maloney and Zambrano (2021).

Figure 12

b) Exports growth: Japan vs. the US



Source: WDI (World Bank, 2023a).

To this "push" factor, one may add a "pull" factor. In one case, Japan was the local "locomotive" pulling the rest of the region forward. In the other case, it was the US. Thus, reflecting its more dynamic exports (Figure 13b), Japan invested heavily in the region to help produce the components of its export boom. Instead, US firms invested in Mexico and the rest of LA mainly to benefit from the rents associated with the heavy protection of the local markets for tradable goods.

Finally, to the push and the pull, one needs to add a "catalytic" factor: industrial policies as a key vehicle to shorten the gap from the economy's competitiveness frontier. The policies clearly differed, not only in terms of their orientation (inward vs. outward) but also their quality: in one case, pragmatism and a close public-private collaboration; in the other, a heavy ideological bias and much less working together to resolve collective action frictions.

3.4 *The post-ISI adjustment costs*

The post-ISI adjustment costs were of two types: 1) the costs associated with the loss of macroeconomic control, which culminated with the crises of 1982 and 1994-1995; and 2) the costs associated with the efforts to put things back on the right track through trade liberalization and inflation stabilization. To help assess the magnitude of these exit costs and the manner in which they depressed Mexico's post-ISI

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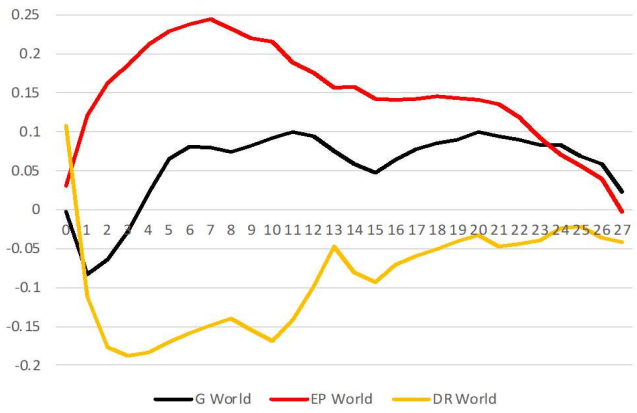
growth potential we conduct two growth decomposition exercises that compare Mexico with other countries that went through similar experiences. The first exercise compares the growth of countries that underwent substantial trade liberalizations, as Mexico did during the mid-eighties. The second exercise does the same for countries that experienced severe and prolonged real exchange rate appreciations, as Mexico did during the first half of the nineties when it sought to stabilize its inflationary dynamics. The methodological details and country sample compositions for both exercises can be found in Appendix 4.

The trade liberalization sample covers 31 countries that experienced a sudden simultaneous divergence of their export pulls and domestic responses (their EP going up, their DR down), as should happen when trade liberalization stimulates both exports and imports (the timing of country dynamics is aligned, with the EP-DR widening starting at time zero). As shown in Figure 13a, the initial average response to trade liberalization is a decline in growth, as imports (DR) pick up faster than exports (EP). However, growth turns positive as early as in year 4, as exports continue to rise while imports reach a plateau. The full life cycle of trade liberalization extends over nearly three decades.

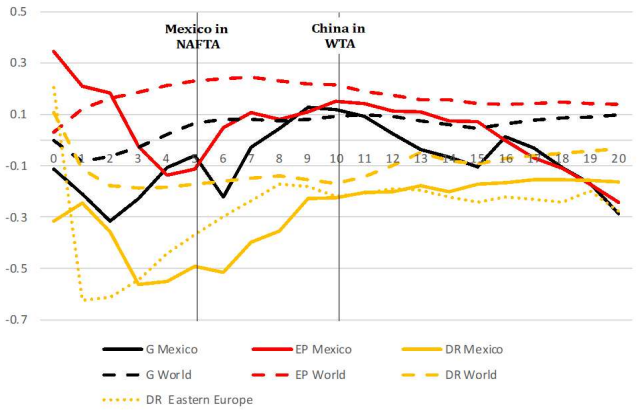
For Mexico (Figure 13b), the initial growth contraction lasted longer (7 years instead of 4) and was much deeper (down to -0.3 instead of -0.08). This was partly because exports initially fell instead of rising, mostly due to the reversal of the oil export boom that depressed Mexican exports. More importantly, however, this was because Mexico's DR collapse was far deeper than that of the rest of the world (down to -0.57 instead of -0.19). But revealingly enough, that collapse was extremely similar to that of Eastern European countries. This is consistent with the fact that both Mexico and Eastern European countries opened very rapidly following decades of extremely tight trade protection. Thus, as predicted by the industrialization model, adjustment dynamics were much tougher for the countries that opened up when the quality of the goods they produced and/or their total factor productivities lay far below the world's competitiveness frontier.

Figure 13
Growth decompositions of countries undergoing trade liberalizations

a) World averages



b) Mexico vs. world average and Eastern Europe



Source: Author's own calculations, based on methodology presented in Appendices 3 and 4, and data from WDI (World Bank, 2023a).

Turning now to the real appreciation exercise, the Mexican government agreed with the labor and business sectors on a social pact (the *Pacto de Solidaridad*) aimed at stabilizing inflation, running at the time at above 100%. The *Pacto* contemplated limiting further nominal exchange rate depreciations in exchange for wage and price

controls. As is evident in Figure 11a above, the *Pacto* was indeed successful in breaking the upward inflationary dynamics. However, it resulted in a sharp and sustained real exchange rate appreciation, together with a private (not public) aggregate demand boom, a huge current account deficit, and a credit boom financed by short-term capital inflows. The whole experiment turned sour when the rising loss of confidence in the peso led to capital outflows that culminated in the 1994 currency crisis. In turn, the currency crisis was followed by the 1995 banking crisis when Banco de Mexico raised domestic peso rates up to the ceiling in order to prevent inflationary pressures from picking up again.

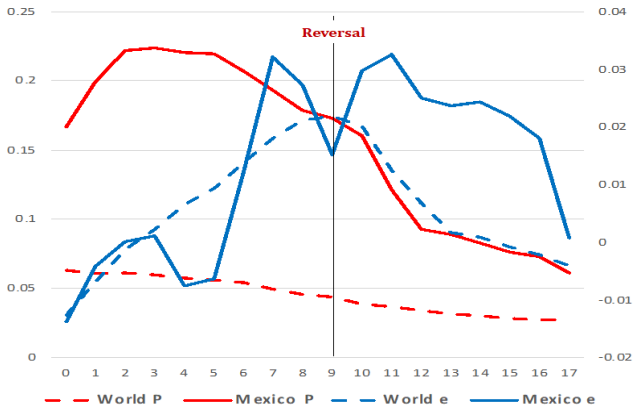
To compare Mexico with the rest of the world, we identify a set of 17 peer countries that underwent similarly sustained real exchange rate appreciations. Remarkably enough, the real exchange appreciations were accompanied by high and declining inflation rates, which is consistent with the underlying stabilization objective of these events (Figure 14a). Whether associated with managed nominal exchange rates (as in the case of Mexico) or freely floating exchange rates (as in the case, say, of Turkey), these real appreciations were accompanied by a sharp rise in the real domestic currency interest rate perceived by foreign investors and a sharp fall in the real foreign currency interest rate perceived by domestic borrowers (Figure 14b). Thus, the appreciation triggered an interest rate "wedge" that became very attractive for foreigners to lend to domestic borrowers and similarly attractive for domestic borrowers to borrow from foreigners. This "attractive to lend-cheap to borrow" syndrome was the basis for the partly dollar-based credit boom (Figure 14c) and the resulting private sector aggregate demand boom (Figure 14d).

In Mexico, inflation came down from a much higher level, and the aggregate demand boom and real appreciation were stronger and longer lasting, hence more damaging than in the rest of the world (Figures 14a and 14c); while the level of credit was substantially smaller (Figure 14d), the interest rate wedge (Figure 14b) and the credit boom (Figure 14d) were remarkably similar, in both magnitudes and durations. In both cases, the macro reversal toward a currency crisis and an exchange rate depreciation, lower real interest rates, and the end of the demand and credit booms took place around nine years after the gradual appreciation.

Figure 14

Monetary dominance crises:
Mexico vs. the rest of the world

a) Real Exchange rate (e) and rate of inflation (P)



b) Real interest rates

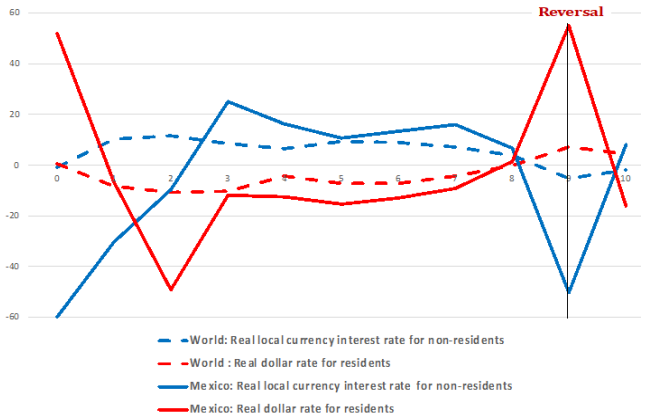


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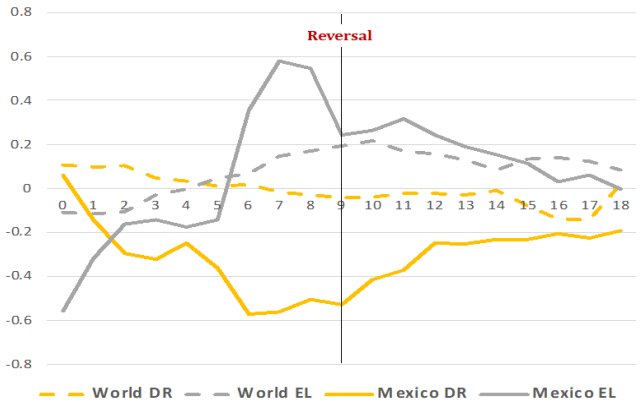
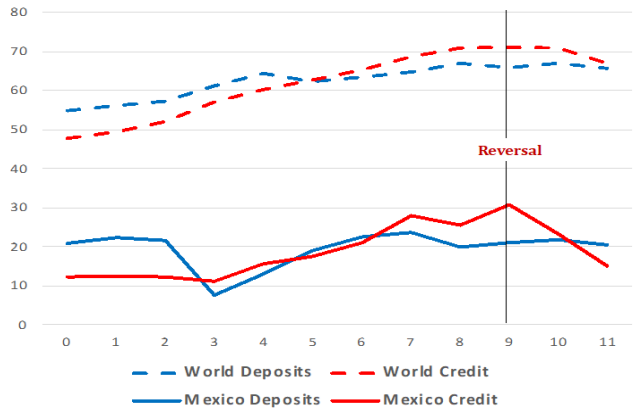
Figure 14

c) Aggregate demand boom



d) Credit boom



Source: Author's own calculations, based on methodology presented in Appendices 3 and 4, and data from WDI and Global Financial Development Database (World Bank, 2023b).

The bottom line of the above exercise is, therefore, that Mexico's 1994-1995 Tequila Crisis was by no means a unique event. Its amplitude may have been exacerbated by local or external factors.[9]

[9] A smoother exchange rate management, better bankers (another unfortunate legacy of the ISI years), better bank supervision, and less political turbulence

However, as in many other countries it was essentially the result of inflation stabilization policies that gave rise to a problem of "monetary dominance". The interest rate wedges resulting from hikes in the local currency nominal interest rates or freezes of the nominal exchange rate caused large capital inflows, demand booms, and credit booms that, in many cases, ended badly, with a mix of currency and/or banking crises. Thus, the huge real exchange rate and financial instability ended up having high economic costs. In addition to shortly interrupting the growth recovery in the wake of the North American Free Trade Agreement (NAFTA), the 95 banking crisis had a particularly enduring adverse growth legacy through its long-run impact on the Mexican financial system. Coming on top of the 1982 crisis, it undermined in a lasting way the confidence in the Mexican banking sector, sharply and durably restricting the availability of credit and raising its cost. Yet the policy adjustments leading to these unfortunate events had become absolutely essential and could no longer be postponed. The resulting price tag was another "child of the ISI years".

3.5 *The strains of growing in a China-dominated globalized world*

After Mexico stabilized its runaway inflation and opened up more fully to the global world through NAFTA, Mexico's growth remained disappointingly low on average and went through three distinct phases (Figure 15). From 2000 (when China joined the World Trade Organization) to 2009 (after the Global Financial Crisis), Mexico's growth declined, and so did its trade (as indicated by the converging EP and DR). From 2009 to 2018 (prior to the start of the current administration and the irruption of the COVID-19 pandemic), both growth and trade (as indicated by the diverging EP and DR) recovered. From 2019 onward, Mexico's trade (as reflected in its EP) reached a plateau, and its growth declined. Three complementary questions come to mind. Why did Mexico's growth remain, on average, so low? What factors lay behind the marked fluctuations in growth and trade? And how can the model of section 2 help provide answers to the first two questions?

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during 1994 would all have helped reduce the magnitude of the crisis. However, none of these was the fundamental root of the problem.

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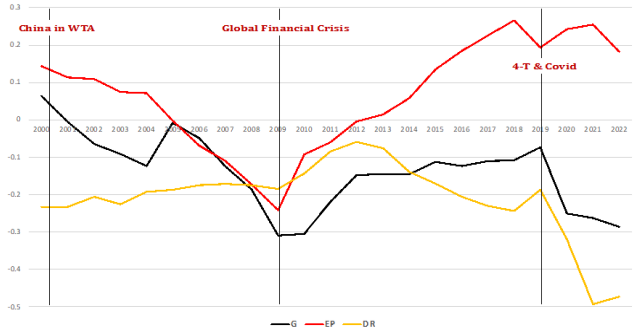
Figure 15
Mexico: Trade and growth; yearly growth decomposition, 2000-2022



Source: Author's own calculations, based on methodology presented in Appendix 3, and data from WDI (World Bank, 2023a).

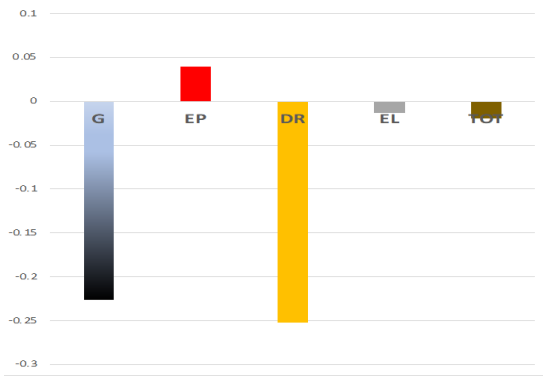
Regarding Mexico's low average growth, as indicated by the growth decomposition for the entire 2000-2022 period, it resulted from its negative DR: the country did not grow faster because the domestic economy failed to respond more successfully to the flow of incoming imports (Figure 16a). Yet, in terms of growth fluctuations (Figure 16b), the culprits were exports, both volumes (EP) and prices (ToT). In other words, the disappointingly low average growth resulted from domestic constraints, yet the growth variations around this low average were trade-induced.

Indeed, as shown by Figure 17a, Mexico's GDP growth closely followed the fluctuations of the country's exports as a share of US imports. During 2000-2008, this largely reflected the inroads made by Chinese exports: the US imports from China following its accession to the WTA clearly displaced those from Mexico (Figure 17b). However, after the Global Financial crisis, Mexican exports started to rise again, but now in tandem with Chinese exports, suggesting that Mexican firms had found export niches that no longer competed so closely with China. Likewise, after the Trump-imposed tariffs and trade restrictions on China, the decline in the Chinese export share was fully offset by the rise of the export share of other Asian countries, with little change in the trend followed by the Mexican export share (at least up to 2022). This again suggests limited substitution between China and Mexico.

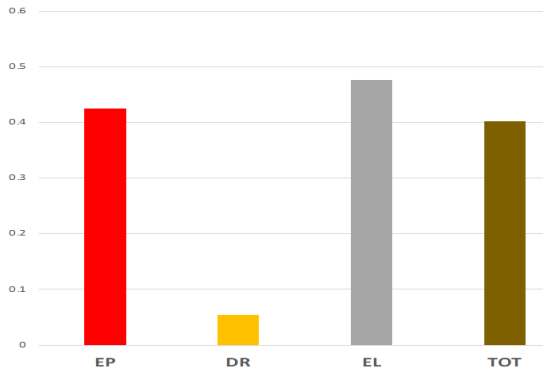
Figure 16

Mexico: Full period growth decompositions, 2000-2022

a) Levels



b) Fluctuations (variance decomposition)



Source: Author's own calculations, based on methodology presented in Appendix 3 and data from WDI (World Bank, 2023a).

While Mexican exports no longer appear to compete so directly with China's, the overwhelming presence of Chinese manufactures has nonetheless most likely contributed to limit Mexico's export potential in many fields, hence its average GDP growth. Figure 18a compares Mexico's growth decomposition for the 2000-2022 period with that of other world manufactures exporters, using the benchmarking methodology explained in Appendix 5 and normalizing the scale of the world manufacturers spectrum to match Mexico's export pull. The two

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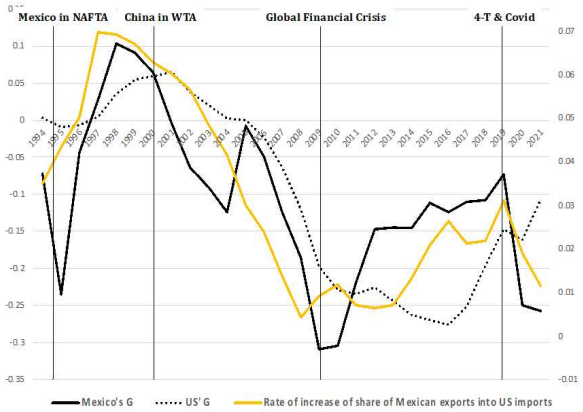
growth spectra follow very similar patterns. In both cases, they show negative ELs, largely associated with negative terms of trade ($ToTs$). By depressing the price of manufactures, China's competition most likely affected the growth of manufactures exporting countries around the world, including Mexico.

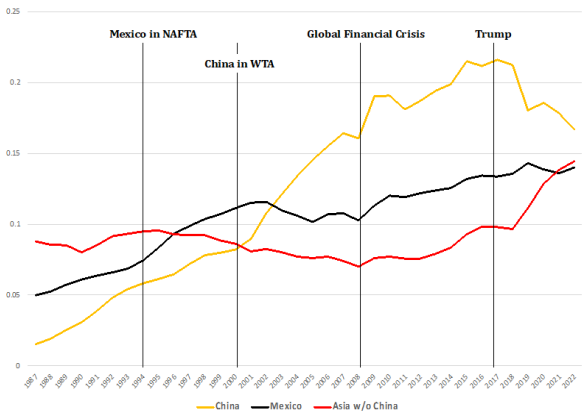
Figure 17

Mexico: US vs. China growth effects, 2000-2022

a) Mexico vs. US growth and imports share



b) US imports shares: Mexico vs. China and Asia



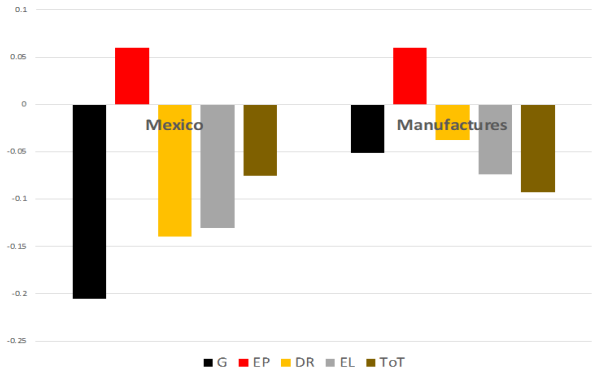
Source: US Census Bureau (2023) and WDI (World Bank, 2023a).

However, Figure 18a also shows that Mexico's GDP growth fell more than that of other manufactures exporters due to the much

deeper contractions of its EL and DR components. Mexico's underperforming DR reflects the limited pull exerted by its trade on its GDP. As shown in Figure 19, a 10% increase in the share of manufacture exports into total exports has only translated into a 1% increase in the value added by manufactures into GDP. While the back and forth of goods in the assembly process between each side of the frontier boosted the accounting value of exports, the value added by Mexican firms at each stage of the process remained limited.[10] And, independently of trade, the slow growth has also most likely reflected the lack of dynamism of the non-traded component of GDP, which in turn has had much to do with Mexico's large informal sector, the lagging development of the country's south, and the lack of sufficient competition in the non-tradable sector. As illustrated by the expression of GDP growth in equation (21) of the model of the previous section, a large informal sector with low productivity, v, will unavoidably slow down overall growth, even when the formal sector is making important gains in terms of productivity (A), the pull from foreign markets (B), or the multiplication of export niches (N).

Figure 18
Mexico: Growth decomposition components, 2000-2022

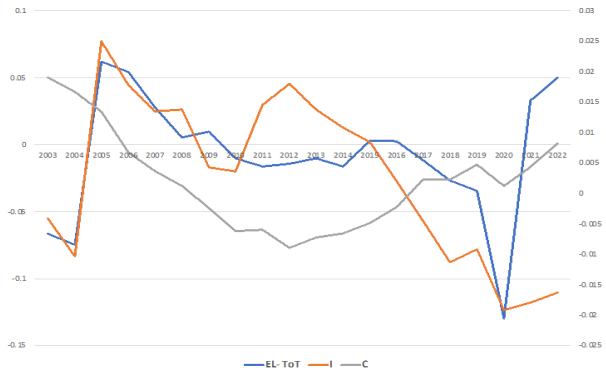
a) Mexico vs. world manufacture exporters



[10] According to Iacovone *et al.* (2022), 47% of the value in Mexican manufacturing exports originates on average from abroad the country, versus only 28% from inside.

Figure 18

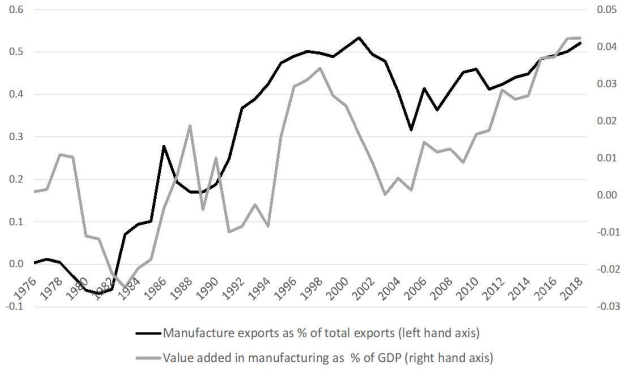
b) Mexico: Excess EL vs. investment



Source: Author's own calculations, based on the methodology presented in Appendices 3 and 4, and data from WDI (World Bank, 2023a).

Figure 19

Mexico: Manufactures value added vs. exports



Notes: To control for the different trends of the two variables in the figure, the averages for LA countries are subtracted from those for Mexico.

Source: WDI (World Bank, 2023a).

As to Mexico's EL contraction, it basically reflects the decline in investment. While the average manufactures exporters' EL fell less than its ToT (i.e., the decline in aggregate demand was less than that warranted by the terms of trade-related income loss), in Mexico, it was the opposite: aggregate demand fell by more. Figure 18b illustrates why: until the post-2021 pick-up in consumption (largely reflecting

the boost of direct transfers), the drop in aggregate demand in excess of the ToT income closely matched the drop in investment. In turn, the latter must have reflected both COVID and the politically-induced drops in confidence.

To conclude, how could changes in total factor productivity have been responsible for the fluctuations in growth? The extremely close post-ISI correlation of TFP and GDP growth, notwithstanding the very high volatility of both variables, clearly challenges an interpretation according to which TFP solely "caused" GDP through efficiency fluctuations (Figure 8b). It is hard to see how pure efficiency shocks could have given rise to such abrupt breaks in productivity unless they were the reflection of deep underlying fluctuations in demand: on the way up, the domestic inflation stabilization boom of 1990 to 1994, followed by NAFTA induced external demand boom of 1995 to 2000; on the way down, the post-China WTO external demand collapse of 2000 to 2008; and on the way up again, the post Global Financial Crisis external demand recovery of 2009 to the present.

However, Mexico's insertion into the global world has shaped the evolution of productivity not only over time but also across firms. While this paper only presented aggregate data, microeconomic data clearly supports the view that trade liberalization has opened a huge competition-driven gap in firm productivity between the tradable and non-tradable sectors. For example, a recent World Bank report on productivity growth in Mexico shows that the productivity of firms linked with GVCs far exceeds that of other firms (Iacovone *et al.*, 2022). This gap between the tradable sector firms that moved to their competitiveness frontier under the pressure of foreign competition and the non-tradable sector firms that continued to benefit from captive domestic demands is another unfortunate yet lasting feature of the Mexican economy, which also matches the key insights provided by the model in this paper.

4. Policy implications

In practical terms, how does this new perspective qualify each of the prevailing growth narratives, and how does it alter the policy discourse? As regards the structuralist narrative, the first key implication is the need to look ahead, not backward. The miracle growth of the ISI years was, at least in the case of Mexico, a calamitous accident waiting to happen. Not only is it meaningless to contrast the fast ISI growth with the slow post-ISI growth, it is outright misleading. Had

Mexico transitioned sooner out of ISI, instead of falling prey to the oil mirage, it would probably have been able to consolidate better its position as a key competitive industrial base for the US market. Faster and more resilient growth would have followed. And the China surge might even have lost some of its potency. At the same time, it is undoubtedly true, as advocated by the structuralist narrative, that the state's involvement in economic development matters probably a lot. However, the content and shape of this involvement is likely to lie light years away from that practiced in Mexico during the ISI years. It is all about strategic policy choices and smart implementing touches to help guide and facilitate private investment; it is not about the state taking control of the means of production, interfering heavily with market dynamics, or becoming captured by corruption or private interests.

With regard to the aggregate productivity narrative, there is little question that Mexico's TFP needs to rise. And for that to happen, much remains to be done in terms of improving the enabling business environment. Improving the country's infrastructure and providing better public goods, including water, clean energy, and a functioning rule of law, are of course key policy priorities. At the same time, however, care is needed to sort out what lies behind Mexico's stagnating TFP, as it may reflect demand constraints rather than supply inefficiencies. Thus, the growth boost from solely improving the business environment may be less than what could be expected from the low TFPs. In particular, Mexican firms need to upgrade the backward GVC orientation of their exports, a descendant of the early *maquila* industry that started during ISI. Instead, they need to make more progress toward forward GVC participation, where quality and attractiveness will play a more fundamental role. Thus, rather than becoming marginally more efficient in producing foreign-conceived, highly competitive, low value-added, labor-intensive products, the key to growing faster is likely to lie in developing more dynamic export niches (including, for example, personal services) and producing home-conceived manufactures that are more innovative and require higher skills, hence generate higher margins and higher value-added. The implications for strategically looking ahead, working more closely with the private sector, and boosting the country's entrepreneurship, knowledge and education are obvious.

Finally, when considering the growth narrative focused on informality, it is certainly appropriate to place informality at the center of the policy discussion. Informality matters a lot. However, some care is again needed to interpret the factors behind it. Informal-

ity is at least as much a by-product of under-development and low growth as it might be a cause. Hence, caution is needed to correctly identify and estimate the possible growth dividends from reducing informality. Addressing distortions may yield welfare benefits that are sufficient per se to justify such policies. Yet, the aggregate productivity gains obtained by a better allocation of resources may be substantially smaller than what could be expected from just comparing TFPs across sectors and firms. Hence, the potential growth benefits need to be carefully assessed and compared to the opportunity costs, even more so when fiscal constraints are tight and tightening, as appears to be currently the case in Mexico.

Author's note:

This paper follows on research conducted both individually and focused on Mexico (Ize, 2019a, 2019b), and jointly with Augusto de la Torre and focused on Latin America as a whole (De la Torre and Ize, 2019, 2020, 2022).

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Appendix 1

1. The impact of protection on welfare and growth

1.1 *Welfare*

As explained in section 2, the GDP of the protected economy is:

$$Y = \omega \bar{L} + \frac{q p_X X}{p_C} + \frac{(1-q)\, p_X X}{p_C^*} \tag{24}$$

Differentiating this expression with respect to q (an increase in protection) gives:

$$\frac{\partial Y}{\partial q} = \frac{\partial \omega}{\partial q} \bar{L} - \frac{q p_X X}{p_C^2} \frac{\partial p_C}{\partial q} - \frac{p_X X}{p_C} \frac{p_C - p_C^*}{p_C^*} \tag{25}$$

For $L_F < \overline{L}, \omega = v$; hence $\frac{\partial \omega}{\partial q} = 0$; since $\frac{\partial p_C}{\partial q} > 0$ and $p_C > p_C^*$ it is obvious that $\frac{\partial Y}{\partial q} < 0$.

For $L_F = \overline{L}$, differentiating ω from (6) yields the following expression:

$$\frac{\partial \omega}{\partial q} \bar{L} = \alpha\,(1-\alpha)\, A (p_X X)^{1-\alpha} \bar{L}^{\alpha} q^{-\alpha} = \alpha\,(1-\alpha)\, q^{-\alpha} Y_F \tag{26}$$

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Similarly, differentiating p_C from (7) and rearranging terms gives:

$$\frac{qp_X X}{p_C^2}\frac{\partial p_C}{\partial q} = \alpha\,(1-\alpha)\,q^{-\alpha}Y_F \tag{27}$$

Hence, the first two terms cancel out in (25), which becomes:

$$\frac{\partial Y}{\partial q} = \frac{p_X X}{p_C}\frac{p_C - p_C^*}{p_C^*} < 0 \tag{28}$$

Thus, protection raises workers' welfare but reduces commodity exporters'. In the aggregate, it is inefficient: it reduces GDP.

Absent any spillovers of protection on productivity (through learning or scale effects), taxing commodity exporters and redistributing the proceeds to workers should therefore achieve a Pareto superior welfare equilibrium. To check that this is the case, let q' be the tax rate on commodity producers that would leave them with the same consumption level as under protection:

$$(1-q')\,\frac{p_X X}{p_c^*} = (1-q)\,\frac{p_X X}{p_c^*} + q\frac{p_X X}{p_C} \tag{29}$$

Or, solving for q':

$$q' = q\left(1 - \frac{p_C^*}{p_C}\right) \tag{30}$$

Redistributing the tax to workers under a pure commodities economy will give them more consumption than under the protected economy if:

$$v\bar{L} + q'\frac{p_X X}{p_c^*} > \omega\bar{L} \tag{31}$$

Or, replacing q' from (30) into (31):

$$\omega - v < \frac{qp_X X}{\bar{L}}\left(\frac{p_C}{p_C^*} - 1\right) \tag{32}$$

Using (6) and (7):

$$\alpha\frac{v}{\omega} + (1-\alpha)\,\frac{p_C}{p_C^*} > 1 \tag{33}$$

Using (8):

$$\alpha\frac{v}{\omega}+(1-\alpha)\left(\frac{\omega}{v}\right)^{\frac{\alpha}{1-\alpha}}>1, \tag{34}$$

which may be written:

$$1-\alpha+r>r^{\alpha} \tag{35}$$

where: $r=(\frac{v}{\omega})^{\frac{1}{1-\alpha}}$. It is obvious that this condition always holds for $\omega\geq v,\ r\,[0,1]$.

1.2 *Growth*

To show that the GDP growth associated with commodity exports growth (whether quantity or price induced) is lower in the protected economy than in an open economy, differentiate (25) with respect to commodity imports, $Z=p_X X$:

$$\frac{dY}{dZ}=\bar{L}\frac{\partial\omega}{\partial Z}-\frac{qZ}{p_C^2}\frac{\partial p_C}{\partial Z}+\left(\frac{q}{p_C}+\frac{1-q}{p_C^*}\right) \tag{36}$$

As in the previous derivation, the two first terms on the right hand side of (36) cancel out:

$$\bar{L}\frac{\partial\omega}{\partial Z}=\frac{qZ}{p_C^2}\frac{\partial p_C}{\partial Z}=\alpha\,(1-\alpha)\,A\left(\frac{\bar{L}}{Z}\right)^{\alpha}q^{1-\alpha} \tag{37}$$

Hence:

$$\frac{dY}{Y}=\frac{Z}{Y}\left(\frac{q}{p_C}+\frac{1-q}{p_C^*}\right)\frac{dZ}{Z} \tag{38}$$

Similarly, differentiating (13):

$$\frac{dY^*}{Y^*}=\frac{Z}{Y^*}\frac{1}{p_C^*}\frac{dZ}{Z} \tag{39}$$

Hence, using (38) and (39), $\frac{dY}{Y}<\frac{dY^*}{Y^*}$ if:

$$\frac{Y}{Y^*}>1-q+q\frac{p_C^*}{p_C} \tag{40}$$

Or, using (12) and (13) and rearranging terms:

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$$\omega > v\left(1 - q + q\frac{p_C^*}{p_C}\right) \tag{41}$$

With $\omega \geq v,\ p_C > p_C^*, q \in [0,1]$, it is clear that (41) always holds.

Thus, protection reduces the economy's growth response to a higher growth of commodity exports.

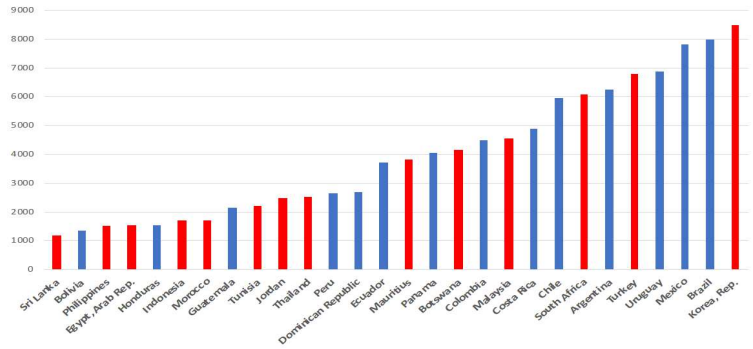
Appendix 2

2. Country composition of the LA and CG groups

Expressing country-specific rates of growth relative to those of the world neutralizes worldwide shocks and facilitates comparisons across countries. Yet, because country growth dynamics are influenced by the level of economic development, the growth of LA countries needs to be compared with that of a peer group of countries at similar levels of GDP per capita. Thus, the countries for the comparator group CG are selected based on the similarity of their per capita incomes with LA countries at the mid-point of the study period (1990). The number of CG countries is the same as that of the LA countries. For both groups, countries that are either too small or for which the available data is too volatile or incomplete are excluded. As a result, the small Caribbean islands, oil exporting Venezuela, nations that have undergone prolonged civil conflicts (El Salvador and Nicaragua), and countries with insufficient data (Paraguay, Belize, and Surinam) are excluded.

Figure A1 displays the 1990 per capita income for the resulting 28 intermingled countries. Per capita income levels range from slightly above USD 1,000 (Sri Lanka and Bolivia) to above USD 8,000 (Mexico, Brazil, and South Korea). LA includes eight South American countries (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Peru, and Uruguay), five Central American or Caribbean countries (Costa Rica, Dominican Republic, Guatemala, and Honduras), and Mexico. CG includes five South East Asian countries (Korea, Malaysia, Thailand, Indonesia, and the Philippines), five countries of the Middle East and North Africa (Turkey, Jordan, Tunisia, Morocco, and Egypt), three African countries (South Africa, Botswana, and Mauritius), and one South Asian country (Sri Lanka).

Figure A1
LA and CG countries: Per capita GDP, 1990



Notes: Per capita GDPs are expressed in constant 2010 USD.
Source: WDI (World Bank, 2023a).

Appendix 3

3. A macro and trade-based growth decomposition

3.1 *The setting*

Consider the simple following accounting identity:

$$G_Y \;=\; G_X \;+ (G_Y - G_M) + (G_M - G_X) \tag{42}$$

where the Gs are (the logs of) the backward-looking ten-year moving averages of growth rates of a country's GDP (Y), exports (X), and imports (M) of goods and nonfactor services, all relative to the rates of growth of the same variables for the world as a whole.[11] The first term in (42), labeled "export pull" (EP), can be interpreted as the traction that export expansion exerts on a country's growth. The second term, labeled as "domestic response" (DR), can be interpreted as the country's capacity to lift GDP growth above import growth

[11] This growth decomposition identity is inspired by Thirlwall (2011). Expressing the identity in logs and relative to the world linearizes and promotes standardization and comparability, both across time and between countries (see De la Torre and Ize, 2020).

(the country's efficiency in using its imports to grow). The third term, labeled as "external leverage" (EL), can be interpreted as the impulse or drag on growth linked to changes in the country's trade deficit or, alternatively, to changes in the availability of external finance. Equation (42) can thus be rewritten as:

$$G = EP + DR + EL \tag{43}$$

This identity is expressed in constant dollars, which captures better the underlying economic drivers of growth (although it could also be expressed in current dollars).[12] Therefore, an increase in the export price that raises the country's terms of trade, and the value of its exports (but not their volume) leaves the EP term unchanged. Instead, by allowing imports volumes to increase, the terms-of-trade windfall shows up as an increase in EL, i.e., as an additional external financing item. Hence, to differentiate changes in EL resulting from valuation gains from those associated with capital flows, a terms of trade term (ToT) is calculated as the difference between the EL terms expressed in constant and current dollars. A country's "growth spectrum" can thus be defined for any given year or period based on a vector of five variables (G, EP, DR, EL, ToT).

3.2 *The identification grid*

The growth spectrum provides a simple identification tool to separate supply from demand shocks. Table A1 summarizes the identification grid. The size of the shock affecting the growth decomposition is set equal to one and α and β are the induced responses of other terms of the decomposition.

Consider first the case of a pure domestic demand shock. By stimulating imports, a domestic demand shock should raise EL. Hence, the external leverage provides a simple indicator of domestic demand pressures. Changes in EL may reflect a term of trade windfall that is "spent", or some other macro disturbance, including those induced by monetary or fiscal policies. In an economy with substantial underutilized capacity (the Keynesian case of a horizontal supply curve), the increase in EL should be matched one-for-one by an increase in G. Instead, in an economy at full employment, the counterpart of the increase in EL should be a reduction in DR, as imports will rise but

[12] Constant dollars match the export and import elasticities of Thirlwall's model and better reflect the changes in the underlying economic drivers of growth, including by isolating price from quantity effects.

GDP will not. In practice, economies should lie generally somewhere in between, with a growth response $1-\alpha,\ \alpha \in [0,1]$. Hence, the trademark of a demand shock should be co-movements of G and EL, with partial opposite fluctuations in DR.[13]

Table A1
Response patterns to macro and trade shocks

	Supply			*Demand*		*Trade*	
	Uniform	*External*	*Internal*	*External*	*Internal*	*Liberalization*	*ToT*
EP	1	1		1		1	
EL					1		α
DR		-α	1	-α	-α	$\alpha - 1 < 0$	-$\alpha\beta$
G	1	$1-\alpha > 0$	1	$1-\alpha > 0$	$1-\alpha \geq 0$	$(\alpha \gtrless 0)$	$\alpha(1-\beta) > 0$
ToT							1

Source: Author's elaboration.

Consider next the case of a pure, uniform supply shock (a Solow-type shock) that raises the economy's output of tradable and non-tradable goods, whether as a result of a build-up in factors of production or a boost in productivity. Because the shock affects all goods, exports (hence EP) and GDP (hence G) should rise equally. But absent changes in domestic demand (i.e., a pure supply shock), EL should not budge. Hence, the rise in imports should match one-for-one the rise in exports and output. As a result, DR should also remain unchanged. The trademark of a uniform supply (Solow-type) shock should, therefore, be a co-movement of G and EP, with no changes in either DR or EL.

Consider now instead the case of an asymmetric supply shock that boosts the supply of non-tradable goods but not that of tradable goods. In this case, G should rise but not EP. At the same

[13] While a rise in EL always signals a rise in domestic demand today, it could also signal an increase in supply tomorrow (an eventual increase in G, alongside a rise in EP or DR) if it mostly reflected a boost in investment, rather than consumption. Such intertemporal interactions between the different components of the growth decomposition can be identified based on additional information on the composition of demand.

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time, as long as domestic demand remains unchanged, EL and hence imports should remain unaffected (i.e., the imported inputs required to produce non-tradables would simply replace other imports). The counterpart of the rise in G should therefore be a rise in DR, with no changes in EP or EL.

Consider next the case of an asymmetric supply shock that boosts the supply of tradable goods, but not that of non-tradable goods, or alternatively an external shock that raises the demand for the country's exports. In either case, both G and EP should rise but G less than EP, as the supply of non-tradable goods should not change. Since imports will rise as much as exports (again, assuming no change in demand), DR will decline by a factor $\alpha < 1$ to offset the difference between the changes in G and EP.

Trade liberalization should boost exports and imports but can affect GDP favorably or adversely. Thus, G may rise or fall by a factor depending on whether the rise in EP exceeds or falls short of the decline in DR. In the case of a positive terms-of-trade shock, the macro response will be pro-cyclical or countercyclical depending upon whether the windfall is "over-spent" (i.e., the rise in EL exceeds the rise in ToT) or "under-spent" ($\alpha \gtrless 1$) . and whether the economy is in a Keynesian or classical equilibrium, $\beta \in [0, 1]$.

Importantly, notice that an economy in macro equilibrium (i.e., with $EL = 0$) can grow faster than the world ($G > 0$) only if its trade grows faster than the world's ($EP > 0$) and/or its economy grows faster than its trade ($DR > 0$). Thus, an EP-based growth is outward-oriented, a DR-based growth is inward-oriented.

Appendix 4

4. World macro episodes

4.1 *Trade Surges*

As trade liberalizations took place gradually over a number of years, countries were selected based on the observed footprints of what would be expected from trade liberalizations (i.e., "trade surges"), rather than on a specific initial date. The footprints had to meet the following patterns:

a) Rising EP over several years.

b) Simultaneously falling DR (at least in initial years).
c) Initially stable EL.

As indicated in Table A1, patterns a) and b) are the key identifying characteristics of trade liberalizations. But pattern c) is also required to differentiate trade liberalizations from pure export surges (i.e., rising EPs) mixed with domestic demand boosts, which could cause an unrelated decline in DR as the counterpart of a rising EL.

Thirty-one trade surges were thereby identified, with initial dates ranging from the mid-70s to the late 90s (see Table A2). A world index was constructed by aligning all countries on the same starting date (year zero) and taking the simple average of all countries in the sample, except Mexico (the country against which to compare the world index).

Table A2
Country breakdown and starting dates

Latin America	*Eastern Europe*	*Southern Europe*	*Northern Europe*
Argentina (1989)	Hungary (1994)	Italy (1982)	Austria (1978)
Chile (1975)	Poland (1994)	Portugal (1984)	Denmark (1980)
Costa Rica (1988)	Rumania (2000)	Spain (1978)	France (1974)
Mexico (1989)	Slovenia (2003)		Germany (1979)
	The Czech Republic (1995)		Ireland (1977)
	The Slovak Republic (1999)		

Other high income	*East Asia*	*Other*
Canada (1983)	China (1981)	India (1977)
New Zealand (1988)	Hong Kong (1979)	Tunisia (1974)
United States (1983)	Indonesia (1972)	
	Malaysia (1972)	
	The Philippines (1977)	
	Singapore (1978)	
	Thailand (1981)	

Source: Author's elaboration.

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4.2 *Real appreciations*

The sample of countries that underwent sustained real exchange rate appreciations with respect to the US dollar was selected based on a pattern of systematic real appreciation during at least four consecutive years for countries above a minimum threshold of size and income per capita, that used their own currency, and that did not undergo major structural changes such as a transition from central planning to a market economy. This yielded the sample of 17 countries and starting dates shown in Table A3.

Table A3
Country breakdown and starting dates

Latin America	*South East Asia*	*Middle East*	*Other*
Brazil (2005)	Indonesia (1989)	Egypt (1992)	Australia (2001)
Chile (2002)	Malaysia (2005)	Turkey (2001)	Canada (1998)
Colombia (1990)	Philippines (2005)		Japan (1985)
Dominican Republic (1994)	South Korea (1987)		South Africa (2005)
Mexico (1987)	Thailand (1990)		Sweden (1985)

Source: Author's elaboration.

Appendix 5

5. A macro and trade benchmarking model

The world population of countries with complete growth spectra during the period 2003-2020 is used as the sample to estimate the set of independent regressions shown in Table A4. The dependent variables are all five components of a country's spectrum, and the regressors include the country's key structural characteristics (GDP per capita, population, and trade openness), the composition of their trade, and dummies (fixed effects) for each of LA's five subregions identified in Figure A2. All variables are averages for the period 2003-2020. Because the three components of trade composition (manufactures, commodities, and services) sum to one, only two of these components are included in the regressions (the regressions coefficients for the missing component may be inferred from the first two). Note also

that because of the accounting identity, the regression coefficients of all the terms in the G regression are the sum of those obtained for the EP, DR, and EL regressions.

Table A4
Growth spectra regressions

Variable	*G*	*EP*	*DR*	*EL*	*ToT*
Intercept	0.45**	1.1***	0.03	-0.72	-0.52
	(0.22)	(0.40)	(0.23)	(0.33)	(0.25)
Commodities	0.0014**	-0.002*	0.00026	0.0032***	0.0038***
	(0.0006)	(0.0010)	(0.0006)	(0.0009)	(0.0007)
Services	0.0016+	-0.0015	0.002*	0.0011	0.0016+
	(0.0010)	(0.002)	(0.001)	(0.001)	(0.001)
Mexico	-0.15	-0.03	0.004	-0.12	-0.055
	(0.13)	(0.24)	(0.14)	(0.20)	(0.16)
South America BCEs	0.025	-0.094	0.11+	0.091	0.024
	(0.07)	(0.12)	(0.06)	(0.08)	(0.065)
South America DCEs	0.07	0.05	-0.007	0.10	0.065
	(0.08)	(0.13)	(0.08)	(0.08)	(0.065)
Central America SEs	0.19**	0.05	0.26***	-0.067	-0.08
	(0.08)	(0.14)	(0.08)	(0.08)	(0.09)
Central America SMEs	-0.094	-0.29**	0.27***	-0.067	-0.11
	(0.08)	(0.04)	(0.08)	(0.08)	(0.09)
Log(GDPxCap)	-0.24***	-0.28***	-0.064***	-0.10***	0.091***
	(0.022)	(0.004)	(0.02)	(0.034)	(0.026)
Log(Population)	0.085***	0.032	0.017	0.035	0.015
	(0.026)	(0.05)	(0.03)	(0.04)	(0.03)
Log(Openness)	0.37***	0.28**	0.09	-0.009	0.091
	(0.074)	(0.13)	(0.07)	(0.11)	(0.08)
R Sq.	0.61	0.33	0.52	0.23	0.35
Adj. R Sq.	0.57	0.28	0.20	0.16	0.29
Observations	114	114	114	114	114

Notes: Significance levels:***p<0.01, **p<0.05, *p<0.10, +p<0.15
Source: Author's elaboration.

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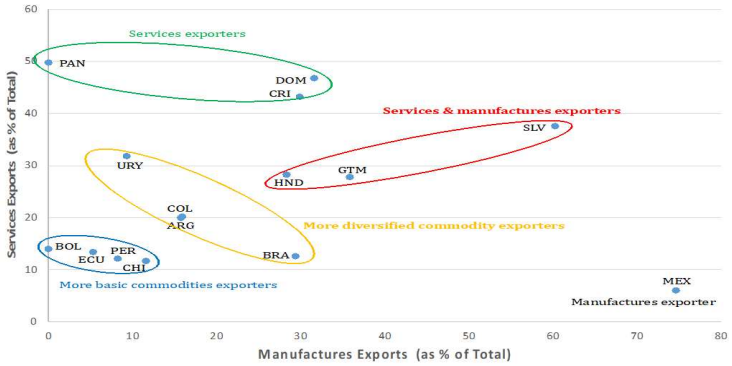
Figure A2
LA countries exports composition



Notes: The manufacture and services series are drawn from the WDI database. The commodities series is obtained as a residual from total exports of goods and services. The data is calculated as the yearly country average during the period 2003-2020.

Source: WDI (World Bank, 2023a).