The Missing Middle Managers: Labor Costs, Firm Structure, and Development[*†]

Jonas Hjort
UCL
& BREAD & CEPR & U. Oslo

Hannes Malmberg
University of Minnesota

Todd Schoellman
Federal Reserve Bank of Minneapolis

Abstract

Using data obtained from human resources consulting firms, we document the cost to large firms of hiring managers and business professionals in 146 countries worldwide. The average pay in the poorest decile of countries is $18,000 per year, which is 9.7 times GDP per worker. In contrast, in the richest decile of countries, large firms pay managers and business professionals only 0.8 times GDP per worker. We use an appropriate technology model to show that the cost of management could be an important deterrent to the expansion of the modern sector in developing countries.

[*] j.hjort@ucl.ac.uk, pmalmber@umn.edu, todd.schoellman@gmail.com.

[†] We thank Giulio Fella, Pete Klenow, and Francesco Caselli for helpful discussions, and audiences at numerous seminars and conferences for comments that improved the paper. This project was funded by the European Union (ERC, ACCESS, 101043465). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union, the European Research Council, the Federal Reserve Bank of Minneapolis, or the Federal Reserve System, which should not be held responsible for them.

1 Introduction

Developing and emerging economies are characterized by a dual economy where productive modern firms using new technologies coexist with small, unproductive traditional firms or own-account workers who produce using out-of-date technologies.[1] A central question for economics is why the modern sector does not expand and displace the traditional sector, either through domestic adoption of new technologies (Murphy *et al.*, 1989; Ciccone, 2002; Cole *et al.*, 2016) or foreign direct investment by multinational firms (Antràs & Yeaple, 2014; Ramondo *et al.*, 2015).

This paper highlights an overlooked factor in the literature: the high cost of middle management in developing economies. It has long been understood that modern economies require skilled managers and business professionals (Chandler, 1977). However, the best available evidence on skill prices comes from educational wage premiums, which are relatively similar for developing and developed economies (Banerjee & Duflo, 2005; Rossi, 2022). This evidence has led to the view that scarcity of skilled labor is unlikely to be a first-order problem in developing economies.

The main contribution of this paper is to show that we get a different picture when we focus on the wages actually paid by modern firms rather than looking at educational wage premiums. Modern firms face high costs for middle managers and business professionals in developing countries, which has the potential to be an important barrier to the expansion of new technologies and reorganization of production into large firms.

We start with the data. A key challenge with studying dual economies empirically is that standard, representative data sets contain information from workers or firms in both the traditional and modern sectors, which makes it hard to isolate the costs facing the modern sector.[2] This matters if the modern sector uses different types of workers and faces different costs than the average firm in the economy. For example, Bassi *et al.* (2023) show that managers in traditional firms perform similar tasks to the production workers; this is unlikely to be the case for, say, multinational firms. We overcome this challenge by drawing on data from two consulting companies that help modern firms navigate labor markets for skilled workers in developing and emerging economies. The first is a compensation consulting firm, which advises clients on labor market conditions

[1] The notion of the dual economy dates to Lewis (1954) and Jorgenson (1961). See Comin & Hobijn (2010) for empirical evidence on lags in technology adoption, Gollin (2008) on the prevalence of self-employment, and Poschke (2018) and Bento & Restuccia (2021) for facts about firm and establishment size.

[2] See for example Buera & Trachter (2024).

and pay. We have access to this firm's database containing records of actual compensation paid by over 1,000 of the firm's clients to over 300,000 workers in 146 countries around the world.[3] The second is a recruitment consulting firm. We have access to this firm's published salary survey, which provides less exhaustive information on the prevailing salaries paid in skilled labor markets based on their market expertise.

The key observation is that firms face high costs for managers and business professionals, even in the poorest countries. Consider, for example, accounts assistants, who perform accounting functions at an intermediate level, above that of bookkeepers but below certified accountants. The compensation consultant's database reports their average compensation as $57,000 in the United States and $69,000 in Denmark, which is roughly one-half of GDP per worker. However, the average compensation for the same workers is $23,000 in Kenya or $21,000 in Chad, which is roughly six times their GDP per worker. The salary guide of the recruitment consultant lists similarly high salary ranges for managers and business professionals throughout Africa. We use these data to estimate the level and cross-country variation in the cost of management and business professionals and how it varies with worker skill level or firm type.

Our second contribution is to use an appropriate technology model in the spirit of Basu & Weil (1998) and Acemoglu & Zilibotti (2001) as a stylized framework to show that the cost of management could be an important deterrent to the expansion of the modern sector. Producers in the model take labor costs of different types of workers as given and decide between modern and traditional production methods. Management costs deter the expansion of the modern sector to the extent that management is relatively expensive in developing countries and used relatively intensively in modern production.

We estimate the importance of management in modern and traditional firms using data from the literature on firm hierarchies (Caliendo *et al.*, 2015). We combine this with the consulting company's data on the cost of management to show that the high price of management has a deterring effect equivalent to a 23 percent tax levied on the gross output of modern firms in developing countries. We show that this figure is higher than that associated with several other factors studied in the literature. We conclude that management costs deserve greater attention as a barrier to modernization. Many barriers studied

[3] Hjort *et al.* (2020) use the same database to show evidence that the low variation in compensation across countries within multinational employers in part reflects headquarter wages themselves affecting foreign establishment wages. Quantitatively such a direct effect can only explain a fraction of the bigger, multi-source, middle-manager-market phenomenon we study in this paper. For example, we show that all our main findings about compensation trends also apply to leading domestic firms.

in the literature, such as financial constraints, poor contracting institutions, weak property rights, unreliable electricity, or trade barriers, reduce the demand for skilled managers, and should ceteris paribus lower management prices. Our finding of high prices suggests that such explanations need to be complemented with theories focusing on skill supply and the functioning of skilled labor markets in developing economies.

In addition to the work cited so far, our paper is also related to a small set of papers that document cross-country pay trends within multinational firms (Hjort *et al.*, 2020; Minni, 2024).[4] Our contribution is to show that the high cost of middle management in developing countries holds broadly, spanning both multinational and large domestic firms, and to describe the potential effect of these costs on firms' behavior. We also touch on the growing literature demonstrating the importance of management (Bloom *et al.*, 2014). Our findings on relative costs help rationalize why firms choose low-quality management, including the widespread use of family members as managers, instead of hiring professional management (Bloom *et al.*, 2013). Finally, we relate to recent work that documents or models a link from skills to the supply of white-collar workers and the organization of production (Engbom *et al.*, 2025; Cox, 2025)

2 Data

Our data come from two consulting companies that help large, leading firms navigate labor markets for skilled workers in developing and emerging economies. The first is a compensation consulting firm that advises clients on how their pay at an establishment compares to the local market. During this process, the compensation consultant collects data on pay of all currently employed workers in the client's establishment. The second is a recruitment consulting firm that helps clients find and hire suitable workers. In the course of its business, the recruitment consultant develops data on the going market rate for newly hired workers in key positions. We describe both sources in turn.

Our agreement with the global compensation consulting company prevents us from revealing their name, so we refer to them as the "Company". Their central business proposition is to provide clients with information on how the compensation of their employees compares with the prevailing rate for similar workers in the local labor market. The Company's niche among compensation consulting firms is information on developing and emerging markets.

[4] By contrast, Brinatti *et al.* (2022) find more variation in pay for workers who use an internet job platform.

The Company employs professional jobs analysts who conduct interviews to learn about the tasks, responsibilities, and skills associated with each position. The analysts use this information to translate each position into the Company's internal, globally standardized job classification scheme. This scheme is detailed, consisting of more than 200 job titles that allow for both horizontal and vertical differentiation of jobs (accounting versus human resources; bookkeeper versus accountant). This work is invaluable for our purposes because it means that the data on compensation for the same job across countries is much more comparable than that produced by the standard method, which involves economists applying crosswalks to workers' self-reported occupations.

The Company measures market compensation using the data provided by past clients in the same labor market. After providing the client comparisons of its pay to this benchmark, the Company adds the client's data to the Company's database for future comparisons. We have access to the database as of late 2015, which in turn reflects compensation reported by clients spanning the years 2000–2015. Each observation reports the firm name, city and country, year, standardized job classification, average compensation of workers in the position in the establishment, and in many cases also the total number of such workers. All observations pertain to local workers; expatriates are reserved to a separate database, which unfortunately we cannot access.

We use the firm name to merge on the firm's industry, profit/non-profit status, and headquarters location. Throughout, we restrict attention to for-profit firms and exclude charities and governmental organizations. A central feature of the database for our research question is that it covers almost exclusively modern business enterprises. Three-fourths of the compensation observations come from multinational firms. These firms are based primarily in North America (predominantly the United States), followed by Africa and Europe. Many firms in the database are large, well-known, publicly listed companies, including numerous members of the S&P 500. The remaining one-fourth of observations come from large domestic firms. Both types of firms come from a wide variety of sectors, including banking, consulting, health care, mining and other natural resources, technology, telecommunications, and transport.

The establishments that appear in the Company database provide local business and headquarter services. We have verified that many firms also have separate production or sales establishments in the same country, but these establishments are not in the database, likely reflecting that the labor markets for sales and production workers are thicker, information on prevailing compensation is easier to access, and compensation for such work-

ers is much lower. The distribution of occupations is heavily weighted towards managers and business professionals, with a small share of support workers who are captured incidentally because they work in the local headquarters establishment; see Appendix A for details.

We measure compensation as total gross pay, which is the sum of gross wage, gross bonus, and other gross income. All amounts are reported in contemporaneous U.S. dollars. We adjust all amounts to year 2017 U.S. dollars by adjusting for the average rate of real wage growth between year t and year 2017, inferred from the growth rate of real GDP per worker. This adjustment makes salaries comparable over time by assuming that each occupation would have experienced the aggregate average wage growth; it misses any occupation-specific wage growth.[5] We trim the bottom and top 0.5 percent of the real earnings distribution, which eliminates some outliers that look to be the result of miscoding.

Our second data source is information provided by the recruitment consultant Robert Walters, a self-described "global specialist professional recruitment consultancy."[6] Robert Walters helps firms recruit for positions in key business areas that overlap substantially with the labor markets covered by the Company. As a part of their business, they employ recruiters who identify and maintain contacts with workers who are interested in moving to new positions. When contacted by clients, they use this information to help fill vacancies.

Like most recruitment consultants, Robert Walters charges clients a fee that is based on the compensation the new hire receives. In most cases, the fee structure is a fixed percentage of the first year's salary, exclusive of benefits. Thus, as part of its business Robert Walters amasses a wealth of information on the actual first-year salaries paid to newly-hired workers in specialized labor markets. It uses this information to produce an annual Salary Survey, which is what we access for data. The Salary Survey aggregates the information in Robert Walters' database to provide a salary range for key positions by broad regions. For example, it reports the typical salary range for HR Managers in West Africa over the previous few years. While this aggregation prevents us from merging on firm characteristics or conducting detailed investigation, it is useful to have data from a second, publicly available source.

We focus on their data for Africa exclusive of South Africa, which contains most of the

[5] All data for the adjustments from World Bank (2025).

[6] https://www.robertwaltersgroup.com/careers/robert-walters/where-we-work.html, July 18, 2023.

poorest countries in the Company's sample. The geographic detail in the Salary Survey increases over time; we collect data from the 2017 survey, which was the first to decompose Africa into four geographic regions: North Africa, East Africa, West Africa, and Central-South Africa (Robert Walters, 2017). The Salary Survey includes a salary range for 65 roles spread across these four regions. We replace the salary range for each position with the midpoint and adjust to 2017 U.S. dollars using the same algorithm that we applied to the Company's database.

3 Empirical Results

We now turn to what these two data sets reveal about the cost of management and business professionals around the world. We start with the Company's database. We use the microdata to estimate regressions of the form

$$\log(w_{c,t,f,j}) = \gamma + \eta \log(y_c) + \beta X_{c,t,f,j} + \varepsilon_{c,t,f,j}, \tag{1}$$

where $w_{c,t,f,j}$ is the total gross compensation for workers in country c and year t working for firm f in standardized job j, y_c is the 2017 GDP per worker in country c measured in U.S. dollars, and X is a vector of controls.[7]

Figure 1 provides a first look at the data. To construct this figure, we residualize log-compensation for job-year interactions (the control variables in our main specification), compute the mean log compensation by country, and plot it against GDP per worker, along with a best-fit line. The main takeaway is that the level of compensation in developing countries is high relative to their GDP per worker. The poorest decile of countries have an average GDP per worker of $1,900 but report an average compensation per worker in the Company database of $18,400.

[Figure 1 about here.]

The slope of the best-fit line corresponds to the estimate of η in equation (1). We refer to this parameter as the compensation elasticity. It captures how much the cost of management for modern firms varies with development. Two simple benchmarks can help build intuition. The first is a standard neoclassical growth model with homogeneous labor. A representative firm in each country takes input costs as given and produces output

[7] All estimation uses the reghdfe package for Stata (Correia, 2016).

using a Cobb-Douglas production function with country-specific total factor productivity. In this model, compensation per employee is the labor share times GDP per worker, which implies that the compensation elasticity is one. The second benchmark is a simple application of the law of one price with heterogeneous labor. If a given type of worker earns the same compensation in all countries, then the compensation elasticity is zero.

[Table 1 about here.]

Table 1 shows the results from estimating equation (1) with different controls and for different subsets of the data. Recall that each observation in our database includes the number of workers and average compensation per country-year-firm-job; we weight the regression by the number of workers and report robust standard errors. The first column shows the simplest specification, which includes no controls at all. In this case, the estimated elasticity is 0.26. The next two columns show the effects of controlling for job-year and firm-job-year interactions, which reduces the estimated elasticity modestly, to 0.22–0.24.[8] Controlling for firm-job-year interactions reduces the sample substantially because we can only use data from multinational firms that report earnings for the same job and year from establishments in multiple countries. However, it is particularly useful for alleviating any remaining concern about the comparability of jobs across countries.

We investigate the heterogeneity of this result along two dimensions. First, we consider whether it differs much between foreign affiliates of multinational firms and domestic establishments, inferred from whether an establishment is in the same country as the firm's headquarters. The results are shown in the last two columns of Table 1. We cannot include firm fixed effects when investigating domestic establishments, so we control for job-year interactions. Note again that the majority of our sample is foreign affiliates. However, the estimated compensation elasticity for the two groups is almost identical. This implies that our findings also apply to large, modern domestic firms.

We also investigate how our results vary by skill level. We use the vertical dimension of the Company's internal job classification scheme to group workers into four broad skill levels. The bottom skill level includes workers who are not in manager or business professional roles. These are cleaners, guards, drivers, and so on. The remaining groups capture different skill levels of managers and business professionals. The low skill level

[8] For some purposes it may be more appropriate to study PPP-adjusted compensation and how it varies with PPP-adjusted GDP per worker. Since developing countries have a lower cost of living, this adjustment implies higher compensation – $51,900 among the poorest decile of countries – and a flatter compensation elasticity – 0.138 when controlling for job-year interactions.

includes workers with clerical jobs, such as secretaries. The medium skill level includes workers with business associate and business professional jobs, such as accountant. The high skill level includes those with upper management roles, such as senior executive.

[Table 2 about here.]

Table 2 shows the implied compensation elasticity for these different skill groups, each estimated with job-year interactions, which control for heterogeneity across countries in the mix of jobs within each broad group. The first column again shows that the elasticity in the aggregate is 0.24. Turning to the results by skill level, there is a very clear pattern: the elasticity is lower for workers with higher skill levels. While the elasticity is 0.33 for the non-management workers, it falls to 0.26 for the least-skilled managers, 0.21 for the medium-skilled managers, and 0.16 for the high-skilled managers.[9] These compensation elasticity differences correspond to large differences in the level of compensation between skill groups in developing countries. Among the poorest decile of countries the average compensation is 2.5 times GDP per worker for non-management workers, 5.8 times GDP per worker for the least-skilled managers, 13.1 times for the medium-skilled managers, and 31.1 times for the high-skilled managers. This finding is consistent with recent research by Minni (2024), who documents heterogeneity in pay patterns by skill level within a large multinational firm.

Finally, we note that these high compensation figures are supported as well by the recruitment consulting data. For example, the midpoint of the annual salary range for a General Manager in Central Africa is $101,000; for a General Accountant in East Africa, $35,000; for a Sales & Marketing Manager in West Africa, $79,000. Further, the two data sets broadly agree on salary levels, with Robert Walters reporting salaries that are roughly 30 percent higher for the same jobs in Africa. This gap is plausibly accounted for by the fact that Robert Walters' data deal exclusively with newly-hired workers who may have higher salaries.

3.1 Comparisons to Nationally Representative Data

The low compensation elasticity for managers and business professionals – equivalently, the high relative cost of managers and business professionals in developing countries – is the central empirical finding of our paper. A natural question is how these costs compare

[9] In Appendix A.2 we show that there is no evidence that clients vary their hiring patterns in response to these cost differentials.

with the earnings reported by managers in nationally representative data sources. We provide a comparison for four countries for which we have access to nationally representative microdata in Appendix A.1. Compensation in the Company database corresponds to the top few percentile of the distribution observed in representative data in the poorest countries. The gap between the two sources declines with development and disappears in the richest countries.

We interpret the gap in pay between the consulting and representative data sources as arising from the fact that the modern sector is much smaller in developing countries. Under this interpretation, the consulting companies capture the high cost of management faced by the representative firm in the modern sector in developing countries. The fact that two unrelated consulting companies both point to similar compensation levels supports this interpretation. Further, we show in Appendix A.2 that our findings apply equally to large, domestic firms or multinational firms. We note, though, that a second interpretation is that the types of firms who use consulting firms are selected even within the modern sector and that the extent of this selection varies with development. In this case, the high costs we document here apply only to a subset of the modern sector. With this important caveat in mind, we now turn to an exercise to help quantify the potential importance of these cost trends.

4 Quantifying the Importance of Management Costs

Our second contribution is to use an appropriate technology model as a stylized framework to show that the cost of management could be an important deterrent to the expansion of the modern sector in developing countries. The model focuses on a single potential driving force, which is variation in the relative cost of middle management to production labor, and incorporates all other possible driving forces into a residual wedge. Our main insight is that relative labor costs have the potential to inhibit the expansion of the modern sector if management is used relatively intensively in modern production and is relatively expensive in developing countries. We provide a back-of-the-envelope calculation suggesting this effect can be large.

4.1 Appropriate Technology Framework

We assume that the economy has a unit interval of goods $i \in [0,1]$ and a set of factors $f = 1, \ldots, F$. Each good can be produced using a modern and a traditional technology, with production functions

$$y^T(i) = A^T(i) \prod_{f=1}^{F} \left(\frac{x_f^T(i)}{\alpha_f^T} \right)^{\alpha_f^T},$$

$$y^M(i) = e^{-\tau} A^M(i) \prod_{f=1}^{F} \left(\frac{x_f^M(i)}{\alpha_f^M} \right)^{\alpha_f^M},$$

where $x_f^T(i), x_f^M(i)$ denote factor inputs and α_f^T, α_f^M denote factor intensities. The terms $A^T(i), A^M(i)$ encode the productivities of different varieties, and capture that the relative productivity of modern and traditional technologies might differ depending on the good produced. The term τ is a wedge that captures other factors relevant to modern production such as contracting frictions, weak intellectual property rights, or low-quality infrastructure.

We think of the traditional technology as the one that was used historically. The modern technology can be introduced either through adoption by local firms or through foreign direct investment by multinationals. In order for this adoption or investment to occur for good i, it must be the case that the modern technology offers a cost advantage over the traditional technology.

Without loss of generality, we assume that $A^M(i)/A^T(i)$ is decreasing in i, which implies that there is a cut-off technology i^*

$$\frac{A^M(i^*)}{A^T(i^*)} = e^{\tau} \prod_f w_f^{(\alpha_f^M - \alpha_f^T)}, \tag{2}$$

where w_f is the price of factor f. Intuitively, adoption is low if there is a large wedge τ, or if there are high factor prices w_f of factors that are used intensively in modern production compared to traditional production. Given the adoption equation, the following is a sufficient statistic for the adoption effect of a difference in factor prices:

$$\sum_f (\alpha_f^M - \alpha_f^T) \Delta \log w_f.$$

4.2 Quantifying the Role of Management Costs

We use this equation to provide a proof-of-concept calculation showing that management costs can deter the expansion of the modern sector in developing countries. In this simple theory, we need data on only two objects: cross-country differences in relative factor prices $\Delta \log w_f$ as well as differences in factor shares between modern and traditional $\alpha_f^M - \alpha_f^T$.

We take the cost of management from the Company's database, using wages of managers and business professionals residualized for job-year interactions to control for differences in workforce composition. We estimate the cost of production and supervisory labor for a wide range of countries by taking 44 percent of each country's non-agricultural GDP per worker, which we show in Appendix A.1 closely approximates the earnings of such workers in several countries where we have microdata. The ratio of the two implies that managers cost 13.45 times as much as production workers in the poorest countries versus 1.42 times as much in the United States. The log difference in prices is then $\log(13.45) - \log(1.42) = 2.25$, as shown in the first panel in Table 3.

For compensation shares of management, we turn to the literature that studies the organization of firms and workers within a production hierarchy (Garicano & Rossi-Hansberg, 2006). Caliendo *et al.* (2015) use French matched employer-employee data that describes each worker's position in the labor hierarchy, from production workers to top managers. They show that firms follow a natural hierarchy: simpler firms have one or two layers (production workers and supervisors), while more complex firms have three or four layers (middle and upper managers). We define modern firms as those with three or four hierarchical layers, and we equate middle and upper managers with workers in the third and fourth layers. Their data imply that the share of labor compensation paid to middle and upper managers in modern firms is 28 percent. To find the total share of factor payments paid to managers in modern firms, we multiply the share of labor compensation they receive by the labor share of value added of 0.66 and intermediate input share of 0.5, yielding $\alpha_{mm}^M = 0.09$. Our approach implies $\alpha_{mm}^T \equiv 0$ by construction. These results are summarized in Panel B of Table 3.

[Table 3 about here.]

Finally, Panel C of Table 3 summarizes the total cost shifter, which is the product of the cross-country difference in log prices and the cross-technology difference in the factor share of management. The result is that management costs raise the relative cost

of operating a modern versus a traditional firm by 21 log points in developing countries. This has the same impact as a gross output tax or wedge on modern-sector firms of $\exp(0.21) - 1 = 23$ percent. We consider several robustness checks on these results in Appendix B, including relaxing the Cobb-Douglas assumption or allowing factor intensities to vary by country. We provide evidence in favor of the Cobb-Douglas assumption for management and overall conclude that the results in a more general setup are if anything stronger than those in Table 3. Last, Appendix B.4 puts our 23 percent in context by applying a similar methodology to assess the cost disadvantage of the modern sector from high electricity prices or financing costs. We show that those factors yield an equivalent barrier of 5 percent from using generator versus grid electricity, and 14 percent when going from US to Brazilian credit spreads.

5 Conclusion

Developing countries are characterized by a dual economy: large, productive modern firms using new technologies co-exist with small, unproductive traditional firms or own-account workers who produce using out-of-date technologies. We provide evidence that a high cost of management helps explain the persistence of the traditional firms. Middle and upper managers are important factor input for large, leading firms and are also expensive in developing countries, with typical salaries around $18,000 per year. These facts could deter the expansion of the modern sector by slowing the adoption by domestic firms or the expansion of multinational firms.

These trends are derived from data from two different global consulting firms; their underlying source is actual pay at large, leading domestic and multinational firms. An important question is whether they apply to all modern firms, or only to a subset of firms that employ global consultancies. For example, it could be that there is an intensive margin of how modern firms are, and that firms in the middle of the range face less extreme costs. Additional, detailed data on pay at a wide range of firms in developing and emerging countries would be a valuable resource for future research.

Our data are not well-suited to test why firms face high costs for management, but we see two leading hypotheses for future research to explore. First, high prices could reflect that leading firms hire particularly skilled workers and such workers are scarce in developing countries – particularly since workers with middle management skills can and do migrate from developing countries on net (Barro & Lee, 2013; Docquier & Rapoport,

2012; Kerr *et al.*, 2016; Martellini *et al.*, 2024). Alternatively, firms could choose to pay higher wages for the same labor, for example in the form of an efficiency wage given weak contract enforcement or in response to intra-firm global pay considerations (Boehm & Oberfield, 2020; Hjort *et al.*, 2020).

References

ACEMOGLU, DARON, & ZILIBOTTI, FABRIZIO. 2001. Productivity Differences. *Quarterly Journal of Economics*, **116**(2), 563–606.

ANTRÀS, POL, & YEAPLE, STEPHEN R. 2014. Multinational Firms and the Structure of International Trade. *Chap. 2, pages 55–130 of:* GOPINATH, GITA, HELPMAN, ELHANAN, & ROGOFF, KENNETH (eds), *Handbook of International Economics*, vol. 4. Elsevier.

BANERJEE, ABHIJIT V., & DUFLO, ESTHER. 2005. Growth Theory through the Lens of Development Economics. *Chap. 7, pages 473–554 of:* AGHION, PHILIPPE, & DURLAUF, STEVEN N. (eds), *Handbook of Economic Growth*, vol. 1A. Amsterdam: Elsevier.

BARRO, ROBERT J., & LEE, JONG WHA. 2013. A New Data Set of Educational Attainment in the World, 1950–2010. *Journal of Development Economics*, **104**, 184–198.

BASSI, VITTORIO, LEE, JUNG HYUK, PETER, ALESSANDRA, PORZIO, TOMMASO, SEN, RITWIKA, & TUGUME, ESAU. 2023. *Self-Employment Within the Firm*. NBER Working Paper 31740.

BASU, SUSANTO, & WEIL, DAVID N. 1998. Appropriate Technology and Growth. *Quarterly Journal of Economics*, **113**(4), 1025–1054.

BENTO, PEDRO, & RESTUCCIA, DIEGO. 2021. On Average Establishment Size across Sectors and Countries. *Journal of Monetary Economics*, **117**, 220–242.

BLOOM, NICHOLAS, EIFERT, BENN, MAHAJAN, APRAJIT, MCKENZIE, DAVID, & ROBERTS, JOHN. 2013. Does Management Matter? Evidence from India. *Quarterly Journal of Economics*, **128**(1), 1–51.

BLOOM, NICHOLAS, LEMOS, RENATA, SADUN, RAFFAELLA, SCUR, DANIELA, & VAN REENEN, JOHN. 2014. The New Empirical Economics of Management. *Journal of the European Economic Association*, **12**(4), 835–876.

BOEHM, JOHANNES, & OBERFIELD, EZRA. 2020. Misallocation in the Market for Inputs: Enforcement and the Organization of Production. *The Quarterly Journal of Economics*, **135**(4), 2007–2058.

BRINATTI, AGOSTINA, CAVALLO, ALBERTO, CRAVINO, JAVIER, & DRENIK, ANDRES. 2022. *The International Price of Remote Work*. mimeo, University of Michigan.

BUERA, FRANCISCO J., & TRACHTER, NICHOLAS. 2024. *Sectoral Development Multipliers*. mimeo, Washington University in St. Louis.

CALIENDO, LORENZO, MONTE, FERDINANDO, & ROSSI-HANSBERG, ESTEBAN. 2015. The Anatomy of French Production Hierarchies. *Journal of Political Economy*, **123**(4), 809–852.

CHANDLER, JR., ALFRED D. 1977. *The Visible Hand: The Managerial Revolution in American Business*. Harvard University Press.

CICCONE, ANTONIO. 2002. Input Chains and Industrialization. *Review of Economic Studies*, **69**(3), 565–587.

COLE, HAROLD L., GREENWOOD, JEREMY, & SANCHEZ, JUAN. 2016. Why Doesn't Technology Flow from Rich to Poor Countries? *Econometrica*, **84**(4), 1477–1521.

COMIN, DIEGO, & HOBIJN, BART. 2010. An Exploration of Technology Diffusion. *American Economic Review*, **100**(5), 2031–2059.

CORREIA, SERGIO. 2016. *Linear Models with High-Dimensional Fixed Effects: An Efficient and Feasible Estimator*. Tech. rept. Working Paper.

COX, ALVARO. 2025. *Fostering Development Through Higher Education: College Attainment, Firms and Economic Growth*. mimeo, Universidad Carlos III de Madrid.

DOCQUIER, FRÉDÉRIC, & RAPOPORT, HILLEL. 2012. Globalization, Brain Drain, and Development. *Journal of Economic Literature*, **50**(3), 681–730.

ENGBOM, NIKLAS, MALMBERG, HANNES, PORZIO, TOMMASO, ROSSI, FEDERICO, & SCHOELLMAN, TODD. 2025. *Economic Development According to Chandler*. mimeo, New York University.

GARICANO, LUIS, & ROSSI-HANSBERG, ESTEBAN. 2006. Organization and Inequality in a Knowledge Economy. *Quarterly Journal of Economics*, **121**(4), 1383–1435.

GOLLIN, DOUGLAS. 2008. Nobody's business but my own: Self-employment and small enterprise in economic development. *Journal of Monetary Economics*, **55**(2), 219–233.

HJORT, JONAS, LI, XUAN, & SARSONS, HEATHER. 2020. *Across-Country Wage Compression in Multinationals*. NBER Working Paper No. 26788.

JORGENSON, DALE W. 1961. The Development of a Dual Economy. *Economic Journal*, **71**(282), 309–334.

KERR, SARI PEKKALA, KERR, WILLIAM, ÖZDEN, ÇAĞLAR, & PARSONS, CHRISTOPHER. 2016. Global Talent Flows. *Journal of Economic Perspectives*, **30**(4), 83–106.

LEWIS, W. ARTHUR. 1954. Economic Development with Unlimited Supplies of Labor. *The Manchester School*, **22**(2), 139–191.

MARTELLINI, PAOLO, SCHOELLMAN, TODD, & SOCKIN, JASON. 2024. The Global Distribution of College Graduate Quality. *Journal of Political Economy*, **132**.

MINNI, VIRGINIA. 2024. Global Managers, Local Workers: Wage Setting Inside a Multinational Firm. *AEA Papers and Proceedings*, **114**, 586–591.

MURPHY, KEVIN M., SHLEIFER, ANDREI, & VISHNY, ROBERT W. 1989. Industrialization and the Big Push. *Journal of Political Economy*, **97**(5), 1003–1026.

POSCHKE, MARKUS. 2018. The Firm Size Distribution across Countries and Skill-Biased Change in Entrepreneurial Technology. *American Economic Journal: Macroeconomics*, **10**(3), 1–41.

RAMONDO, NATALIA, RODRÍGUEZ-CLARE, ANDRÉS, & TINTELNOT, FELIX. 2015. Multinational Production: Data and Stylized Facts. *American Economic Review: Papers and Proceedings*, **105**(5), 530–536.

ROBERT WALTERS. 2017. *Salary Survey*.

ROSSI, FEDERICO. 2022. The Relative Efficiency of Skilled Labor across Countries: Measurement and Interpretation. *American Economic Review*, **112**(1), 235–266.

WORLD BANK. 2025. *World Development Indicators*. Downloaded July 2, 2025. edn. Washington DC: World Bank.

FIGURE 1: MIDDLE MANAGER COMPENSATION AND DEVELOPMENT

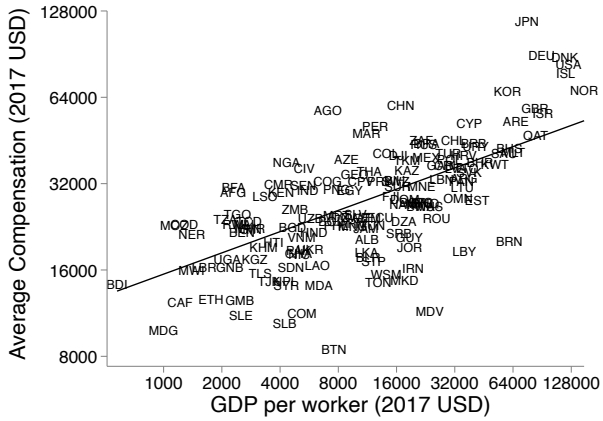

TABLE 1: ESTIMATED COMPENSATION ELASTICITY W.R.T. GDP PER WORKER

	Firm Type				
	All	All	All	Foreign	Domestic
Log GDP per worker	0.258***	0.239***	0.223***	0.235***	0.241***
	(0.033)	(0.007)	(0.003)	(0.005)	(0.018)
Fixed Effects	None	Year × Job	Year × Job × Firm	Year × Job	Year × Job
R-squared	0.071	0.702	0.835	0.707	0.704
N	162,239	162,239	86,351	127,608	34,374

Standard errors in parentheses

Sample size for last three columns is reduced because it includes only firm-job-years or job-years in the relevant sample with observations in multiple countries.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE 2: ESTIMATED ELASTICITY OF COMPENSATION BY SKILL LEVEL

	All	By Skill Level			
		Non-Management	Low	Medium	High
Log GDP per worker	0.239***	0.330***	0.259***	0.208***	0.156***
	(0.007)	(0.016)	(0.014)	(0.004)	(0.004)
Fixed Effects	Year × Job	Year × Job	Year × Job	Year × Job	Year × Job
R-squared	0.702	0.411	0.385	0.241	0.235
N	162,239	10,493	71,590	47,316	32,840
Example Job		Driver	Secretary	Accountant	Senior Executive

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE 3: EFFECT OF MANAGEMENT COSTS

Panel A: Relative Cost of Management $\log(w_{mm}/w_{prod})$ *by Country*

Poorest Decile	U.S.	Log Difference, Poorest Decile–U.S.
13.45	1.42	2.25

Panel B: Factor Intensity of Management α_{mm} *by Technology*

Modern	Traditional	Difference, Modern–Traditional
0.09	0.00	0.09

Panel C: Total Cost Shifter

Relative Cost Difference $\times$ Factor Intensity Difference

$2.25 \times 0.09 = 0.21$

Note: Panel A draws on Company data and World Bank (2025). Panel B draws on Caliendo *et al.* (2015). See text for details.