What Explains Latin America’s Low Share of Industrial Employment?

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Abstract

This paper investigates the relative importance of different channels in explaining the low share of industrial employment in Latin America relative to the economies that employ a large share of the workforce in industry. Differences in domestic final consumption shares play a pivotal role and can account for 50–70 percent of the industrial share gap. The paper finds limited support for the comparative advantage hypothesis, as differences in trading patterns account for less than 15 percent of the gap. More important are the differences in sectoral linkages and wage gaps which account for more than 30 percent of the industrial employment gap individually.
What Explains Latin America’s Low Share of Industrial Employment?*

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1 Introduction

Modern economic growth is accompanied by shifts in the distribution of economic activity across the three broad sectors of the economy. As a sustained period of growth takes off, the share of agriculture in employment and output declines and this loss is picked up by industry and services. While services continue to expand, industry reaches a threshold after some time after which it starts to lose its share in the economy. These stylized facts of structural transformation have been documented since the late 1950s (Clark (1957), Chenery (1960), Kuznets (1957)). More recently, using data from multiple sources Herrendorf et al. (2014) documents these patterns of transformation for a broad set of countries. Nonetheless, there exist deviations in the transformation experience of countries. In particular, Rodrik (2016) documents an intriguing aberration in the industrialization pattern of the developing countries in which the transformation started much later compared to the early industrializers. Industry in many developing countries fails to reach the thresholds achieved by the developed countries in the past. Moreover, the onset of deindustrialization from this lower peak happens at a lower level of GDP per capita. The Latin American economies are more adversely affected by this premature deindustrialization compared to the other regions of the world.

In this paper, I investigate the relative strength of different channels in accounting for the low share of industry in Latin American economies. I employ a version of the open economy multi-sector accounting framework developed in Uy et al. (2013) in which the sectoral good is an aggregate of a continuum of tradeable varieties which are in turn produced using labor and composite sectoral goods as intermediates (Eaton & Kortum (2002)). The specification links sectoral production to the production activity in other sectors as well as in other countries. The framework yields a system of equations that establishes a relationship between the sectoral share of the economic activity and various channels that are readily measured from the data and bear association with different aspects of the transformation process. The share of a sector rises with an increment in its share of the total value-added in the economy, either via an increase in domestic consumption or net exports. A sector also realizes an expansion if it sees an upturn in the intensity with which it is used as an intermediate. Moreover, sectors differ in how intensely they employ labor relative to intermediates and any rise in the intensity of labor use of a sector needs to be compensated by the transfer of labor towards it. All the above changes affect the value-added and the employment shares in the same way which equal each other. To account for the difference in the value-added and the employment share of a sector as seen in the data, I allow for labor market barriers which restrict the flow of labor thereby generating wage (or productivity) gaps across sectors.

\footnote{Also refer to the paper for a comprehensive survey of both the theoretical and the empirical literature on structural transformation.}
Thus, the accounting framework links the sectoral allocation of labor to the consumption shares, the trade shares, the intermediate shares, the wage gaps, and the value-added shares of the sectors. I exploit this relationship and stack the Latin American countries against the economies that have attained a high industrial share of employment to gauge the relative success of the factors. The input-output data are an essential ingredient of the analysis which I source from the OECD database (OECD (2017)) which contains this information for many countries – including seven countries in Latin America, for 1995–2010/11. To construct a comparator set for these Latin American economies, I pick countries in the GGDC 10-Sector database (Timmer et al. (2015)) in which the peak industrial share during 1995-2010/11 exceeds 30 percent. Fortunately, the OECD database has information on all these comparator countries barring Mauritius. I also add China to the comparator set as its peak industrial share falls just short of the 30 percent threshold.

On average, the share of employment in the broad industrial sector in a Latin American economy is 11 percentage points lower compared to the comparator set. The counterfactual exercise reveals that more than half of this gap is accounted for by differences in consumption shares. Cross-country differences in sectoral wage gaps and linkages are also significant and roughly account for 5 and 3.5 percentage points of the gap. Differences in trade shares, on the other hand, play a muted role and can account for only a tenth of the gap in industrial employment shares. The findings for the manufacturing sub-sector which constitutes the bulk of the industrial gap, are somewhat different. Though differences in final consumption and wage gaps are still significant, they can only account for a quarter of the manufacturing gap. Differences in sectoral linkages emerge as the strongest factor and still account for a third of the employment share gap. The explanatory power of trade shares is more pronounced in manufacturing, but wanes compared to what can be explained by differences in final consumption, linkages and wage gaps. Looking at individual countries within the Latin American sample, I find a moderately dominant role of trade shares for Colombia, Costa Rica and Mexico. The closest the differences in trade shares come in explaining the employment gap is for the manufacturing sub-sector in Costa Rica where it accounts for almost half of the 8.7 percentage points gap.

In a second quantitative exercise, I turn my attention to the experience of the Latin American economies during 1995–2010/11 in which the industrial and the manufacturing shares of employment declined by 2 and 3.5 percentage points respectively. The exercise helps in parsing determinants that dragged the employment shares down from the ones that provided tailwinds towards an expansion. Trade, arguably more essential for manufacturing, did not play a primary role in driving manufacturing shares down. It is true that changes in trading patterns allude

\[ \text{\footnotesize Berlingieri (2014) studies the evolution of linkages in the post-war US and shows that the rise in forward linkages of the services sector is quantitatively relevant in accounting for the structural change. However, the role of outsourcing in driving transformation goes back at least to Fuchs (1968). Also, see Acemoglu et al. (2012) and Jones (2013) which consider variation in linkages across countries and time.} \]
to a contraction in manufacturing shares for five of the seven countries in the sample, but the
impact is quantitatively moderate. At their most detrimental, the changes in trade shares imply
a contraction of around 55 basis points in Costa Rica and Peru which is orders of magnitude
smaller compared to the contractions entailed by changes in the sectoral wage gaps. At the other
end, Chile and Colombia experienced an expansion in export shares, the quantitative response
of which implies an employment share gain of 35 and 90 basis points respectively.

The trivial role of trade shares in explaining the changes in employment shares begs the
question that whether this conclusion is specific to the Latin American economies. To this end,
I conduct the same exercise for China and the United States to parallel the findings relative to
what I observe for the Latin American economies. Like the Latin American economies, I find that
changes in trade shares play a minor role in explaining the massive shifts in employment shares
for China and US as well. In the US, changes in trading patterns imply a decline of 50 basis points
in industrial and manufacturing shares which constitute 10 percent of the total slump. China’s
expanding share of manufacturing exports in total value-added advances employment share by
80 basis points which makes up for a quarter of the total change in the manufacturing sub-sector.
However, at the broad industrial level, changes in trade shares remain largely inconsequential.
In contrast to Latin American economies where changes in final consumption which do not
uniformly explain the decline of employment shares, these changes are material in resolving the
evolution of shares in China and the US. In China, they account for 85–90 percent of the entire
gain in industrial and manufacturing shares.

The limited role of trade shares in accounting for the industrial employment gap needs
interpretation in the light of findings in Rodrik (2016). Rodrik (2016) shows that the pace of
deindustrialization is faster in non-manufactures exporters relative to manufactures exporters.
Differences in comparative advantage can serve as an explanation for these differences in ex-
periences. The comparative advantage hypothesis also proves helpful in explaining why the
early-developers were able to put a larger share of the workforce in industry before they started
deindustrializing. Nonetheless, the accounting exercises show the differences in the shares of
value added derived from industrial exports across countries are not large enough to close the
industrial gap. During 1995–2010 when global trade grew exponentially, the shifts in trade shares
are not stark enough to justify the shifts in employment shares even in China and the US which
are usually at the center of the debate. However, it would be naive to argue that trade plays a lim-
ited role in changing the sectoral allocation of resources. Indeed, Pierce & Schott (2016) find that
the withdrawal of tariff increases on Chinese imports is causally linked to the loss of manufac-
turing employment in the US. The findings of this paper instead contend that any trade-induced
force goes beyond the comparative advantage mechanism. Trade arguably interacts with prefer-
ences on the consumption side of the economy as households adjust their expenditure shares in
response to trade. Similarly, sectoral linkages and productivity gaps might also react to trade.
These avenues remain largely unexplored and need further investigation.

I conclude the quantitative analysis by highlighting some aspects of the construction sub-sector whose share in employment increased by 1.3 percentage points during 1995–2010/11. Specifically, the motivation is to evaluate whether construction can keep growing in the coming decades blunting the slump in manufacturing. The expansion of the sub-sector was driven by changes in sectoral wage gaps and a shift towards construction in final consumption. The continued expansion depends on whether these trends continue into the future. However, there exists a concern as to how large the sub-sector can get given that its share in most countries is close to global standards. Closing the remaining gap will yield modest expansion in most countries with Colombia and Costa Rica realizing the largest gains, partially driven by the fact that the construction sector contracted in the two countries during the 1995–2010/11 period.

The rest of the paper is organized as follows. In the next section, I outlay the accounting framework derived from the open-economy model which I use for the counterfactual analysis. I discuss the results of the analysis in section 3 before concluding with some remarks on the relevance of the findings for policy.

2 Accounting Methodology

The accounting methodology that I employ in the paper essentially uses the open-economy framework developed in Uy et al. (2013). In addition, I also allow wages to differ across sectors which accounts for differences in labor productivity across sectors.

There are $J$ sectors in the economy and each sector is characterized by a unit interval of tradable varieties. A typical variety of sector $j$ is indexed by $x_j \in [0,1]$ and each variety can be produced domestically or can be imported from abroad. The varieties are used to produce a composite sector good, the quantity of which is given by $Q_j$. The composite good has twin uses—it is either consumed domestically or is used as an intermediate in the domestic production of some variety of some sector. A variety is produced using labor and composite sectoral goods and the production technology is Cobb-Douglas in inputs. The Cobb-Douglas share of labor in the production of a particular variety $x_j$ of sector $j$ is given by $\beta_j$ while the Cobb-Douglas share of the composite good from sector $k$ used in total spending on intermediates is given by $\mu_{jk}$ ($\sum_k \mu_{jk} = 1$).

The household sector is endowed with a unit of labor which it supplies inelastically to the production of varieties. However, the wage rate differs across sectors which leads to differences

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3Hulten (1978) and Horvath (1998) are early examples of studies that formalize the connection between sectoral linkages and various aspects of the economy. More recently, Berlingieri (2014) and Sposi (2018) use a similar accounting framework to study structural transformation in separate settings. Also see Ngai & Samaniego (2009) and Caliendo & Parro (2015) (among others) which are other recent examples that incorporate linkages on an economy-wide basis.
in value-added per worker across sectors. The household sector spends its wage income on the consumption of composite goods. In addition, it can lend or borrow from abroad leading to a trade surplus or deficit.

Using this framework, the value-added by sector \(j\) \((V_j)\) can be written as

\[
V_j = \beta_j(C_j + N_j) + \sum_{k=1}^{J} (1 - \beta_k)\mu_{kj} \left( \frac{\beta_j}{\beta_k} \right) V_k
\]

where \(C_j\) and \(N_j\) denote the final consumption expenditure and the net exports of sector \(j\) respectively. The system of equations can be summarized in matrix notation as

\[
\begin{bmatrix}
v_1 \\
v_2 \\
\vdots \\
v_J \\
\end{bmatrix} =
\begin{bmatrix}
  1 - (1 - \beta_1)\mu_{11} & -(1 - \beta_2)\mu_{12}(\beta_1/\beta_2) & \cdots & -(1 - \beta_J)\mu_{1J}(\beta_1/\beta_J) \\
  -(1 - \beta_1)\mu_{21}(\beta_2/\beta_1) & 1 - (1 - \beta_2)\mu_{22} & \cdots & -(1 - \beta_J)\mu_{2J}(\beta_2/\beta_J) \\
  \vdots & \vdots & \ddots & \vdots \\
  -(1 - \beta_1)\mu_{J1}(\beta_J/\beta_1) & -(1 - \beta_2)\mu_{J2}(\beta_J/\beta_2) & \cdots & 1 - (1 - \beta_J)\mu_{JJ}
\end{bmatrix}
\begin{bmatrix}
  \beta_1(c_1 + n_1) \\
  \beta_2(c_2 + n_2) \\
  \vdots \\
  \beta_J(c_J + n_J)
\end{bmatrix}
\]

where the aggregate variables \(V_j\), \(C_j\) and \(N_j\) have been reduced to be expressed as ratios of GDP. The above equation links the value-added shares of sectors with the final consumption expenditures of the household sector as well as with the external sector. The equation also captures the association between the value-added shares and the labor shares of income \((v_j)\) and sectoral linkages \((\mu_{kj})\). There is one more step needed to convert the above relationship from value-added shares to employment shares. If \(w_j\) is the wage rate in sector \(j\), then the labor share of sector \(j\) can be recovered from the sectoral share of value added using

\[
l_j = \frac{v_j}{\sum_k v_k} = \frac{v_j/\tau_j}{\sum_k v_j/\tau_j}
\]

where \(w_j = \tau_j w\) and \(\tau_j\) represent wedges that create barriers which restrict the flow of labor across sectors.

Introducing time-scripts in the notation, the labor allocation \(L_t = [l_{1t}, l_{2t}, \ldots, l_{Jt}]\)' at any time can be written as a function of final consumption shares \(C_t\), trade shares \(N_t\), sectoral linkages \(M_t\), wage gaps \(T_t\), and labor intensity \(B_t\)

\[
L_t = F(C_t, N_t, M_t, T_t, B_t)
\]

where \(C_t, N_t, T_t, B_t\) are vectors of \(J\) elements and \(M_t\) is the matrix of size \(J \times J\). Hence, the function \(F\) which encases equations 2 and 3 dispenses the counterfactual labor allocation when one or more variables on the right-hand side is counterfactually altered.\(^4\)

\(^4\)Appendix section A.1 provides details on the derivation of equations 2 and 3.
3 Quantitative Analysis

The framework in section 2 establishes a relationship between the sectoral distribution of the workforce and the five variables outlined before. In this section, I will use the data to perform a set of counterfactuals to highlight issues related to the industrial share of employment in the Latin American economies.

3.1 Cross-country variations in employment shares

The first exercise pertains to the stark pattern of premature deindustrialization observed in Latin America. The idea is to stack the Latin American countries against the economies that have attained a high industrial share of employment and gauge the relative importance of the aforementioned variables in explaining the gap across the two. Given that the sectoral share of employment varies systematically with development, it is desirable if the comparator countries have similar levels of economic development. My selection of comparator countries follows these two principles subject to the availability of data.

The input-output data from the OECD database (OECD, 2017) are available for the period 1995–2010/11 which defines the universe against which to compare the Latin American economies. Of more than 40 countries that feature in the GGDC 10-Sector database (Timmer et al., 2015), the peak industrial share of employment exceeded 30 percent in 8 countries during this period. Mauritius is the only country among these 8 for which the input-output data are not available. I also include China as a comparator country as its industrial share of employment was just under 30 percent in 2011. China also merits inclusion as it is often argued that the development process in China has been different from many countries. It will be useful to see if China serves as an outlier benchmark relative to others in the present context.

Table 1: Comparator Countries

| Country | CHN | ESP | ITA | JPN | KOR | MYS | SGP | TWN |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|
| Peak Industrial Share (%) | 29.5 | 30.6 | 31.1 | 31.6 | 33.5 | 35.8 | 34.3 | 37.5 |
| Year | 2011 | 2001 | 1995 | 1995 | 1995 | 1997 | 2000 | 1995 |

The table reports the peak industrial share for the seven countries in the GGDC 10-Sector database for which the share breached the 30 percent mark in any year beginning 1995. China is also included as its peak is just short of the 30 percent threshold. The last two rows report the GDP per capita for the eight countries in the year they achieve the peak share relative to the average GDP per capita of the seven Latin American economies in 1995 and 2011.
Table 1 shows the peak industrial share of these countries and the year corresponding the peak share. To measure the gap in industrial employment share across the Latin American economies and the comparator economies, I focus on this peak industrial share achieved by each comparator country. For half of the comparators, the first year for which the data are available is also the year corresponding to the peak share whereas for Malaysia, Singapore, and Spain the peak corresponds to 1997, 2000 and 2001 respectively. China, of course, is still industrializing and its peak industrial share during the period is highest in the last year for which the data are available.

Figure 1 shows the extent of the industrial employment share gap for the seven Latin American countries in 1995 and 2010/11 compared to the peaks of the industrial shares. The bars represent the average gap for the region while the symbols report the gap for the individual countries. The figure shows the importance of manufacturing in explaining the aggregate industrial gap. On average, the industrial share of employment in Latin America was 9.6 percentage points lower in 1995. Roughly 70 percent of this gap is explained by lower employment shares in manufacturing. The gaps widen over time as industry loses its share in employment. However, the loss in employment share at the aggregate industrial level is far outpaced by the loss in share by manufacturing. As a result, the manufacturing gap accounts for just under 90 percent of the industrial gap in 2010/11. Chile is an extreme example which highlights the influence of the manufacturing sub-sector where the gap in manufacturing share is larger than the gap in industrial share.

The figure also shows how the gaps vary across Latin America. In 1995, the gaps were particularly large in Brazil and Peru while relatively much smaller in Costa Rica and Mexico. Interestingly, the cross-sectional variation in 2010/11 is much smaller. Apart from Peru and Mexico that have relatively large and small gaps respectively, both the industrial and manufacturing share gaps in the remaining five countries have converged over time. Note that most countries have lost industrial and manufacturing share in employment over the years. As such, this convergence is on the back of moderately lower losses in shares by the lagging countries.

These large gaps in industrial and manufacturing employment shares warrant explanation. Nonetheless, as table 1 shows, the income per capita in many comparator countries is much higher compared to the Latin American economies. For example, income per capita in Japan and Singapore was 4–5 times as large compared to the average of the seven Latin American countries. The gap in incomes converged over the next decade-and-a-half but income per capita still was orders of magnitude higher in many instances. To discipline the selection of comparator countries, I restrict attention to cases where the income per capita in comparator countries is within 0.5–2 times the Latin American average. Hence, I compare the Latin American employment shares in 1995 to the peaks achieved in China and Malaysia. Similarly, I compare shares in 2010/11 to the peaks achieved in Spain, Italy, Korea, and Taiwan in addition to China and Malaysia. The
quantitative results are not sensitive to these restrictions and are robust when I consider a larger comparator group.

Having selected the comparator countries and years, quantifying the role of factors in explaining the low industrial share in Latin America follows from the framework in section I. For example, take any Latin American country in 1995 and compare its industrial employment share to the peak achieved by some comparator country. The differences in the patterns of final consumption, net exports, sectoral linkages, wage gaps and intensity of labor use together can account for differences in industrial employment shares across the two. As discussed earlier, a distinct set of variables in the data are associated with these factors. To check how each factor contributes to the aggregate gap, I keep all variables for the Latin American country fixed at its observed value except for the variables that correspond to the factor of interest. For variables pertaining to this factor, I plug in the counterfactual values seen in the comparator country. Thus, the implied change in industrial employment share captures the importance of a factor in accounting for the aggregate gap.\(^5\)

The exercises related to the counterfactual changes in patterns of sectoral linkages, wage gaps, and labor intensities are straightforward as they require replacing the Latin American values with the values of comparator countries. However, in the case of implied changes in patterns of final consumption and net exports needs one adjustment. Net lending as a fraction of GDP varies across countries. As such, replacing final consumption shares of sectors in GDP of a country \((C)\) with counterfactual consumption shares of sectors from a counterfactual country \((C')\) without any adjustment to sectoral net export shares \((N)\) leads to an imbalance in the total value-added if the net lending as a share of GDP is different across the two countries.

To balance the total output in the counterfactual exercises, I scale the net export shares \((N)\) by a factor such that the net lending as a share of GDP matches the net lending pattern of the counterfactual country. Similarly, when using the trade patterns from the counterfactual countries, I scale the final consumption shares \((C)\) to retain the net lending behavior of the counterfactual country. The advantage of this adjustment is that it accepts the observed values of counterfactually changed variables.

Table 2 summarizes the results of the exercise. I recall that I compare the sectoral distribution of employment in 1995 in Latin America to the distribution in China and Malaysia. The comparator set for 2010/11 in Latin America is larger with four more countries added to the set – Spain, Italy, Korea, and Taiwan. The figures in the first two columns correspond to the average of all such comparisons. The first row reports the average of the actual gap in employment shares. The rows that follow report the implied gap in employment shares when I replace the specified

\(^5\)Note that the sum of implied changes does not necessarily add up to the aggregate gap. This is because the implied change due to change in one factor is not independent of the levels of variables associated with the other factors.
### Table 2: Actual & Implied Employment Share Gap

| Industry | Manufacturing | Industry | Manufacturing |
|----------|---------------|----------|---------------|
|          |               | All Comparator Countries | Asia Only |
|          | (1)           | (2)      | (3)           | (4)        |
| Actual Gap | 11.1          | 9.9      | 11.6          | 10.1       |
| Final Consumption | 5.2          | 7.1      | 3.8           | 6.5        |
| Trade     | 9.9           | 8.1      | 10.0          | 8.0        |
| Sectoral Linkages | 7.5          | 6.7      | 7.4           | 6.1        |
| Wage Gap  | 6.2           | 7.3      | 8.4           | 8.7        |
| Labor Intensity | 14.2         | 10.8     | 15.2          | 11.4       |

The first row reports the actual gap in industrial/manufacturing employment share. The following rows report the implied gap remaining when the variables pertaining to the listed factor is counterfactually changed to a comparator country, keeping other variables unchanged. All figures are averages across the Latin American and the comparator set countries. All figures in percentage points.

The evidence justifies the importance of trade in manufacturing compared to the other industrial sub-sectors which are arguably less tradable. Nonetheless, the influence of trade in explaining the manufacturing gap wanes compared to what can be explained by differences in final consumption shares.
consumption, linkages and wage gaps. Within manufacturing, differences in sectoral linkages emerge as the strongest factor driving the employment share gap and can still account for a third of the employment share gap.

The comparator set includes Italy and Spain which industrialized earlier together with the Asian economies in which the industrialization started much later. It is possible that some factors became more relevant for the latter set as they industrialized in a world much different from the early starters. Of singular interest are the differences in trading patterns across the two groups. For instance, the higher industrial (and manufacturing) share in Asian economies may be driven by trade rather than domestic consumption as they engage more resources in the sector by taking advantage of foreign demand as the world became more open.

To see if the ability of factors in explaining the employment share gap responds to the exclusion of early industrialized economies, I perform the same exercise by reducing the set of comparator countries to China, Korea, Malaysia, and Taiwan. Columns (3) and (4) report the actual and implied gaps when the comparator set only includes these Asian economies. The employment share gap in industry, as well as in the manufacturing sub-sector, remains stable when Italy and Spain are excluded from the comparator set. Looking at the broad industrial sector, differences in final consumption shares are still the most powerful factor driving the cross-country variation in the employment share gap. Compared to earlier, differences in final consumption patterns account for roughly 70 percent of the total gap. However, the role of trade in explaining the gap is still subdued. The employment gap decreases by 1.5 percentage points when the trade shares are changed to match the shares of the Asian economies. On the other hand, changes in sectoral linkages can shrink the gap by more than 4 percentage points. Differences in wage gaps are still significant and explain more than twice the gap explained by trade. Nonetheless, they are not as relevant as before, implying that skill and non-skill barriers in Latin America are closer to those in Asia relative to Italy and Spain. A similar pattern emerges for the manufacturing sub-sector. Like with the larger comparator group, final consumption explains a lower share of the gap in manufacturing relative to the industrial sector. However, there is a slight increase in its explanatory power when I restrict comparisons to Asian economies only. I also find a marginal increase in the impact of trade with it accounting for a fifth of the gap in the manufacturing share. Sectoral linkages remain the dominant factor driving the gap in manufacturing while differences in wage gaps come out as much less important than before.

In summary, for the aggregate industrial sector, the differences in final consumption are critical in explaining the employment share gap with differences in linkages and wage gaps also being important. Relative to these factors, trade plays a secondary role. Trade is much more important in explaining the manufacturing share gap accounting for a fifth of the gap but still plays a modest role relative to differences in linkages and final consumption. In what follows, I assess how these results seen at the regional level for Latin America relate to the seven constituent
Figure 2 summarizes the accounting for each Latin American country in the sample. The bars represent the actual gap in industry’s share of employment for a country with respect to the average employment share in the comparator countries. The symbols represent the implied gap remaining after the differences in a factor have been accounted for. Thus, symbols closer to zero have higher explanatory power in explaining the actual gap. The reference lines indicate the average implied gap remaining for the entire Latin American sample. Like before, I separately present results for the extended set of comparator countries which includes Italy and Spain and the restricted set that consists only of Asian economies in panel (a) and (b) respectively.

The variations in final consumption shares can explain more than half of the employment share gap for the seven countries taken together. This dominance of consumption in accounting for the total gap is most visible in Argentina, Brazil, and Costa Rica. For the three countries, these variations account from two-thirds to almost the entire gap. The differences in consumption are the principal factor explaining the gap for Colombia and Mexico as well when the comparator set consists of Asian economies alone. Chile and Peru are the two countries where consumption patterns play a secondary role where sectoral wage gaps are more critical in explaining the low employment share of the industrial sector. Nonetheless, consumption remains a significant factor for these two countries and still explains at least a third of the total gap. Barring Costa Rica, trade performs a passive role for the rest of the sample. Trade is particularly latent in explaining the low industrial shares of Chile and Peru where the implied gaps remain close to the actual gaps. Even at its most influential in the case of Costa Rica, trade accounts for just under a third of the gap. This is substantially lower compared to what is explained by final consumption and sectoral linkages for the same country.

When it comes to the relevance of the sectoral wage gaps, I notice a diverse effect across countries. The differences in sectoral wage gaps play a vital part in explaining the gaps for Colombia, Mexico, and Peru, especially when using the restricted set of comparators. Chile stands out as an outlier where accounting for wage gaps leads to an expansion in the industrial share of employment that surpasses that of comparator countries. Giving the economies of Argentina and Brazil the sectoral wage gaps of comparator countries only marginally helps in closing the gap. In a starker contrast, the gaps widen by 1.6–3.2 percentage points after accounting for sectoral differences in wages in Costa Rica. The effect of sectoral linkages is more uniform across countries. Like with trade and wage gaps, Costa Rica stands out from the rest of the sample. Sectoral linkages can explain around two-thirds of the total gap which is twice what I observe for the region.

Figure 3 reports the results for the manufacturing sub-sector. Recall that variation in sectoral linkages between the Latin American and the comparator economies is the primary factor explaining the gap in manufacturing shares. Reference lines represent the relative capability of the
determinants for the entire sample. Sectoral linkages are of most consequence in explaining the gaps in Argentina, Brazil, and Costa Rica. In Costa Rica, the gaps reduce to less than a half of the actual gap when the linkages in the country are counterfactually changed to mimic the linkages in comparator economies. Wage gaps and consumption patterns overshadow the linkages in driving the gap in Chile and Colombia respectively. Nonetheless, they still account for a notable portion of the total gap. Even in Mexico and Peru, linkages can explain at least a fifth of the gap in manufacturing shares.

All countries in the sample witness an increase in the explanatory power of trade relative to the aggregate industrial sector. However, this gain is marginal for most cases and variations in trade shares in general account for modest portions of the total gaps. Trade patterns explain less than 15 percent of the manufacturing share gaps for four of the seven countries in the sample even when restricting the comparator set to include Asian economies. Trade plays a more pivotal role in resolving low manufacturing shares in Columbia, Costa Rica and Mexico. In particular, of the 8.7 percentage points gap in manufacturing share in Costa Rica relative to comparator countries, almost half is successfully accounted for by trade alone.

There are some engaging deviations in the relative importance of factors both when looking at the industrial and the manufacturing share gaps. However, the variations in final consumption, linkages and wage gaps usually outweigh trade in driving the gaps in nearly all cases.

3.2 Changes in employment shares over time

In this sub-section, I turn my attention to the experience of the Latin American economies during the period under study. During the period the industrial share of employment has gone down by more than 2 percentage points. However, the decline in Chile and Costa Rica has been more severe. A couple of countries did gain some ground at the aggregate sector level but the decline in manufacturing has befallen every country in the sample. The average loss in manufacturing share is more than 3.5 percentage points with losses being exceptionally high in Chile, Costa Rica, and Peru. Analyzing inter-temporal changes is not only crucial for countries that observe significant shifts in the sectoral distribution of the workforce. The distribution may remain stable when changes in factors influencing the distribution act in opposing ways. The exercise helps in parsing determinants that dragged the employment shares down from the ones that provided tailwinds towards an industrial expansion.

Figure 4 shows the results of the exercise for each country in the sample. The bars represent the actual change in employment shares. The symbols depict the counterfactual change in employment shares when the variables pertaining to a factor are changed, keeping all the other variables fixed at the 1995 levels. To avoid clutter, I show reference lines only for trade and wage gaps. The reference lines correspond to the average change in shares across the seven countries.
Panel (a) focuses on the aggregate industrial sector. Considering the average change across the region, I notice that changes in all factors – including trade, except for the changes in wage gaps contribute to the expansion of industrial share. However, the joint push provided by these factors is not enough to overturn the huge pull produced by changes in the wage gaps. On average, changes in the wage gaps during the period shaved off 2.8 percentage points. Among other factors which all move to help the expansion of the industrial share, changes in the intensity of labor use come out as most powerful.

At the country level, the loss of industrial share driven by changes in wage gaps is individually high for Chile, Colombia, and Costa Rica. The impact is also notable for Argentina and Peru. Argentina and Colombia offset this sizable impact of changes in wage gaps with the assistance of changes in other factors. While a robust increase in the industrial share of final consumption blunts the impact in Argentina, both changes in trade shares and intensity of labor use rescue the contraction in Colombia. Brazil is the only country in the sample in which the movements in the wage gaps imply share gain by the industry. Though changes in final consumption remain a relatively inert factor for the region, the impact varies drastically across countries. At one extreme, these changes alone drive a contraction of around 3.5 percentage points in Chile and Costa Rica while suggesting an expansion of more than 4.5 percentage points in Argentina. A critical finding of this exercise is that rather than dragging the industrial share down during this period, shifts in trade shares laid the ground for marginal expansion. At the country level though, this implied expansion occurs for only Colombia, Mexico and Peru. Even in countries in which trade is responsible for dragging shares down, the quantitative effect is mild compared to the actual decline. For instance, changes in trade shares can account for half a percentage point decline in industrial share for Argentina. This is markedly lower compared to the effect produced by changes in the intensity of labor use (-0.8 pp) and sectoral wage gaps (-2.9 pp).

Panel (b) shows the results for the manufacturing sub-sector where except for Costa Rica and to a smaller extent for Colombia, the loss of share has been more pronounced. Like for the aggregate industrial sector, changes in wage gaps during the period are mainly responsible for the lost employment share at the sub-sector level. The importance of changing wage gaps holds for individual countries too. In a departure from this pattern, inter-temporal movements in gaps do not imply a substantial deviation in manufacturing share in Mexico and instead imply an expansion of share in Brazil. In line with the broader industrial sector, changes in final consumption do not suggest a massive shift in the manufacturing share at the regional level but do produce potent effects for many countries individually. Argentina and Peru experience a drastic increase in the manufacturing share of final consumption while there is a shift away from manufacturing in Chile and Costa Rica. These moves in final consumption shares indicate 2.5–4 percentage points change in employment shares for these countries. For Mexico, the changes in final consumption share do imply a modest 40 basis points expansion in the manufacturing share.
in contrast to a 2.5 percentage points expansion in the industrial share. Considering changes in sectoral linkages at the sub-sector level, I notice a divergence from the effect seen for the industrial sector. On average, changes in sectoral linkages imply a contraction of more than 40 basis points. All the countries in the sample except Argentina experience shifts in linkages which imply a loss of manufacturing share and the impact is severe for Chile and Mexico.

Trade, arguably an essential factor of manufacturing employment, did not play a primary role in driving manufacturing shares down for the region during the period as seen by the reference line that lies close to zero. It is true that changes in trading patterns allude to a contraction in manufacturing shares for five of the seven countries in the sample, but the impact is quantitatively moderate. At their most detrimental, the changes in trade shares imply a contraction of around 55 basis points in Costa Rica and Peru which is orders of magnitude smaller compared to the contractions entailed by changes in the sectoral wage gaps. At the other end, Chile and Colombia experienced an expansion in export shares, the quantitative response of which implies an employment share gain of 35 and 90 basis points respectively.

In summary, the exercises at the industry and the manufacturing level show that changes in trade shares during the period are not large enough to explain the loss of employment shares endured by the Latin American economies. Instead, the changes in sectoral wage gaps explain most of the shrinking of industry as well as of manufacturing.

### 3.3 Changes in trade shares in China and the United States

The trivial role of trade shares in explaining the changes in employment shares begs the question that whether this conclusion is specific to the Latin American economies. To this end, I conduct the same exercise for China and the United States to parallel the findings relative to what I observe for the Latin American economies. The employment share has risen sharply in the former, more so in the industrial sector than in manufacturing. On the other hand, employment shares in both industry and manufacturing have fallen more than 5 percentage points in the US. Table 3 presents the results for the two countries together with the average of the seven Latin American economies. Like the Latin American economies, I find that changes in trade shares play a much smaller role in explaining the massive shifts in employment shares for China and US as well. In the US, changes in trading patterns imply a decline of 50 basis points in industrial and manufacturing shares which constitute 10 percent of the total slump. China’s expanding share of manufacturing exports in total value-added advances employment share by 80 basis points which makes up for a quarter of the total change in the manufacturing sub-sector. However, at the broad industrial level, changes in trade shares remain largely inconsequential.

In a starker vein, changes in final consumption which do not uniformly explain the behavior of employment shares in Latin American economies, are material in resolving the evolution
of shares in China and the US. In China, they account for 85–90 percent of the entire gain in industrial and manufacturing shares. Though not as dominant in the US, they still account for 70 percent and just under a half of the absolute decline in the industrial and the manufacturing share respectively. Impact of inter-temporal evolution in sectoral linkages also contributes to the aggregate changes in China and US as opposed to an inert factor in Latin America. In China particularly, the nature of the development has afforded a marked expansion of both industry and the manufacturing sub-sector. Much less dominant compared to Latin America, changes in sectoral gaps still effectuate over 3 percentage points decline in the industrial and manufacturing share in the US. In contrast, they are ineffective in generating any significant change in China during the period.

### 3.4 Changes in consumption shares: Income- and price-effects

I conclude this sub-section by considering the diverse effect of changing patterns of final consumption in individual countries. The motivation for doing this is two-fold. From a purely accounting perspective, these changes signify large movements in employment shares for many countries. However, more importantly, the bulk of the theoretical literature on structural transformation has looked at the role of preferences and technological growth to explain changes in consumption patterns and the associated shifts in employment shares. The theory also ties to the hump-shaped behavior of the industrial sector as an economy moves up the development ladder. In the context of the analysis here hence, it is possible to evaluate the changes in consumption shares that I observe in Latin America against the predictions of the theory.

The literature proposes two distinct explanations of why consumption patterns change over time. The first contends that household preferences are non-homothetic and as an economy

![Table 3: Changes in Employment Shares: 1995–2010/11](image-url)
grows richer, the resource allocation changes as households do not raise their expenditure proportionally across all goods (Kongsamut et al. (2001)). The second explanation hinges on differential exogenous productivity growth across sectors that alter the relative prices of goods over time (Baumol (1967), Ngai & Pissarides (2007)). Because of its association with changes in income, the first mechanism is often referred to as income-effects while the second mechanism is referred to as price-effects owing to its association with changes in relative prices.\(^6\)

Figure 5 plots the implied change in employment shares for industry and manufacturing during 1995–2010/11 against the GDP per capita in 1995. Under the scenario that all countries in the region follow a similar path, the income-effects require that changes in employment shares be positive and higher at lower incomes before turning negative at a threshold income. These changes deliver the hump-shaped behavior in levels. Apropos industry, the figure shows an inverse relationship between the changes in employment shares and incomes after taking out Argentina and Mexico. The implied changes for the two countries are not only high at the levels of their incomes, but they are also positive. Though still in line with the negative relationship, the implied contraction for Costa Rica is much higher for its income level. The inverse relationship is more apparent in manufacturing where Mexico no longer appears separate from the pack. Nonetheless, there is no perceptible change for Argentina where implied gains remain highest even though it has the highest income per capita in the region.

Of course, it is feasible that paths of transformation differ across countries and that implied changes for Argentina and Mexico will still follow a downward trend individually. The price-effect mechanism can potentially help in resolving these deviations. Empirical analyses in different settings have found the elasticity of substitution in consumption across sectoral goods to be less than unity. This complementary association implies that the sector with relatively higher productivity growth loses its share as its price relative to other sector goods falls. Figure 6 plots the change in employment shares against the excess of labor productivity growth in the sector over the aggregate labor productivity growth.\(^7\) For example, the industrial labor productivity growth during the period in Costa Rica outpaced the aggregate labor productivity growth by roughly 40 percent. A compelling inverse relationship between the two variables is evident with regards to the aggregate industrial sector. Changes in consumption shares imply substantial reductions in employment shares in Chile and Costa Rica where industrial productivity growth has far exceeded the growth in aggregate productivity. Concurrently, the consumption shares have shrunk in Argentina and Mexico in line with the industrial productivity growth lagging behind the aggregate. However, Peru and to some extent Brazil deviate from the broad trend when seen

\(^6\)The analysis in this paper focuses on changes in final consumption shares which is different from changes in value-added shares. In essence, the two effects are applicable when specifying either final goods or value-added production functions at the sectoral level. Nonetheless, the relative importance of the two effects is not necessarily independent of the specification. For instance, Herrendorf et al. (2013) explores the relative influence of the two effects in accounting for the transformation of the post-war US economy.

\(^7\)Labor productivity is measured as real value-added per worker using data from the GGDC 10-Sector database.
in isolation. Again, if each country follows a different path, the dominance of the income-effect can explain such deviations. Changes in the share of manufacturing bear no visible relationship with the excess of productivity growth in the sub-sector. In contrast to the industrial sector, the productivity growth in manufacturing has been higher than the productivity growth at the aggregate for each country in the sample. However, the implied change in employment share is positive for the majority. Chile and Costa Rica report an implied loss in manufacturing share on the back of a colossal relative productivity growth while the implied change is positive in Peru where the relative productivity growth in manufacturing has been the highest. On the other hand, the implied expansion in manufacturing share is highest for Argentina even though the relative productivity growth in the country has far outperformed the relative growth in Colombia and Mexico.

In conclusion, both income- and price-effects help in understanding the changes in consumption shares. Nevertheless, comparing the experience of countries reveals intriguing deviations. It is difficult to reconcile these deviations even after employing both mechanisms jointly. An alternative is to explore if paths of transformation vary across countries, but lack of long-term data puts a natural impediment to such investigations. However, even if countries do indeed follow drastically different paths of transformation, the pertinent concern will be to determine what factors cause these divergences across countries.

3.5 Role of construction

As a final quantitative examination, I cast attention towards the construction sub-sector. Though differences in manufacturing shares account for much of the aggregate industrial gap, the contribution of the construction sub-sector in explaining the gap is not trivial. On average, the employment share of the sub-sector is 2 percentage points lower in the region in comparison to the economies in the comparator set. This 2 percentage point difference accounts for roughly a fifth of the total industrial gap and is robust to the selection of a more restrictive comparator set consisting only of the Asian economies. Moreover, while the manufacturing share of employment declined in each of the seven Latin American economies during 1995–2010/11, the construction sub-sector realized an expansion in all except Colombia and Costa Rica. The construction share increased by 1.3 percentage points on average compared to a 3.7 percentage point decline in the manufacturing share, capping the loss for the industry as a whole. Construction sub-sector led the industrial expansion in other developing countries too. In China, the share of construction grew by 3.8 percentage point, outpacing the expansion in manufacturing share. The contribution of construction in the industrial expansion is even more drastic in India where it saw a share gain of 3.5 percentage points. The rise in manufacturing share of less than a percentage point appears tepid in contrast.
In this scenario, it is worthwhile to evaluate whether construction can keep growing in the coming decades blunting the slump in manufacturing. To this end, I look at the drivers of construction growth during the period. Figure 7 plots the actual change in the construction shares for the seven Latin American economies together with China. Like before, the symbols represent the implied change in sectoral share by changing variables pertaining to a factor and leaving the others fixed at the 1995 levels. Previously, I noted the importance of changes in sectoral wage gaps in explaining the decline in the industrial and manufacturing shares. In this context, it is striking that the changes in sectoral wage gaps do not only imply a movement of resources into the services sector but also into the construction sub-sector. The decline in skill and non-skill barriers during the one and a half decades implies an average share gain of 65 basis points which accounts for one-half of the total share gain for the sub-sector. The implied change is positive for most of the sample with implied gains being particularly impressive for Peru where almost all the expansion in construction can be attributed to shifts in sectoral wage gaps alone. Comparing the results for Latin America with China, I notice that the shifts in wage gaps aid the expansion of the construction sub-sector in a meaningful way in China as well. Not surprisingly though, the share gain implied by shifts in final consumption shares is considerably higher for China which went through a construction boom during the period. The implications of changes in consumption patterns for construction shares in Latin America varies across countries. The implied changes are positive for Costa Rica and Mexico and negative for Brazil, Chile, and Colombia. Changes in consumption shares deliver scant change in construction share over the period for Argentina and Peru, the two countries that sit at the opposite extremes of the sample in terms of GDP per capita.\(^8\)

In this light, the continued expansion of the construction sub-sector going forward depends on two factors. First, construction share continues to grow on the back of changes in sectoral wage gaps that delivered expansion during the 1995-2010/11 period. Second, construction shares in final consumption rise pulling in resources from other sectors. However, there also exists a concern if there exists a limit on how large the sub-sector can become. Comparing the Latin American economies to the restrictive comparator set,\(^9\) I find that the construction share gap for the region contracted by 1.3 percentage points on average during the period and the average gap stands at 1.7 percentage points by 2010/11. As seen earlier, the gap closed in five of the countries with both Mexico and Peru reporting handsome gains. Closing the remaining gap will yield modest expansion in most countries with Colombia and Costa Rica realizing the largest gains, partially driven by the fact that the construction sector contracted in the two countries during the 1995–2010/11 period. While changes in the sectoral wage gaps can deliver this result in Colombia, Costa Rica’s best bet is through changes in final consumption patterns.

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\(^8\)Argentina and Chile have the highest GDP per capita among the seven countries and are close to each other in absolute terms. While the GDP per capita was marginally higher for Argentina in 1995, Chile edged ahead in 2011.

\(^9\)I do this to keep the income levels in a close range. The qualitative findings are robust to adding other countries in the set.
4 Conclusion

The anxiety that permeates from premature deindustrialization and deindustrialization, in general, is not rooted in descriptive variations observed in the data. Many observers and policymakers contend industrialization to be an engine of growth which creates relatively higher paying jobs. Indeed, there is evidence that manufacturing plays a critical role in the catch-up process as it exhibits an unconditional convergence in labor productivity unlike the other sectors of the economy (Rodrik, 2012). A fallout of this hypothesis is that policy should be placed to arrest the slide in industry. However, for the policy to be effective, it is crucial to understand what underlying factors are responsible for the divergent paths of transformation. Rodrik (2016) hints that trade can explain deindustrialization faced by many developing countries as they lose manufacturing share opening their borders because of their comparative disadvantage in the sector. In this paper, I find limited evidence of the comparative advantage hypothesis. The accounting exercises show that even if the Latin American economies counterfactually move to mimic the trade shares of countries that have a large share of their workforce in industry and manufacturing, they will realize modest gains in their shares of industrial and the manufacturing employment. More important than trade shares are the differences in sectoral linkages which account for more than 30 percent of the industrial employment gap. Integrating linkages in theories of structural transformation seem promising in getting closer to matching the data, as standard theories are not able to account for some essential trends (Buera & Kaboski, 2009). There is growing interest in this direction with many studies investigating the role of variations in linkages across countries and time in the process of structural transformation, and economic growth in general (Berlingieri (2014), Bartelme & Gorodnichenko (2015), Fadinger et al. (2018), Sposi (2018) etc.). In a related paper, using an endogenous model of sectoral linkages, I study the distortions in intermediate markets in the same countries and find that changes in distortions can deliver quantitatively meaningful expansion of the industrial base (Sinha, 2018).

Comparing Latin American economies to Korea and Taiwan shows that the low growth of productivity in the region is pervasive across sectors and is pivotal in accounting for the difference in growth experience of the region compared to the Asian miracles since the 1960s. Nonetheless, differences in productivity growth in manufacturing and wholesale are especially relevant (Üngör, 2017). If the manufacturing sector in the Latin American economies was to experience the high growth in productivity as realized by Korea and Taiwan, the sector would have lost a larger share of employment during the period according to the price-effect mechanism. Still, economic growth would be higher in such a scenario. Thus, the pertinent issue regarding policy making is to identify if the present allocation truly reflects inefficiencies. An even more

\footnote{Using panel data from 28 countries in a recent paper, I also find that the elasticity of substitution across sectoral inputs to be less than one in each of the three broad sectors of the economy (Sinha, 2019). Hence, linkages respond to changes in relative prices driven by sector-based productivity growth as well.}
important question is whether policy interventions are needed to affect the distribution of sectoral activity if indeed growth is the primary concern. While it may be possible to influence sectoral allocations, doing so may create distortions restricting the efficient flow of resources across sectors and countries, hence generating a drag on economic growth.

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Figure 1: Employment Share Gap

The bars represent the average employment share gap for the seven Latin American economies while the symbols report the gap for the individual countries. The comparator countries consist of China, Italy, Japan, Korea, Malaysia, Singapore, Spain and Taiwan. Employment shares for the comparator countries correspond to the year in which the industrial share is highest during 1995–2010/11 for each comparator country. See table 1 for more details. All figures in percentages.
Figure 2: Actual and Implied Employment Share Gap: Industry

The bars represent the actual gap in the industrial share of employment with respect to the average employment share in the comparator set. The symbols represent the implied gap remaining after the differences in a factor have been accounted for (symbols closer to zero have higher explanatory power in explaining the gap). The reference lines indicate the average implied gap remaining for the entire Latin American sample. All figures in percentage points.
Figure 3: Actual and Implied Employment Share Gap: Manufacturing

The bars represent the actual gap in the manufacturing share of employment with respect to the average employment share in the comparator set. The symbols represent the implied gap remaining after the differences in a factor have been accounted for (symbols closer to zero have higher explanatory power in explaining the gap). The reference lines indicate the average implied gap remaining for the entire Latin American sample. All figures in percentage points.
Figure 4: Changes in Employment Shares: 1995–2010/11

The bars represent the actual change in employment shares. The symbols depict the counterfactual change in employment shares when the variables pertaining to a factor are changed, keeping all the other variables fixed at the 1995 levels. The reference lines correspond to the average change in shares across the seven countries. All figures in percentage points.
Figure 5: Implied Change in Employment Share: Final Consumption only
Needs to be changed.

Figure 6: Change in Relative Productivity and Implied Change in Employment Share
Figure 7: Change in Employment Share–Construction: 1995–2010/11

The bars represent the actual change in employment shares. The symbols depict the counterfactual change in employment shares when the variables pertaining to a factor are changed, keeping all the other variables fixed at the 1995 levels. All figures in percentage points.
A Appendices

A.1 Accounting Framework

In this appendix, I outline how the two equations 2 and 3 used in the accounting framework are derived. Recall that all varieties of a sector \( j \) are tradeable and are used to produce the composite non-tradeable sectoral good \( Q_j \). In what follows, I add subscripts \( p, q \) for countries and update the notation accordingly. For example, \( Q_{jp} \) represents the quantity of composite good of sector \( j \) in country \( p \). Suppose that the expenditure share of sector \( j \) in country \( p \) from varieties from country \( q \) is given by \( \pi_{jpq} \). Then the receipts of all varieties of firms of sector \( j \) in country \( p \) are given by

\[
R_{jp} = \sum_q (P_{jq} Q_{jq}) \pi_{jpq} \tag{5}
\]

The composite good is used either for final consumption or in the domestic production of varieties in each sector. Hence, the market clearing requires

\[
Q_{jp} = \tilde{C}_{jp} + \sum_k M_{kjp} \tag{6}
\]

where \( M_{kjp} \) denotes the quantity of composite good \( j \) used in the production of all varieties of sector \( k \) in country \( p \). Then, \( P_{jp} M_{kjp} \) is the total expenditure which can be written as \( (1 - \beta_{kp}) \mu_{kjp} R_{kp} = (1 - \beta_{kp}) \mu_{kjp} \sum_q (P_{kq} Q_{kq}) \pi_{kqp} \) where \( \beta_{kp} \) is the value-added share and \( \mu_{kjp} \) is the intermediate share of sector \( j \) in the production of varieties in sector \( k \) of country \( p \). Multiplying both sides of equation 6 by \( P_{jp} \) and using the above relationship yields

\[
P_{jp} Q_{jp} = P_{jp} \tilde{C}_{jp} + \sum_k (1 - \beta_{kp}) \mu_{kjp} \left( \sum_q (P_{kq} Q_{kq}) \pi_{kqp} \right)
\]

\[
= P_{jp} \tilde{C}_{jp} + \sum_k (1 - \beta_{kp}) \mu_{kjp} \left( P_{kp} Q_{kp} \pi_{kpp} + \sum_{q \neq p} (P_{kq} Q_{kq}) \pi_{kqp} \right)
\]

\[
= P_{jp} \tilde{C}_{jp} + \sum_k (1 - \beta_{kp}) \mu_{kjp} \left( P_{kp} Q_{kp} \sum_{q \neq p} (1 - \pi_{kpq}) + \sum_{q \neq p} (P_{kq} Q_{kq}) \pi_{kqp} \right)
\]

\[
= P_{jp} \tilde{C}_{jp} + \sum_k (1 - \beta_{kp}) \mu_{kjp} \left( P_{kp} Q_{kp} + \sum_{q \neq p} (P_{kq} Q_{kq} \pi_{kqp} - P_{kp} Q_{kp} \pi_{kpq}) \right)
\]

The term \( \sum_{q \neq p} (P_{kq} Q_{kq} \pi_{kqp} - P_{kp} Q_{kp} \pi_{kpq}) \) is essentially the net exports of country \( p \) in sector \( k \). Also, using \( C_{jp} \) for the consumption expenditure \( P_{jp} \tilde{C}_{jp} \), the following ties gross output to consumption expenditures, net exports and the share of labor and intermediates in sectoral production

\[
P_{jp} Q_{jp} = C_{jp} + \sum_k (1 - \beta_{kp}) \mu_{kjp} \left( P_{kp} Q_{kp} + N_{kp} \right) \tag{7}
\]

The payments to labor in sector \( j \) in country \( p \) are given by \( w_{jp} L_{jp} \). Then, as in the case of
payments to intermediates

\[ w_{jp}L_{jp} = \beta_{jp} \sum_q P_{jq}Q_{jq}\pi_{jqp} \]

\[ = \beta_{jp} \left( P_{jp}Q_{jp}\pi_{jpq} + \sum_{q \neq p} P_{jq}Q_{jq}\pi_{jqp} \right) \]

\[ = \beta_{jp} \left( P_{jp}Q_{jp} \sum_{q \neq p} (1 - \pi_{jpq}) + \sum_{q \neq p} P_{jq}Q_{jq}\pi_{jqp} \right) \]

\[ = \beta_{jp} \left( P_{jp}Q_{jp} + \sum_{q \neq p} (P_{jq}Q_{jq}\pi_{jqp} - P_{jp}Q_{jp}\pi_{jpq}) \right) \]

\[ = \beta_{jp} (P_{jp}Q_{jp} + N_{jp}) \]

Substituting, the above equation in 6 and recalling that value-added equals payments to labor yields

\[ V_{jp} = \beta_{jp} (C_{jp} + N_{jp}) + \sum_{k=1}^{l} (1 - \beta_{kp}) \mu_{kjp} \left( \frac{\beta_{jp}}{\beta_{kp}} \right) V_{kp} \quad (8) \]

Finally, denoting the value-added share of a sector \( j \) as \( v_{jp} \left( = \frac{w_{jp}L_{jp}}{\sum_{k} w_{kp}L_{kp}} = \frac{\tau_{jp}w_{jp}}{\sum_{k} \tau_{kp}w_{kp}} \right) \), the condition that \( \sum_{k} l_{jp} = 1 \) can be used to recover labor shares \( l_{jp} \) from the value-added shares as represented in equation 3.
A.2 Supplementary Tables

Table A.1: Actual & Implied Employment Share Gap: Argentina

|                      | IND | MAN | CON | IND | MAN | CON |
|----------------------|-----|-----|-----|-----|-----|-----|
|                      | All Comparator Countries | (1) | (2) | (3) | (4) | (5) | (6) |
| Actual Gap           | 11.0| 9.5 | 1.8 | 11.5| 9.8 | 1.9 |
| Final Consumption    | 2.9 | 6.0 | -3.0| 1.0 | 5.1 | 6.0 |
| Trade                | 9.8 | 8.4 | 1.7 | 10.0| 8.4 | 0.1 |
| Sectoral Linkages    | 6.7 | 5.6 | 1.1 | 6.5 | 4.9 | 0.3 |
| Wage Gap             | 9.8 | 8.4 | 2.1 | 12.2| 10.2| -0.2|
| Labor Intensity      | 13.3| 8.4 | 3.5 | 14.4| 10.9| -2.0|

The first row reports the actual gap in employment shares. The following rows report the implied gap remaining when the variables pertaining to the listed factor is counterfactually changed to a comparator country, keeping other variables unchanged. Figures represent averages across the comparator set countries. All figures in percentage points.

Table A.2: Actual & Implied Employment Share Gap: Brazil

|                      | IND | MAN | CON | IND | MAN | CON |
|----------------------|-----|-----|-----|-----|-----|-----|
|                      | All Comparator Countries | (1) | (2) | (3) | (4) | (5) | (6) |
| Actual Gap           | 12.8| 10.4| 1.8 | 13.4| 10.8| 2.0 |
| Final Consumption    | 4.4 | 8.0 | -4.2| 3.3 | 7.8 | 7.2 |
| Trade                | 11.9| 9.4 | 2.0 | 12.3| 9.5 | -0.1|
| Sectoral Linkages    | 10.4| 7.7 | 2.2 | 10.5| 7.4 | -0.6|
| Wage Gap             | 9.6 | 8.9 | 1.3 | 11.4| 10.1| 0.8 |
| Labor Intensity      | 14.4| 9.7 | 4.3 | 15.6| 10.6| -0.1|

The first row reports the actual gap in employment shares. The following rows report the implied gap remaining when the variables pertaining to the listed factor is counterfactually changed to a comparator country, keeping other variables unchanged. Figures represent averages across the comparator set countries. All figures in percentage points.
Table A.3: Actual & Implied Employment Share Gap: Chile

|                  | IND | MAN | CON | IND | MAN | CON |
|------------------|-----|-----|-----|-----|-----|-----|
| **All Comparator Countries** |     |     |     |     |     |     |
| Actual Gap       | 9.2 | 10.9| 0.6 | 9.4 | 10.9| 0.7 |
| Final Consumption| 5.7 | 10.2| -2.4| 4.2 | 9.6 | 4.0 |
| Trade            | 9.3 | 10.4| 0.6 | 9.1 | 10.1| 0.1 |
| Sectoral Linkages| 7.0 | 7.9 | 0.3 | 6.6 | 7.3 | 0.0 |
| Wage Gap         | -3.0| 0.8 | -2.6| -1.1| 2.4 | 3.6 |
| Labor Intensity  | 15.7| 14.7| 4.0 | 16.2| 14.9| -3.6|

The first row reports the actual gap in employment shares. The following rows report the implied gap remaining when the variables pertaining to the listed factor is counterfactually changed to a comparator country, keeping other variables unchanged. Figures represent averages across the comparator set countries. All figures in percentage points.

Table A.4: Actual & Implied Employment Share Gap: Colombia

|                  | IND | MAN | CON | IND | MAN | CON |
|------------------|-----|-----|-----|-----|-----|-----|
| **All Comparator Countries** |     |     |     |     |     |     |
| Actual Gap       | 11.7| 10.5| 2.5 | 12.2| 10.9| 2.5 |
| Final Consumption| 6.9 | 5.1 | 1.6 | 5.8 | 4.6 | 0.9 |
| Trade            | 10.7| 7.6 | 2.9 | 10.6| 7.6 | 2.9 |
| Sectoral Linkages| 7.4 | 6.4 | 2.2 | 7.2 | 5.9 | 2.4 |
| Wage Gap         | 5.7 | 9.8 | -2.0| 8.0 | 11.2| -2.2|
| Labor Intensity  | 15.3| 11.6| 4.6 | 16.2| 12.2| 4.8 |

The first row reports the actual gap in employment shares. The following rows report the implied gap remaining when the variables pertaining to the listed factor is counterfactually changed to a comparator country, keeping other variables unchanged. Figures represent averages across the comparator set countries. All figures in percentage points.

IV
Table A.5: Actual & Implied Employment Share Gap: Costa Rica

|                      | IND | MAN | CON |                      | IND | MAN | CON |
|----------------------|-----|-----|-----|----------------------|-----|-----|-----|
|                      | (1) | (2) | (3) |                      | (4) | (5) | (6) |
| Actual Gap           | 11.1| 8.7 | 3.4 |                      | 11.2| 8.7 | 3.3 |
| Final Consumption    | 2.7 | 5.1 | -0.8|                      | 0.9 | 4.4 | -2.1|
| Trade                | 7.7 | 5.0 | 3.9 |                      | 7.5 | 4.7 | 3.8 |
| Sectoral Linkages    | 4.3 | 4.3 | 2.0 |                      | 3.6 | 3.4 | 2.3 |
| Wage Gap             | 12.7| 8.9 | 3.2 |                      | 14.4| 10.4| 3.3 |
| Labor Intensity      | 14.4| 10.4| 4.9 |                      | 15.2| 10.8| 5.1 |

The first row reports the actual gap in employment shares. The following rows report the implied gap remaining when the variables pertaining to the listed factor is counterfactually changed to a comparator country, keeping other variables unchanged. Figures represent averages across the comparator set countries. All figures in percentage points.

Table A.6: Actual & Implied Employment Share Gap: Mexico

|                      | IND | MAN | CON |                      | IND | MAN | CON |
|----------------------|-----|-----|-----|----------------------|-----|-----|-----|
|                      | (1) | (2) | (3) |                      | (4) | (5) | (6) |
| Actual Gap           | 6.9 | 6.3 | 0.2 |                      | 7.6 | 6.7 | 0.4 |
| Final Consumption    | 3.8 | 6.0 | -2.8|                      | 2.1 | 5.4 | -4.1|
| Trade                | 6.0 | 4.8 | 0.6 |                      | 6.3 | 4.8 | 0.8 |
| Sectoral Linkages    | 5.3 | 4.8 | 0.1 |                      | 5.7 | 4.5 | 0.7 |
| Wage Gap             | 2.9 | 5.1 | -0.2|                      | 5.4 | 6.4 | -0.2|
| Labor Intensity      | 9.0 | 5.8 | 3.0 |                      | 10.4| 6.6 | 3.5 |

The first row reports the actual gap in employment shares. The following rows report the implied gap remaining when the variables pertaining to the listed factor is counterfactually changed to a comparator country, keeping other variables unchanged. Figures represent averages across the comparator set countries. All figures in percentage points.
Table A.7: Actual & Implied Employment Share Gap: Peru

|                      | IND | MAN | CON | IND | MAN | CON |
|----------------------|-----|-----|-----|-----|-----|-----|
|                      |     |     |     |     |     |     |
| **Actual Gap**       | 15.1| 12.7| 2.9 | 15.6| 12.8| 3.2 |
| Final Consumption     | 10.1| 9.4 | 2.9 | 9.0 | 8.9 | 0.4 |
| Trade                | 14.3| 11.0| 3.1 | 14.5| 10.9| 3.4 |
| Sectoral Linkages    | 11.7| 10.1| 1.8 | 12.0| 9.6 | 2.6 |
| Wage Gap             | 5.8 | 8.9 | 0.2 | 8.9 | 10.3| 0.0 |
| Labor Intensity      | 17.5| 13.2| 4.7 | 18.5| 13.6| 5.1 |

The first row reports the actual gap in employment shares. The following rows report the implied gap remaining when the variables pertaining to the listed factor is counterfactually changed to a comparator country, keeping other variables unchanged. Figures represent averages across the comparator set countries. All figures in percentage points.
Table A.8: Changes in Employment Shares: 1995–2010/11

|                  | LAC  | ARG  | BRA  | CHL  | COL  | CRI  | MEX  | PER  |
|------------------|------|------|------|------|------|------|------|------|
|                  | (1)  | (2)  | (3)  | (4)  | (5)  | (6)  | (7)  | (8)  |
| (a) Industry     |      |      |      |      |      |      |      |      |
| Actual Change    | -2.1 | -1.3 | 0.4  | -5.0 | -1.9 | -6.4 | 0.5  | -1.3 |
| Final Consumption| 0.2  | 4.5  | -0.9 | -3.5 | -0.2 | -3.7 | 2.5  | 2.9  |
| Trade            | 0.4  | -0.5 | -0.3 | -0.1 | 2.1  | -0.2 | 0.5  | 1.0  |
| Sectoral Linkages| 0.3  | 1.3  | 0.3  | 0.2  | 0.2  | 0.5  | -0.5 | 0.1  |
| Wage Gap         | -2.8 | -2.9 | 2.1  | -5.6 | -4.4 | -5.5 | -0.9 | -2.7 |
| Labor Intensity  | 0.8  | -0.8 | -0.3 | 4.5  | 2.5  | 0.1  | -0.4 | -0.1 |
| (b) Manufacturing|      |      |      |      |      |      |      |      |
| Actual Change    | -3.7 | -2.9 | -1.4 | -6.5 | -1.8 | -6.2 | -2.1 | -4.8 |
| Final Consumption| 0.3  | 4.7  | -0.4 | -2.6 | 1.2  | -4.4 | 0.4  | 3.2  |
| Trade            | -0.1 | 0.0  | -0.5 | 0.4  | 0.9  | -0.5 | -0.1 | -0.6 |
| Sectoral Linkages| -0.4 | 1.3  | -0.9 | -2.1 | -0.3 | 0.0  | -0.9 | -0.1 |
| Wage Gap         | -3.0 | -4.6 | 1.4  | -5.6 | -2.7 | -4.4 | -0.1 | -5.2 |
| Labor Intensity  | 0.3  | -0.8 | -1.1 | 2.8  | 1.3  | 0.4  | -0.6 | -0.2 |
| (c) Construction |      |      |      |      |      |      |      |      |
| Actual Change    | 1.3  | 1.3  | 2.0  | 0.5  | -0.8 | -0.7 | 3.0  | 3.7  |
| Final Consumption| 0.1  | 0.0  | -0.6 | -1.2 | -1.0 | 0.9  | 2.1  | 0.1  |
| Trade            | 0.0  | -0.3 | -0.1 | -0.1 | -0.2 | 0.6  | 0.4  | -0.2 |
| Sectoral Linkages| 0.0  | -0.2 | 0.5  | 0.0  | -0.4 | 0.4  | 0.2  | -0.2 |
| Wage Gap         | 0.6  | 1.8  | 1.2  | 0.8  | -0.8 | -1.8 | -0.2 | 3.5  |
| Labor Intensity  | 0.3  | -0.3 | 0.6  | 1.1  | 1.1  | -0.4 | 0.3  | -0.1 |

The first row in each panel reports the actual change in employment shares during 1995–2010/11. The following rows indicate the counterfactual change in employment shares when the variables pertaining to a factor are changed, keeping all the other variables fixed at the 1995 levels. All figures in percentage points.