ROCKWOOL Foundation Berlin
Institute for the Economy and the Future of Work (RFBerlin)

DISCUSSION PAPER SERIES 154/26

Formal Labor Market Dynamics and Development

Anne Brockmeyer, François Gerard, Gabriel Ulyssea, Linda Wu, Marcelo Bergolo, Rodrigo Ceni González, Benard Kirui, Andrea Lopez-Luzuriaga, Leonardo Fabio Morales, Andrea Otero-Cortés, Nadine Riedel, Matías Tapia, Tanisa Tawichsri, Verena Wiedemann

www.rfberlin.com JUNE 2026

Formal Labor Market Dynamics and Development

Authors

Anne Brockmeyer, François Gerard, Gabriel Ulyssea, Linda Wu, Marcelo Bergolo, Rodrigo Ceni González, Benard Kirui, Andrea Lopez-Luzuriaga, Leonardo Fabio Morales, Andrea Otero-Cortés, Nadine Riedel, Matías Tapia, Tanisa Tawichsri, Verena Wiedemann

Reference

JEL Codes: O17, J46, J63

Keywords: Formal Employment, Economic Development, Life-Cycle Wage Growth

Recommended Citation: Anne Brockmeyer, François Gerard, Gabriel Ulyssea, Linda Wu, Marcelo Bergolo, Rodrigo Ceni González, Benard Kirui, Andrea Lopez-Luzuriaga, Leonardo Fabio Morales, Andrea Otero-Cortés, Nadine Riedel, Matías Tapia, Tanisa Tawichsri, Verena Wiedemann (2026): Formal Labor Market Dynamics and Development. RFBerlin Discussion Paper No. 154/26

Access

Disclaimer

Imprint

RFBerlin
ROCKWOOL Foundation Berlin –
Institute for the Economy
and the Future of Work

Gormannstrasse 22, 10119 Berlin
Tel: +49 (0) 151 143 444 67
E-mail: info@rfberlin.com
Web: www.rfberlin.com

Formal Labor Market Dynamics and Development*

Anne Brockmeyer, François Gerard, Gabriel Ulyssea, Linda Wu,
Marcelo Bergolo, Rodrigo Ceni González, Benard Kirui,
Andrea Lopez-Luzuriaga, Leonardo Fabio Morales, Andrea Otero-Cortés,
Nadine Riedel, Matías Tapia, Tanisa Tawichsri, Verena Wiedemann*

May 22, 2026

Abstract

This paper studies formal employment dynamics using linked employer–employee data from eight countries spanning a wide income range from Kenya to Chile. First, we show that formality rates increase with development, both between and within countries, because more workers enter the formal sector, not because they spend more time in formal jobs. Second, formal labor market fluidity increases with development, as workers hold more formal jobs, spend less time in each job, and less time between jobs. Third, greater fluidity is associated with higher life-cycle wage growth, which is largely accounted for by within- rather than between-firm wage gains.

*Corresponding author: Linda Wu (l.wu@ubc.ca), affiliations: World Bank Group, UCL & IFS, UCL, UBC, Universidad de la Republica, Universidad de la Republica, Privatisation Commission, IADB and George Washington University, Central Bank of Colombia, Central Bank of Colombia, University of Münster, Central Bank of Chile, Bank of Thailand, World Bank Group. We thank Kevin Donovan, Todd Schoellmann, Niklas Engbom and seminar/conference audiences at the World Bank, the Oxford Blavatnik School, Oxford CSAE, IFS and IIPF for helpful comments. We thank Gabriel Chaves Bosch and Wasakorn Yousab for excellent research assistance. We gratefully acknowledge financial support by the World Bank' Innovations in Tax Analytics program, the World Bank's DaTax Lab funded by the Global Tax Program, UKAID via the Centre for Tax Analysis in Developing Countries (TaxDev), and the UKRI through Brockmeyer's Future Leaders Fellowship (grant reference MR/V025058/1). The findings, interpretations, and conclusions do not necessarily represent the views of the institutions the authors are affiliated with, the institutions' Board of Directors or Executive Directors, or the governments they represent.

In high-income countries, more fluid labor markets are associated with better outcomes for workers: greater fluidity makes it easier for the unemployed to find jobs, and for workers to switch employers and move up the job ladder, thereby achieving higher life-cycle wage growth (Topel and Ward, 1992; Haltiwanger et al., 2018; Hahn et al., 2021; Engbom, 2022). In lower-income countries, the opposite seems to hold. While labor market flows are substantially higher than in richer economies, they do not translate into better outcomes for workers. Instead, they may reflect a slippery job ladder, dominated by movements into and out of low-quality, informal jobs (Donovan et al., 2023).

We know little, however, about labor market flows within lower-income countries' *formal* sector. Perhaps more crucially, we do not know how these flows change as economies develop and the formal sector expands.[1] For instance, as the formality rate rises with development, is this because more workers enter the formal sector, because they spend more time in each formal job, or because spells outside the formal sector become shorter — or some combination of these three factors? Moreover, we do not know how these patterns relate to life-cycle wage growth. The answers to these questions have important consequences for our understanding of labor market functioning in lower-income countries, their main frictions, and how these may change as economies develop.

This paper fills this gap by documenting how labor market flows and life-cycle wage growth in the formal sector evolve along the development path. We show that the formal sector expands as economies grow because more workers become attached to it — the *extensive* margin (in the terminology of Abel et al., 2024) —- and not because they spend more time in formal jobs conditional on ever holding one — the *intensive* margin. The absence of a gradient between the intensive margin and development masks substantial changes in job mobility within the formal sector as economies develop: workers hold more formal jobs, spend less time in each job, and less time between them. This greater fluidity, in turn, is associated with higher life-cycle formal wage growth. Our results can therefore reconcile the seemingly contrasting findings on labor market flows in lower- and higher-income economies: as the former grow, their labor markets formalize, and their formal labor market flows become more like those in high-income countries.

To establish these facts, we harmonize linked employer-employee (EE) administrative data from eight countries across three continents: Brazil, Chile, Colombia, Ecuador, Kenya, Thailand, South Africa, and Uruguay. Our data cover 112 country-years and span a wide range of income levels, with GDP per capita in the poorest and richest countries differing by a factor of 9.3. The use of administrative data is key to our analysis, as they have univer-

[1] The strong positive association between GDP per capita and formal sector's size is well-documented in the literature (La Porta and Shleifer, 2014; Ulyssea, 2020).

sal coverage of formal workers and establishments — minimizing measurement error and small-sample issues common in household surveys (Guvenen et al., 2022) — and provide longitudinal information on employees' work histories in the formal sector. These features allow us to examine formal labor market flows and wage dynamics over workers' life cycle with great detail and precision. We use the microdata to compute various moments for each country within consecutive four-year periods, ensuring that our estimates are not overly sensitive to short-term fluctuations. For two large and diverse countries — Brazil and Colombia — we further leverage the geographic granularity of the data to conduct within-country analyses, using 624 and 276 region-years, respectively.

We start by replicating the well-known positive association between formality rates and economic development with our administrative data. We construct formal employment-to-population ratios, and show that formality rates strongly increase with (log) GDP per capita. The estimated slopes are similar across country-period cells, and region-period cells within Brazil and Colombia. This similarity is important. The literature emphasizes differences in national institutions — e.g., formal sector entry costs (Djankov et al., 2002; Auriol and Warlters, 2005), labor and tax regulations, corruption, or institutional quality (Loayza, 1996; Johnson et al., 1998; Friedman et al., 2000; Botero et al., 2004; Dabla-Norris et al., 2008) — as the key determinants of the formality-development gradient, but within-country variations appear as important. This similarity also motivates our use of within-country comparisons to expand the scope and sample size of our analysis.

Our first contribution is to propose a decomposition of the formality rate into two components: (i) the extensive margin — the share of working-age individuals who ever hold a formal job in a given time period; and (ii) the intensive margin — the average share of time these individuals spend employed in the formal sector during that period. This decomposition allows us to ask whether the positive formality-development gradient is driven by more workers entering the formal sector, or by greater attachment to the formal sector among those who enter it, or both. The literature still lacks evidence on this rather fundamental question, most likely because such a decomposition requires the type of comprehensive longitudinal data on formal employment used in this paper.[2]

Our results show that the extensive margin of formality increases strongly with GDP per capita. While around 20% of working-age individuals enter formal employment at least once during a four-year period at the lower end of the GDP per capita distribution, that figure reaches 80% at the upper end. By contrast, the intensive margin of formality

[2]The question has direct policy relevance. For instance, in an unemployment insurance (UI) system funded by payroll taxation, extensive-margin formality increases imply an expansion in coverage, while intensive-margin increases imply an increase in the contribution per covered worker.

shows a much weaker association with economic development.

Our second contribution is to show that the weak intensive margin-development gradient masks greater fluidity in formal labor markets as countries become richer. Indeed, conditional on entering the formal sector, workers in countries and regions with higher GDP per capita (and higher formality) find formal jobs more quickly, but they also remain in each of these jobs for a shorter duration. As a result, they hold, on average, a greater number of different formal jobs within a given period.

The rich data available for Brazil allow us to shed further light on the patterns underlying our first two contributions. First, we show that they are not due to fixed differences across labor markets, as they hold when we examine growth rates across Brazilian regions. Second, an Oaxaca-Blinder type of decomposition indicates that our findings are not simply driven by changes in workforce or industrial composition often associated with economic development (e.g., rising education levels).

The findings in Donovan et al. (2023) leave open whether the rise in formal labor market flows that accompanies economic development translates into better worker outcomes, or simply reflects wasteful reallocation. We thus directly examine how formal labor market fluidity, life-cycle wage growth, and GDP per capita are related. To do so, we use the data from Brazil and Colombia, which track workers' wages, age, and tenure over several years and across a large number of regions. For each region, we estimate life-cycle wage gains by regressing log formal wages on age dummies, controlling for worker and year fixed effects (accounting for the usual age-time-cohort colinearity problem). Our measure of life-cycle wage growth is the coefficient at age 40, the peak of the age-wage profile.

Our third contribution is to show that life-cycle wage growth in the formal sector is increasing with both economic development[3] and formal-sector fluidity. We highlight two key forces underlying these patterns. First, the fluidity-development gradient is much steeper among younger workers, who also exhibit higher fluidity at all income levels. This is consistent with the literature that emphasizes the importance of a "job-shopping period" in the early stages of workers' careers for explaining wage growth over the life cycle (Jovanovic, 1979; Topel and Ward, 1992; Bagger et al., 2014).

Second, we follow Engbom (2022) and decompose formal-sector wage growth over the life cycle into between-firm and within-firm components, showing that the latter accounts for most of the difference between lower- and higher-income regions. Workers experience only modest wage gains upon switching jobs, and these gains do not rise with GDP per

[3] This is consistent with the cross-country evidence that experience-wage profiles are steeper in richer countries (Lagakos et al., 2018). Our estimates of life-cycle wage growth, however, focus on the formal sector and use longitudinal rather than cross-sectional data (i.e., we control for worker fixed effects).

capita. As a result, higher job-to-job transition rates alone are not sufficient to generate sizable improvements in life-cycle wage growth. By contrast, and consistent with the central role of the within-firm component, we show that returns to tenure are strongly increasing in GDP per capita.[4] Altogether, these results suggest that workers in richer regions enjoy higher life-cycle wage growth by benefiting from greater fluidity during the "job-shopping period", after which they tend to settle and experience stronger within-job gains.

This paper contributes to different strands of the literature. Our main contribution is to the understanding of labor market flows in developing countries, and the frictions that characterize them (Rud and Trapeznikova, 2020; Poschke, 2025). An earlier literature focused on the transitions in and out of informality (e.g. Funkhouser, 1996; Gong and Van Soest, 2002; Bosch and Maloney, 2010), and how these behave over the business cycle (Loayza, 1996; Perry et al., 2007; Bosch and Maloney, 2010; Bosch and Esteban-Pretel, 2012), with emphasis on the existence or not of formal-informal labor market segmentation (Maloney, 1999b, 2004). More recently and directly related to our paper, Donovan et al. (2023) use survey data from 49 countries to show that labor market flows are higher in poorer countries, largely driven by movements in and out of informal wage employment and self-employment (or "marginal jobs"), which are associated with a slippery job ladder. They interpret their results as evidence that poorer economies are not characterized by frictions that prevent individuals from switching jobs.

We contribute with new results on formal labor market flows using long individual panels from administrative EE datasets. Our findings suggest that frictions that prevent the expansion of *formal-sector* jobs and that prevent workers from transiting into and out of *formal jobs* are likely to be first order. Our empirical results therefore speak to the literature that analyzes the role of frictions — such as labor and entry regulations — in shaping formal job creation and labor market flows in developing countries (Gonzaga et al., 2003; Albrecht et al., 2009; Ulyssea, 2010; Haltiwanger et al., 2014; Bosch and Esteban-Pretel, 2012; Meghir et al., 2015; Gerard and Gonzaga, 2021; Flórez et al., 2021; Dix-Carneiro et al., 2026; Imbert and Ulyssea, 2026). Our findings suggest that these frictions become less binding as economies develop, leading to an increase in formal labor market fluidity, which allows more workers not only to join the formal sector, but also to switch formal jobs more easily.

Finally, our results echo those from the literature on labor market flows in higher-income countries, which has long emphasized that greater fluidity improves worker outcomes (Topel and Ward, 1992; Haltiwanger et al., 2018; Hahn et al., 2021; Engbom, 2022). By contrast, Donovan et al. (2023) find the opposite pattern in developing countries when

[4]This is consistent with on-the-job training increasing with development (Guner and Ruggieri, 2022).

considering the entire labor market. We show that these seemingly contrasting results can be reconciled: as lower-income economies grow, their labor markets formalize, and their formal-sector flows come to resemble those of high-income countries.[5]

1 Data

We use linked employer-employee (EE) datasets based on administrative records from Brazil, Chile, Colombia, Ecuador, Kenya, Thailand, South Africa, and Uruguay. These restricted-access data cover the universe of formal-sector employees and firms, containing unique identifiers that allow us to track worker-firm matches over time. Table A.1 summarizes the data sources, and Appendix A details our data harmonization procedures.

The EE data differ across countries in both time coverage and the richness of worker and firm characteristics. For example, while they include 112 country-years in total, we have 24 years of data for Brazil (1994–2017) but only four for Kenya (2017–2020). Detailed information on workers' earnings and their location is available only in some countries. We thus present two types of analyses in the paper.

The *cross-country analysis* is based on a core set of outcomes that can be consistently constructed for all countries. The minimum requirement for inclusion in our sample is that the EE data span at least 4 consecutive years. We complement the EE data with representative survey data covering the same periods to measure the size of the working-age population, which allows us to compute the formality rate and its extensive margin consistently across countries using the EE data. Table A.1 lists the surveys used in each country.

The *within-country analysis* uses the EE data for Brazil and Colombia, two countries which exhibit substantial spatial heterogeneity in economic development. This allows us to replicate the cross-country analysis across 26 Brazilian and 23 Colombian regions, for a total of 624 and 276 region-years, respectively.[6] Moreover, the EE data in both countries span at least 12 years and include detailed information on workers' age and wage, which are necessary for our analysis of life-cycle wage growth. Since they include additional information (e.g., education) over a longer period, we also use the Brazilian EE data for more granular analyses and robustness checks.

Finally, we follow the literature and proxy levels of economic development in each period by (log) GDP per capita (measured in constant 2015 USD). For the cross-country anal-

[5]Interestingly, Engbom et al. (2022) show that earnings volatility in the formal sector in Brazil is also comparable to that of richer countries, like the US and Canada, while informal earnings are more volatile.

[6]We use the term "regions" hereafter to refer to the states in Brazil and the departments in Colombia. We exclude the Federal District in Brazil and nine highly rural departments in Colombia (see Appendix A).

ysis, we use data from the World Bank (World Bank, 2025); regional GDP per capita data for Brazil and Colombia come from IBGE (Instituto Brasileiro de Geografia e Estatística) and DANE (Departamento Administrativo Nacional de Estadística), respectively.

2 Formal Employment Dynamics and Development

This section examines how formal employment dynamics evolve along the development path. First, we decompose the contributions of the extensive and intensive margins of formality to the positive association between formality and development. Second, we examine how formal labor market flows change as economies grow, and to what extent these changes are driven by shifts in workforce and industrial composition.

2.1 A Simple Decomposition of the Formality Rate

We measure the formality rate in period p as the ratio of the average number of formal workers in the EE data to the average number of working-age individuals in the survey data. Each period p corresponds to a non-overlapping four-year interval, and we average over the months and years within this interval to smooth out short-term fluctuations.[7]

$$P(formality_p) = \frac{\frac{1}{4}\sum_{y\in p}\frac{1}{12}\sum_{m=1}^{12} \text{\# workers in EE data in month m in year y}}{\frac{1}{4}\sum_{y\in p} \text{\# working-age individuals in survey in year y}} \qquad (1)$$

We define the working-age population as individuals between 18 and 49 years old.[8]

Panel (a) of Figure 1 confirms the well-known positive formality-development gradient. Formal-employment-to-population ratios rise from around 10% in Kenya to nearly 50% in Chile. Moving from the poorest to the richest regions of Brazil and Colombia spans a similar range of formality rates. Estimated slopes are remarkably consistent: each additional log point in GDP per capita is associated with a 17–18 percentage point higher formality rate, whether estimated across country-period or region-period observations within Brazil and Colombia. This holds even though Colombia's formality rates tend to be lower than Brazil's at comparable income levels—likely reflecting differences in labor market institutions. The similarity of gradients within and across countries suggests the formality-development relationship is not merely an artifact of differences in national institutions.

[7]The specific four-year periods differ across countries based on data availability. Table B.1 shows that results are robust to using alternative window lengths (3-year or 6-year).

[8]Figure B.1 shows that the results are robust to using the active labor force (employed or seeking employment) as an alternative denominator in equation (1). For Kenya, where age is unobserved, the numerator includes all ages. Table B.2 shows robustness to alternative denominator age ranges.

The measure of formality rate in equation (1) can be decomposed into an *extensive* margin and an *intensive* margin of formality (in the terminology of Abel et al., 2024):

$$P(formality_p) = \underbrace{P(EverFormal_p)}_{\text{Extensive Margin}} \times \underbrace{E(ShareFormalMonths_p | EverFormal_p)}_{\text{Intensive Margin}} \quad (2)$$

The extensive margin — the number of unique individuals who appear in the EE records in a period divided by the average working-age population in the period — captures the share of the working-age population that ever holds a formal job in period p. The intensive margin captures the average attachment to the formal sector among those individuals. It is measured as as average share of months in period p (out of 48) that ever-formal individuals spend in formal employment. This decomposition allows us to ask whether the formality-development gradient is driven by more workers entering the formal sector, by stronger attachment to the formal sector among those who enter it, or both.

Panel (b) of Figure 1 shows that the extensive margin rises sharply with GDP per capita. Fewer than 20% of working-age individuals enter formal employment during a four-year period in Kenya, compared to about 80% in Chile. We document a similar range from the lower to the upper end of the GDP per capita distribution within Brazil and Colombia, and the slope coefficients are again similar in the cross- and within-country analyses: an additional log point in GDP per capita is associated with a 25-33 percentage point higher extensive margin.

Panel (c) of Figure 1 reveals a much weaker association between the intensive margin and economic development. On average, ever-formal individuals spend between 45% and 65% of the time in formal employment across country-period observations and region-period observations within Brazil. Colombia displays a similarly weak gradient, but with lower levels of the intensive margin across all income levels. The slope coefficients are positive but an order of magnitude smaller than in panel (b): each additional log point in GDP per capita is associated with a 1-5 percentage point higher intensive margin. Our decomposition thus indicates that, as economies develop, workers become more likely to join the formal sector but not to remain formally employed for longer periods of time.

2.2 Unpacking the Intensive Margin

The lack of a gradient between the intensive margin of formality and economic development can mask substantial changes in labor market flows within the formal sector. To see this, we can decompose the intensive margin as follows:

$$\underbrace{E(ShareFormalMonths_p|EverFormal_p)}_{\text{Intensive Margin}} = \frac{E\left[MonthsFormal_p|EverFormal_p\right]}{TotalMonths_p}$$
$$= \frac{E\left[NumberJobs_p|EverFormal_p\right] \times E\left[MonthsPerJob_p|EverFormal_p\right]}{TotalMonths_p} \tag{3}$$
$$= \frac{E\left[MonthsPerJob_p|EverFormal_p\right]}{E\left[MonthsPerJob_p|EverFormal_p\right] + E\left[MonthsBetweenJob_p|EverFormal_p\right]}$$
$$= \frac{1}{1 + \frac{E\left[MonthsBetweenJob_p|EverFormal_p\right]}{E\left[MonthsPerJob_p|EverFormal_p\right]}} \tag{4}$$

As shown in equation (3), the intensive margin is the product of two forces: (i) how many distinct formal jobs ever-formal workers hold in period p, and (ii) how long each of those jobs lasts, scaled by the total number of months in the period. A constant intensive margin can therefore arise from offsetting changes: workers may switch more (less) frequently between formal jobs while each job spell becomes shorter (longer), leaving their overall share of time in formal employment unchanged.

Figure 2 reveals that economic development is associated with substantial *increases* in labor market flows within the formal sector. Panel (a) shows that the average number of formal jobs held by ever-formal workers rises with GDP per capita, while panel (b) shows that the average duration of these jobs decreases. On average, Kenyan workers hold about 1.5 jobs and stay about 17 months in each job within a 4-year period, while Chilean workers hold about 2.2 jobs but stay only about 10 months in each. These statistics span a similar range in the cross-country and within-Brazil analyses, resulting in similar slope coefficients: each additional log point in GDP per capita is associated with an increase of about 0.3 job and a decrease of about 3 months per job. Within Colombia, the range is wider for the average number of jobs, but narrower for the average job duration.

The opposite signs of the slopes in panels (a) and (b) reflect, in part, a mechanical relationship. Holding constant the time it takes a worker to find a formal job, a decrease in average job duration necessarily increases the average number of jobs held within a period. However, this is not sufficient to yield a constant intensive margin, as highlighted in equation (4), where $E\left[MonthsBetweenJob_p|EverFormal_p\right]$ is the average time spent outside the formal sector within period p divided by the number of jobs held in the period. Specifically, a decline in average job duration must be offset by a decline in the average duration between formal jobs to keep the intensive margin constant. This is the pattern that we document in panel (c) of Figure 2: the average time between formal jobs also decreases with GDP per capita. The slope coefficients are again similar in the cross-country and within-Brazil analyses (between −2.6 and −3.2 months).[9]

Importantly, the positive gradient between economic development and labor market flows within the formal sector is not specific to the measures of flows used in Figure 2. We obtain similar results for the within-country analyses using the sum of hiring and separation rates—also known as the *workers' reallocation rate* (Davis et al., 2006)—which is a standard measure of flows at the firm level (Figure B.2). Moreover, we show that the same patterns hold when we net out fixed labor market effects. The black lines and markers in Figure 3 replicate the findings in Figures 1 and 2 using only variation in growth rates across region-period observations within Brazil—for which we have more region-period cells—by differentiating out the value in the first period of each region.

2.3 The Role of Workforce and Industrial Composition

This section uses the rich data available for Brazil to address a natural question raised by the patterns in Figures 1 and 2: whether they simply reflect changes in workforce or industrial composition, often associated with economic development and formalization. For instance, higher regional GDP per capita is associated with higher education levels within Brazil, and formality rates rise with educational attainment (see Figures C.1 and C.2). Higher regional GDP per capita is also associated with lower employment shares in agriculture — which is highly informal — and higher employment shares in manufacturing and services (see Figures C.3 and C.4). Moreover, higher GDP per capita is associated with increases in the formal employment share of manufacturing and services, but also with a sharp decline in the formal employment share of the public sector (see Figure C.5). The latter could be particularly important for the rise in formal labor market flows as economies grow, since there is often less movements in and out of public-sector jobs.

To assess the contribution of changes in workforce composition, we apply an Oaxaca-Blinder type of decomposition to the results in growth rates in Figure 3. For each of 40 demographic bins based on age (4), education (5), and gender (2) categories, we compute the same statistics as in Figures 1 and 2. We then decompose the change in each statistic y across region-period observations into two components (and a residual):

$$\text{Constant-mean:} \quad \Delta y_{p,r}^{CM} = \sum_b \omega_{p,r,b} \times y_{p_0,r,b} - \sum_b \omega_{p_0,r,b} \times y_{p_0,r,b} \tag{5}$$

[9] The within-Brazil relationship in panel (c) is consistent with a related pattern documented by Gerard and Gonzaga (2021), where the average duration without a formal job among a sample of displaced formal workers is increasing in *informality* rates across Brazilian regions.

$$\text{Constant-share:} \quad \Delta y^{CS}_{p,r} = \sum_b \omega_{p_0,r,b} \times y_{p,r,b} - \sum_b \omega_{p_0,r,b} \times y_{p_0,r,b} \tag{6}$$

where $\omega_{p,r,b}$ is the share of the relevant workforce in period p and region r belonging to bin b.[10] The "constant-mean" component captures the change in a given statistic over time as predicted by compositional changes only, while the "constant-share" component captures the change holding fixed the composition of the workforce in the first period p_0.

Consistent with rising education levels, the orange line and markers in panel (a) of Figure 3 highlight that changes in workforce composition can account for about 75% of the gradient between formality rates and economic development. The constant-share component – corresponding to the blue line and markers – can account for the rest of the gradient (the residual component is thus very small). This is consistent with the patterns in Figure C.2 showing that formality rates rise with GDP per capita *within each educational level*.

Importantly, all the results in Figures 1 and 2 hold when we focus exclusively on the constant-share component. The extensive margin drives all of the constant-share increase in formality rates with economic development; the coefficient for the intensive margin is *negative* once we account for compositional changes. The rise in the average number of formal jobs held by ever-formal workers as economies grow comes entirely from the constant-share component. Finally, the constant-share component decreases with GDP per capita for both the average duration per formal job and the average time between formal jobs.[11]

To assess the contribution of changes in the industrial composition of the formal sector, we apply a similar decomposition to the sum of hiring and separation rates as the measure of labor market flows. We do so because, like industry, it is measured at the firm level. We consider 7 industry categories: agriculture, manufacturing, construction, retail, transportation/accommodation/food, other services, and the public sector. The black line and markers in Figure C.6 first confirm that the positive gradient between development and workers' reallocation rate holds in growth rates. The orange and blue lines and markers then show that the constant-share component can account for most of this gradient, while changes in industrial composition account for only about 15%. This finding is consistent with additional patterns presented in Figure C.7: higher GDP per capita is associated with higher workers' reallocation rates *within each industry category*.[12]

[10] The relevant workforce is the working-age population when considering the overall formality rate and the extensive margin, but it is the ever-formal population when considering the other statistics.

[11] Consistent with rising education levels, compositional changes increase the extensive and intensive margins of formality, increase the average duration per formal job, and reduce the average time between formal jobs. The latter two patterns explain the increasing intensive margin and the lack of any gradient between the average number of formal jobs and economic development, with the constant-mean component.

[12] For completeness, Figure C.8 replicates Figures 1 and 2 restricting attention to the private sector.

3 Development, Fluidity and Life-Cycle Wage Growth

The results so far indicate that formal labor market flows increase with development, but it remains unclear whether this translates into better outcomes for workers. We now examine the relationship between economic development, formal-sector fluidity, and formal-sector wage growth over the life cycle. Following the empirical analysis in Engbom (2022), we construct a measure of fluidity based on formal job-to-job changes. We leverage the long individual panel data in Brazil and Colombia to estimate life-cycle wage growth for each region, and then exploit the cross-regional variation of both measures relative to GDP per capita within the two countries.

We build an individual-year panel for workers aged 18–49.[13] For each region-year, we then compute the share of formally employed workers observed in a different firm 12 months later, and average it across years within each region. Consistent with the positive gradient between formal labor market flows and economic development in the previous section, panel (a) of Figure 4 shows that these average job-switching rates increase strongly with regions' average (log) GDP per capita within both Brazil and Colombia.

Next, we construct a measure of life-cycle wage growth by estimating the following regression separately for each region:

$$log(w_{it}) = \sum_{k=19}^{40} \beta_k \cdot \mathbb{1}(age_{it} = k) + \alpha_i + \delta_t + \epsilon_{it} \tag{7}$$

where w_{it} is the wage of worker i formally employed in year t, α_i and δ_t are worker and year fixed effects, and ϵ_{it} is the error term. The coefficients on the age dummies capture wage growth compared to the excluded age 18. We pool all ages above 40 in one age-above-40 bin to deal with the usual age-time-cohort colinearity problem. Figure D.1 displays the estimated coefficients on each bin for each region, showing that wages grow rapidly until about age 26, after which wage growth slows down and becomes flat by age 40. We thus use the estimated coefficient at age 40 as our measure of life-cycle wage gain.

Panel (b) of Figure 4 shows that life-cycle wage growth in the formal sector is strongly increasing in regions' average (log) GDP per capita, within both Brazil and Colombia.[14,15]

[13] We retain one observation per worker per year, always in the same month, so that year-to-year changes compare workers in the same month.

[14] Figure D.3 shows that the patterns from panels (a) and (b) in Figure 4 — as well as those in panels (e) and (f) discussed below — replicate when excluding the public sector.

[15] Lagakos et al. (2018) and Donovan et al. (2023) document a positive gradient between life-cycle wage growth and development. Our estimates of life-cycle wage growth, however, focus on the formal sector and use longitudinal rather than cross-sectional data (i.e., we control for worker fixed effects).

Figure D.2 shows that the measure of life-cycle wage gain in panel (b) is also strongly increasing in the measure of labor market fluidity in panel (a).

Differences in job-switching rates by age group shed further light on this relationship. The literature has emphasized that an initial "job-shopping" period early in workers' career could be critical for their life-cycle labor market outcomes, as young workers have fewer skills and limited knowledge about their comparative advantage or the best available matches to them (Jovanovic, 1979; Topel and Ward, 1992). By contrast, excessive turnover especially at more advanced stages in workers' careers could be counterproductive, as workers would not accumulate human capital on the job. Panels (c) and (d) of Figure 4 show that job switching rates rise more strongly with GDP per capita among younger workers—aged 21-25, which are the peak job-mobility ages (see Figure D.4)—than among older workers aged 36-40, which is the peak of the experience-wage profile.

Sources of Life-Cycle Wage Growth

To shed light on the sources of life-cycle wage growth in the formal sector, we decompose it between wage gains upon switching formal jobs and within-job wage growth, and document how these two components vary with economic development.

We start by computing the average wage gains upon switching formal jobs. We calculate the change in (log) real wages between consecutive years for workers who switched jobs and those who stayed with their employer. For each region-year, we then define the wage gain from switching as the difference between the average wage growth of switchers and stayers, and average this gain across years within a region. Panel (e) of Figure 4 shows that this wage gain measure is positive for all regions within Brazil and Colombia, but that it is *not* increasing in GDP per capita. Yet, because the wage gains are positive and job-switching rates are increasing with development, the net effect of job-to-job transitions on life-cycle wage growth could still be increasing in GDP per capita.

We quantify the overall "between-job" component of life-cycle wage growth following Engbom (2022). For each region, it corresponds to the product of three terms: the average wage gain of job switchers relative to stayers, the annual job switching rate, and the length of the working life (ages 18-40). The "within-job" component is then obtained residually as the difference between total life-cycle wage growth and the between-job wage component. Panels (a) and (b) of Figure 5 plot the results of this decomposition against development for regions within Brazil and Colombia, respectively. In each panel, the shaded areas are constructed from two fitted lines: a regression of the between-job component on log GDP per capita and a regression of total life-cycle wage growth on log GDP per capita, so that the light and dark grey areas represent the between- and within-job components, respectively. While the between-job component is slightly increasing in GDP per capita in both countries, the gradient between life-cycle wage growth and development is primarily driven by within-job growth. Thus, the share of life-cycle wage growth accounted for by the within-job component increases substantially with development.

To shed further light on the determinants of the within-job component, we estimate returns to tenure by augmenting the wage regression in equation (7) with a second-degree polynomial in tenure, reporting the coefficient on the linear term. Panel (f) of Figure 4 shows that returns to tenure are increasing in GDP per capita across regions within the two countries, and quite strongly so in Brazil. Again, these results contrast with the findings of Donovan et al. (2023), who document a declining cross-country relationship between returns to tenure and development considering the overall labor market. Our results that returns to tenure in the formal sector rise with economic development are consistent with two patterns documented above: (i) the stronger life-cycle wage gains with respect to development in Brazil relative to Colombia, and (ii) the increasing share of life-cycle wage growth accounted for by the within-job component in both countries.

4 Conclusion

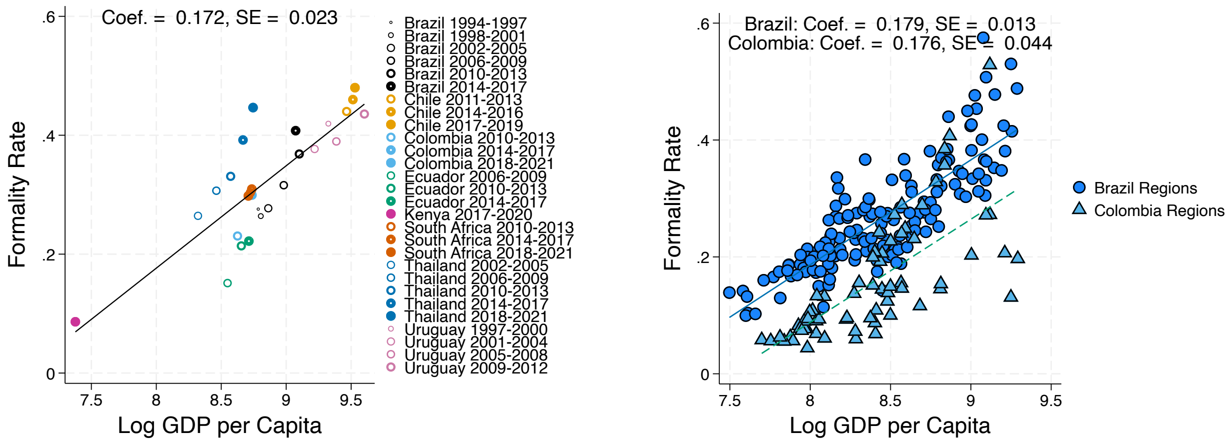
Our results show that formality rates increase with economic development because individuals have greater access to formal jobs, and not because they are more attached to these jobs conditional on entering the formal sector. In fact, as economies develop, formal labor market fluidity increases, which implies that (on average) individuals have a greater number of formal jobs, they spend less time in each job, but also less time between formal jobs. This greater fluidity is associated with substantial improvements in formal-sector wage gains over the life cycle, driven by the increasing importance of within-job wage gains. Consistently, richer regions also display higher returns to tenure in the formal sector.

A string of empirical work over the past two decades has contested the dual view of informality — that formal and informal sectors are segmented — finding that workers transit between sectors quite frequently (Maloney, 1999a, 2004; Ulyssea, 2020). Together with the results in Donovan et al. (2023), our findings point to a different form of duality: formal and informal labor markets are characterized by fundamentally different dynamics.

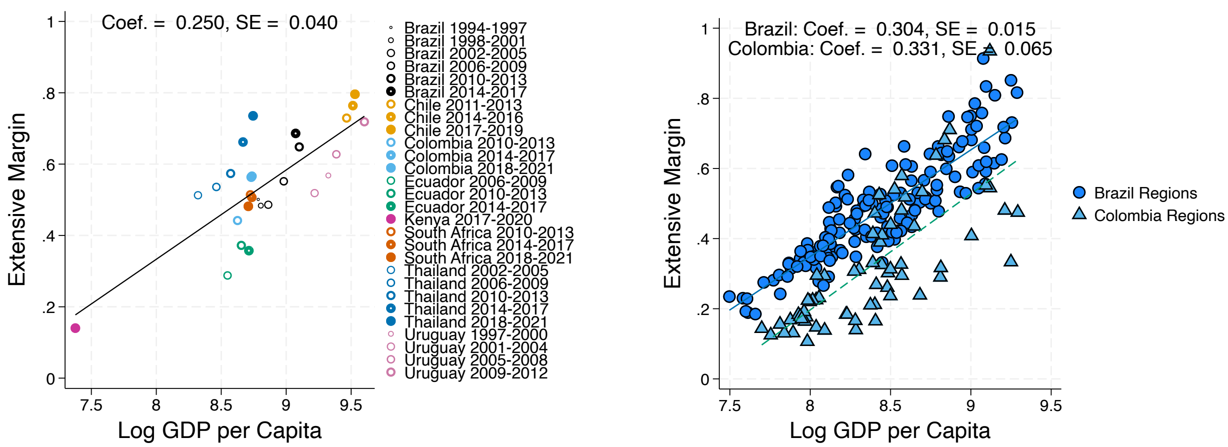
Figure 1: Formality and Development Across and Within Countries

I. Cross-Country II. Within Brazil/Colombia

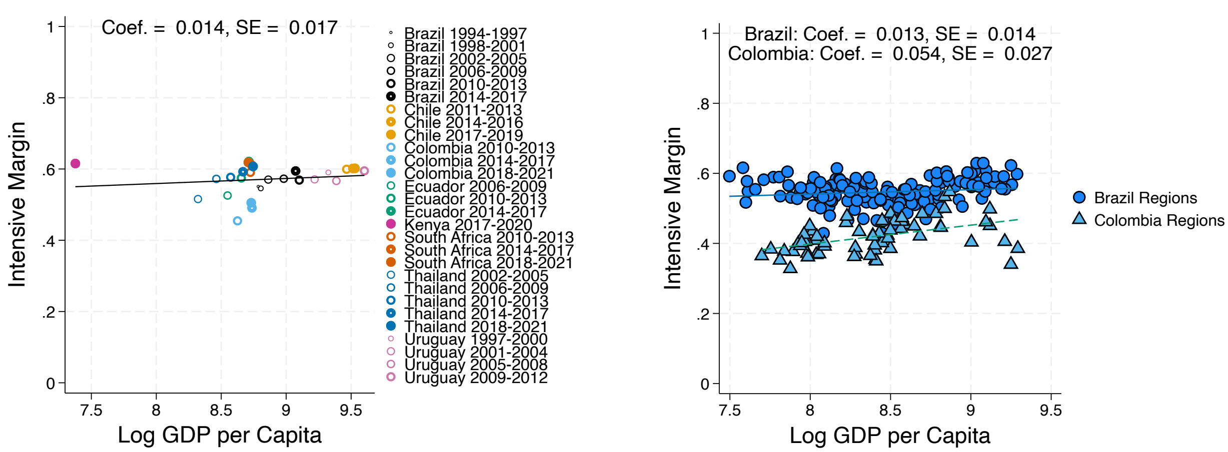
(a) Overall Formality Rate



(b) Extensive Margin Formality Rate



(c) Intensive Margin Formality Rate

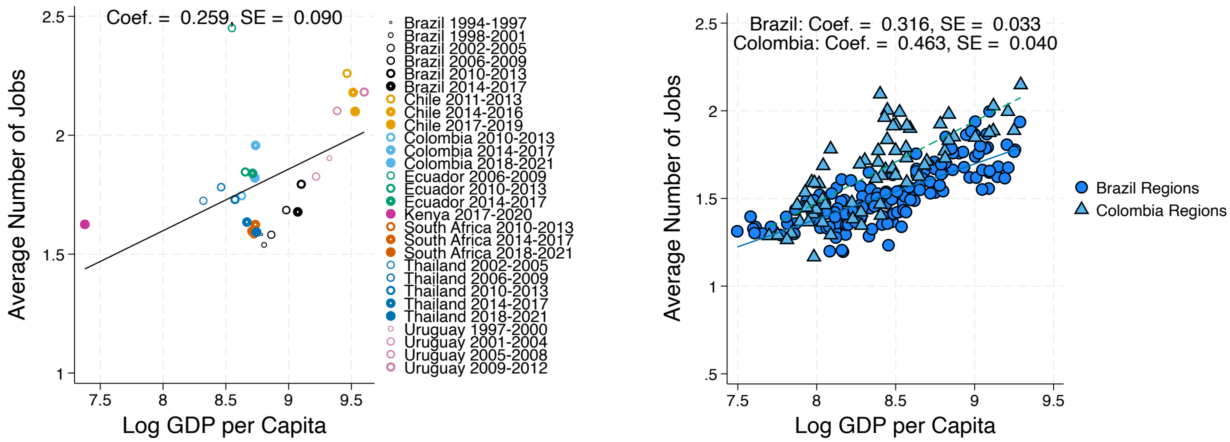


Note: This figure shows the relationships between different formality measures and log GDP per capita using the administrative EE data and the survey data described in Table A.1. Panels (a)–(c) consider the formality rate, its extensive margin, and its intensive margin, respectively. The left- and right-hand-side columns display cross-country comparison and within-country cross-region comparisons, respectively. Standard errors are clustered at the region level in the right-hand-side column (we have too few countries for such clustering in the left-hand-side column). This figure is discussed in Section 2.1.

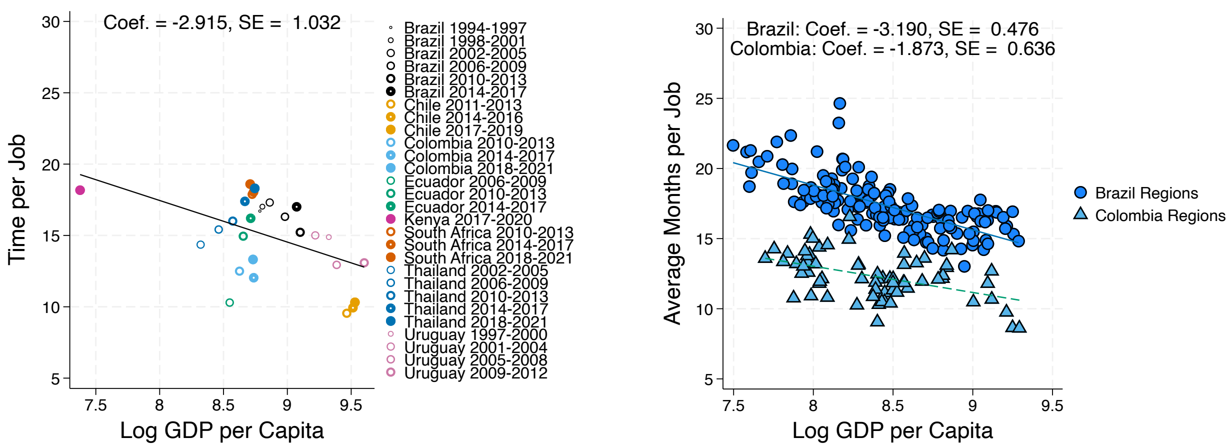
Figure 2: Formal Labor Market Flows and Development

I. Cross-Country II. Within Brazil/Colombia

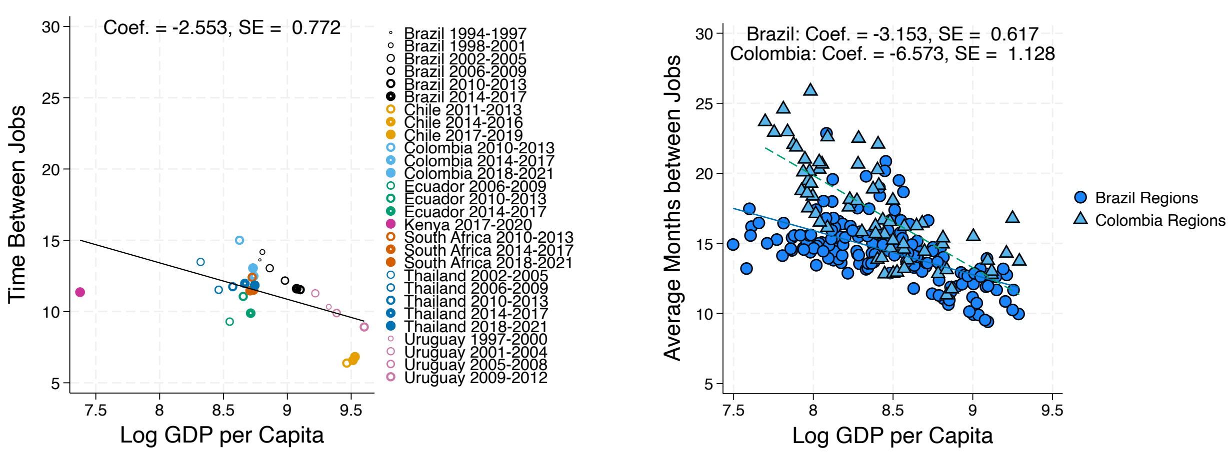
(a) Average Number of Jobs



(b) Average Time per Job

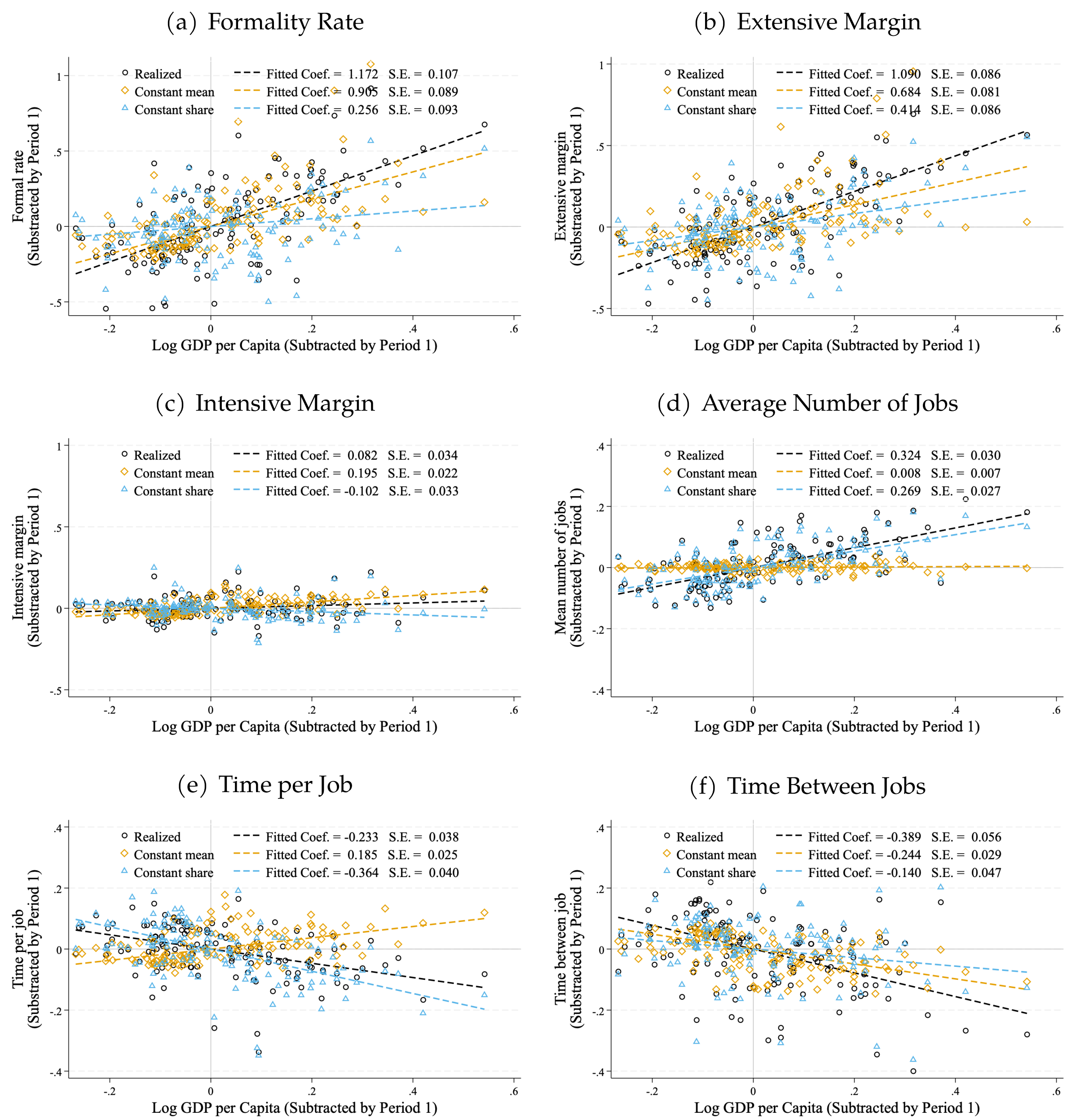


(c) Average Time Between Jobs



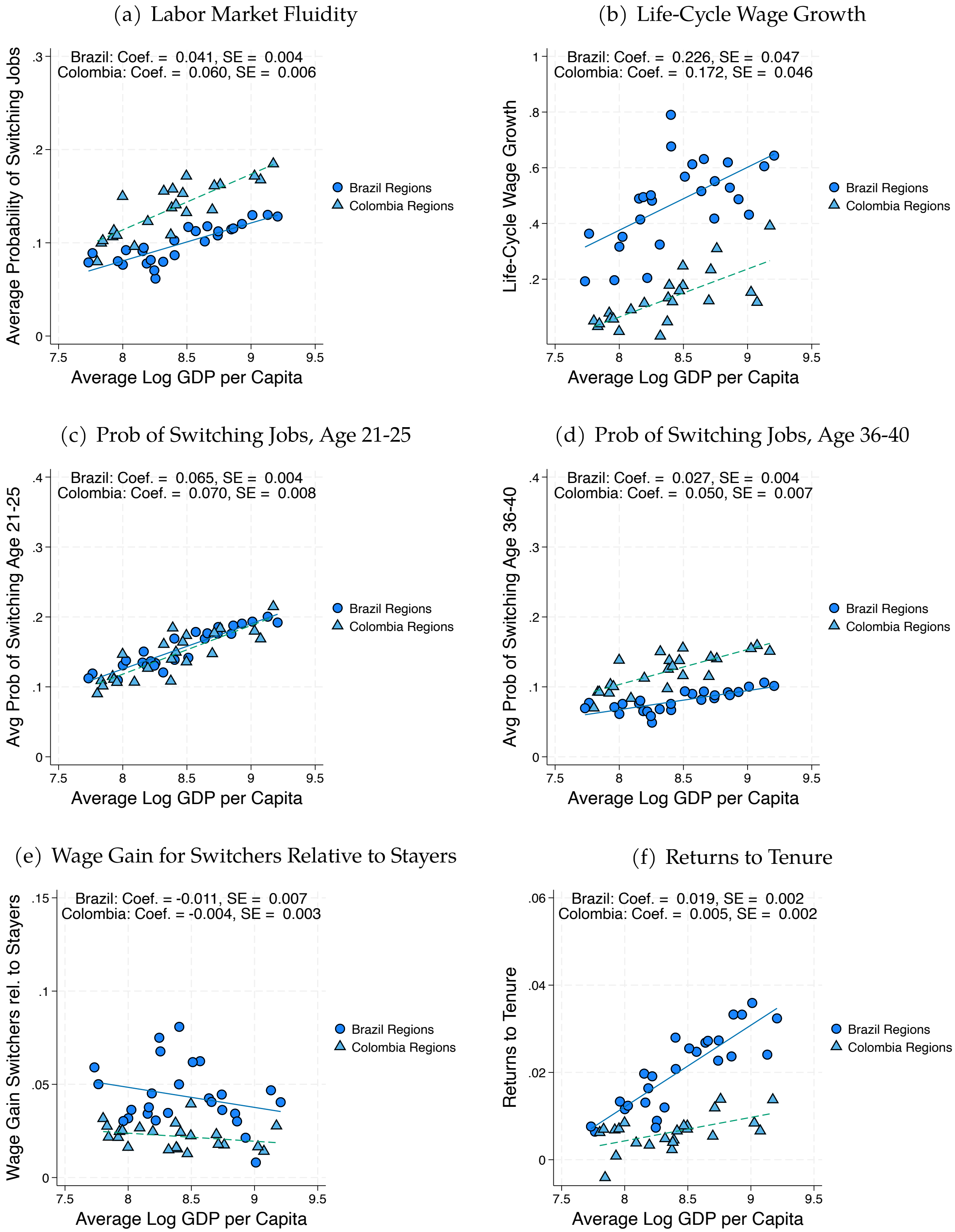
Note: Similar to Figure 1, this figure shows the relationships between different measures of formal labor market flows and log GDP per capita using the administrative EE data and the survey data described in Table A.1. Panels (a)–(c) consider the average number of formal jobs, the average time per formal job, and the average time between formal job. This figure is discussed in Section 2.2.

Figure 3: The Role of Workforce Composition



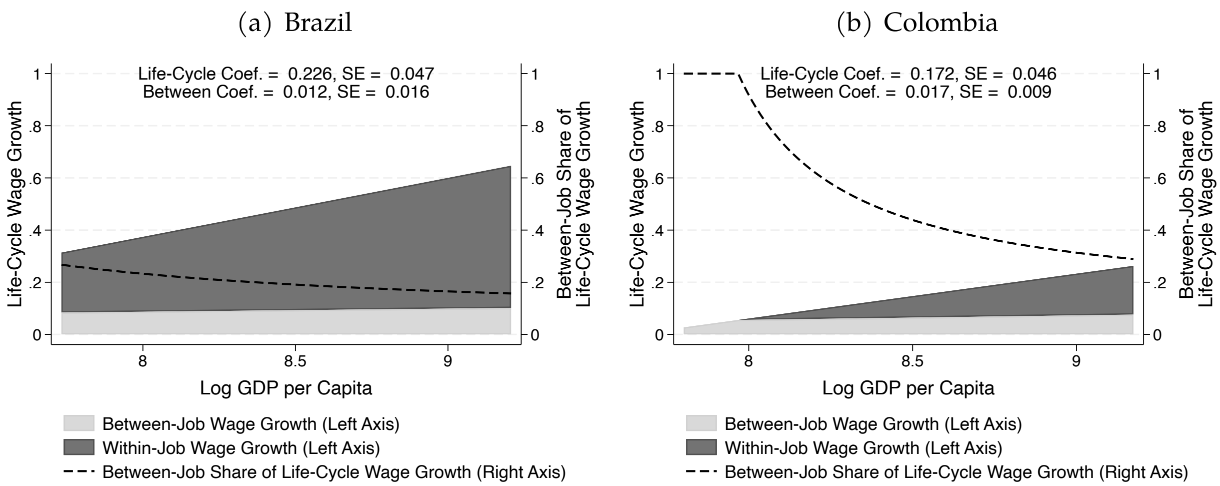
Note: This figure presents an Oaxaca-Blinder decomposition of the changes in the different outcomes considered in Figures 1 and 2 relative to the first period (p_0), using the Brazilian administrative EE data and survey data described in Table A.1. We use 40 demographic bins based on age (4), education (5), and gender (2) categories. The "constant-mean" component captures changes predicted solely by compositional shifts in the workforce (changing weights ω, as in Equation 5). The "constant-share" component captures changes holding workforce composition fixed (changing outcomes y, as in Equation 6). This figure is discussed in Section 2.3.

Figure 4: Formal Labor Market Fluidity, Life-Cycle Wage Growth and Development



Note: This figure shows the relationships between log GDP per capita and measures of formal labor market fluidity and life-cycle wage growth across regions within Brazil and Colombia, using administrative EE data. Panel (a) considers a measure of labor market fluidity: the share of formally employed workers observed in a different formal firm 12 months later (averaged across years within a region). Panel (b) considers a measure of life-cycle wage growth: the estimated β_{40} in Equation (7), which captures life-cycle wage growth relative to age 18. Panels (c) and (d) consider our labor market fluidity measure for younger (aged 20–25) and older workers (aged 36–40), separately. Panels (e) and (f) consider drivers of life-cycle wage gains: wage gains upon job switching (comparing switchers relative to stayers) and returns to job tenure, respectively. The latter is the estimated linear coefficient from augmenting Equation (7) with a quadratic tenure term for each region. Standard errors are clustered at the region level. This figure is discussed in Section 3.

Figure 5: Components of Formal Life-Cycle Wage Growth and Development



Note: This figure decomposes the relationship between life-cycle wage growth and log GDP per capita into between-job and within-job components, using Brazilian and Colombian administrative EE data in Panels (a) and (b), respectively. For each region, we compute the between-job component as the product of three terms: the average wage gain of job switchers relative to stayers, the annual job-switching rate, and the length of the working life (40 minus 18 years). The within-job component is obtained residually as the difference between total life-cycle wage growth and the between-job component. In each panel, the upper boundary of the light grey area is the fitted line from a regression of the between-job component on log GDP per capita, and the upper boundary of the dark grey area is the fitted line from a regression of total life-cycle wage growth on log GDP per capita. The light and dark grey areas thus represent the between- and within-job components, respectively. The dashed line represents the share of the between-job component relative to the total life-cycle wage growth. In each panel, the y-axes on the left- and right-hand sides apply to the level of the two components and the share of the between-job component, respectively. Reported coefficients indicate the slope of each component with respect to log GDP per capita. Standard errors are clustered at the region level. This figure is discussed in Section 3. Appendix Figure D.5 replicates this figure using formal labor market fluidity (our labor market fluidity measure in Figure 4) on the x-axis.

References

Abel, Martin, Eliana Carranza, Kimberly Geronimo, and Maria Elena Ortage, "Can Temporary Wage Incentives Increase Formal Employment? Experimental Evidence from Mexico," Working Paper August 2024. 1, 7

Albrecht, James, Lucas Navarro, and Susan Vroman, "The effects of labour market policies in an economy with an informal sector," *The Economic Journal*, 2009, *119* (539), 1105–1129. 4

Auriol, Emmanuelle and Michael Warlters, "Taxation base in developing countries," *Journal of Public Economics*, 2005, *89* (4), 625–646. 2

Bagger, Jesper, François Fontaine, Fabien Postel-Vinay, and Jean-Marc Robin, "Tenure, experience, human capital, and wages: A tractable equilibrium search model of wage dynamics," *American Economic Review*, 2014, *104* (6), 1551–1596. 3

Bosch, Mariano and Julen Esteban-Pretel, "Job creation and job destruction in the presence of informal markets," *Journal of Development Economics*, 2012, *98* (2), 270–286. 4

— **and William F. Maloney**, "Comparative analysis of labor market dynamics using Markov processes: An application to informality," *Labour Economics*, 2010, *17* (4), 621–631. 4

Botero, Juan C, Simeon Djankov, Rafael La Porta, Florencio Lopez de Silanes, and Andrei Shleifer, "The regulation of labor," *The Quarterly Journal of Economics*, 2004, *119* (4), 1339–1382. 2

Dabla-Norris, E., M. Gradstein, and G. Inchauste, "What causes firms to hide output? The determinants of informality," *Journal of Development Economics*, 2008, *85*, 1–27. 2

Davis, Steven J., R. Jason Faberman, and John Haltiwanger, "The Flow Approach to Labor Markets: New Data Sources and Micro-Macro Links," *Journal of Economic Perspectives*, September 2006, *20* (3), 3–26. 9

Dix-Carneiro, Rafael, Pinelopi K Goldberg, Costas Meghir, and Gabriel Ulyssea, "Trade and Domestic Distortions: The Case of Informality," *Econometrica*, 2026, (Forthcoming). 4

Djankov, Simeon, Rafael La Porta, Florencio Lopez de Silanes, and Andrei Shleifer, "The Regulation of Entry," *The Quarterly Journal of Economics*, 2002, *117* (1), pp. 1–37. 2

Donovan, Kevin, Will Jianyu Lu, and Todd Schoellman, "Labor Market Dynamics and Development," *The Quarterly Journal of Economics*, 05 2023, *138* (4), 2287–2325. 1, 3, 4, 11, 13

Engbom, Niklas, "Labor Market Fluidity and Human Capital Accumulation," Working Paper 29698, National Bureau of Economic Research January 2022. 1, 3, 4, 11, 12

— **, Gustavo Gonzaga, Christian Moser, and Roberta Olivieri**, "Earnings inequality and dynamics in the presence of informality: The case of Brazil," *Quantitative Economics*, 2022, *13* (4), 1405–1446. 5

Flórez, Luz A., Leonardo Fabio Morales, Daniel Medina, and José Lobo, "Labor flows across firm size, age, and economic sector in Colombia vs. the United States," *Small Business Economics*, 2021, *57* (3). 4

Friedman, Eric, Simon Johnson, Daniel Kaufmann, and Pablo Zoido-Lobaton, "Dodging the grabbing hand: the determinants of unofficial activity in 69 countries," *Journal of public economics*, 2000, *76* (3), 459–493. 2

Funkhouser, Edward, "The urban informal sector in Central America: Household survey evidence," *World development*, 1996, *24* (11), 1737–1751. 4

Gerard, François and Gustavo Gonzaga, "Informal labor and the efficiency cost of social programs: Evidence from unemployment insurance in brazil," *American Economic Journal: Economic Policy*, 2021, *13* (3), 167–206. 4, 9

Gong, Xiaodong and Arthur Van Soest, "Wage differentials and mobility in the urban labour market: a panel data analysis for Mexico," *Labour economics*, 2002, *9* (4), 513–529. 4

Gonzaga, Gustavo, William F Maloney, and Alejandra Mizala, "Labor turnover and labor legislation in brazil [with comments]," *Economia*, 2003, *4* (1), 165–222. 4

Guner, Nezih and Alessandro Ruggieri, "Misallocation and inequality," 2022. 4

Guvenen, Fatih, Luigi Pistaferri, and Giovanni L. Violante, "Global trends in income inequality and income dynamics: New insights from GRID," *Quantitative Economics*, 2022, *13* (4), 1321–1360. 2

Hahn, Joyce K, Henry R Hyatt, and Hubert P Janicki, "Job ladders and growth in earnings, hours, and wages," *European Economic Review*, 2021, *133*, 103654. 1, 4

Haltiwanger, John, Henry Hyatt, and Erika McEntarfer, "Who Moves Up the Job Ladder?," *Journal of Labor Economics*, 2018, *36* (S1), S301–S336. 1, 4

— **, Ron S. Jarmin, and Javier Miranda**, "Who Creates Jobs? Small versus Large versus Young," *The Review of Economics and Statistics*, 05 2013, *95* (2), 347–361. 27

— **, Stefano Scarpetta, and Helena Schweiger**, "Cross country differences in job reallocation: The role of industry, firm size and regulations," *Labour Economics*, 2014, *26*, 11–25. 4

Imbert, Clément and Gabriel Ulyssea, "Rural migrants and urban informality: Evidence from brazil," *Econometrica*, 2026. 4

Johnson, Simon, Daniel Kaufmann, and Pablo Zoido-Lobaton, "Regulatory discretion and the unofficial economy," *The American economic review*, 1998, *88* (2), 387–392. 2

Jovanovic, Boyan, "Job matching and the theory of turnover," *Journal of political economy*, 1979, *87* (5, Part 1), 972–990. 3, 12

Lagakos, David, Benjamin Moll, Tommaso Porzio, Nancy Qian, and Todd Schoellman, "Life Cycle Wage Growth across Countries," *Journal of Political Economy*, 2018, *126* (2), 797–849. 3, 11

Loayza, Norman A., "The economics of informal sector: A simple model and some empirical evidence from Latin America," *Carnegie Rochester Series in Public Economics*, 1996, *45*, 129–162. 2, 4

Maloney, W.F., "Does informality imply segmentation in urban labor markets? Evidence from sectoral transitions in Mexico," *World Bank Economic Review*, 1999, *13* (2), 275–302. 13

Maloney, William F, "Does informality imply segmentation in urban labor markets? Evidence from sectoral transitions in Mexico," *The World Bank Economic Review*, 1999, *13* (2), 275–302. 4

_ , "Informality revisited," *World development*, 2004, *32* (7), 1159–1178. 4, 13

Meghir, Costas, Renata Narita, and Jean-Marc Robin, "Wages and informality in developing countries," *American Economic Review*, 2015, *105* (4), 1509–1546. 4

Perry, G., W. Maloney, O. Arias, P. Fajnzylber, A. Mason, and J. Saavedra-Chanduvi, *Informality: Exit or exclusion*, The World Bank. Washington, D.C., 2007. 4

Porta, Rafael La and Andrei Shleifer, "Informality and Development," *Journal of Economic Perspectives*, September 2014, *28* (3), 109–26. 1

Poschke, Markus, "Wage employment, unemployment and self-employment across countries," *Journal of Monetary Economics*, 2025, *149*, 103684. 4

Rud, Juan Pablo and Ija Trapeznikova, "Job Creation and Wages in Least Developed Countries: Evidence from Sub-Saharan Africa," *The Economic Journal*, 2020, *131* (635), 1331–1364. 4

Topel, Robert H and Michael P Ward, "Job mobility and the careers of young men," *The Quarterly Journal of Economics*, 1992, *107* (2), 439–479. 1, 3, 4, 12

Ulyssea, Gabriel, "Regulation of entry, labor market institutions and the informal sector," *Journal of Development Economics*, 2010, *91* (1), 87–99. 4

_ , "Informality: Causes and consequences for development," *Annual Review of Economics*, 2020, *12* (1), 525–546. 1, 13

World Bank, "World Development Indicators," `https://data.worldbank.org/` 2025. Accessed: November 3, 2025. 6, 23

Online Appendix: Not for Publication

This online appendix is structured as follows: Appendix A provides more information on the data, Appendix B shows robustness tests for our main results, Appendix C presents graphs complementing our analysis of changes in workforce and industrial composition, and Appendix D shows additional results on life-cycle wage growth and fluidity.

A Data Appendix

This section details the construction of the analysis samples, the harmonization of the EE data across the eight countries, and the specific data preparation procedures utilized for both the cross-country and within-country analyses.

A.1 Coverage of Formal Employment

Across all eight countries in our sample, formal employment is defined as salaried workers covered by the social security system, and is drawn from employer-employee (EE) administrative records. We define formal employment to include only salaried workers, excluding self-employed individuals and independent contractors. The EE data encompass formal salaried workers in both the private and public sectors for all countries except Thailand, where public sector workers are not included.

A.2 Sample Construction for Cross-Country Analysis

For each country, we divide the available data into non-overlapping four-year periods, with the specific calendar years varying by country based on data availability. Within each period, we construct a monthly panel restricted to individuals between 18 and 49 years old. Age information is available for all countries except for Kenya, for which the restriction is not applied.[16] The panel is organized at the year-month-employer-employee level, retaining a single job per individual per month. When an individual holds multiple jobs in a given month, we identify the primary job using the following sequential rule: we first retain the job with the longest tenure; if a tie remains, we retain the highest-paying job; if a tie still remains, we retain the job that appears most frequently within the calendar year; if a tie persists, we select randomly. For countries where tenure is not directly observed, we proxy it by computing the number of months the individual remains with a given employer within the four-year period.

For each individual, we then compute the number of distinct jobs held and the total number of months spent in formal employment over the period. These measures are finally averaged across individuals to obtain period-level estimates for each country.

[16] Therefore, the numerator in equation (1) includes formal workers of all ages for Kenya, while the denominator retains the working-age population. Table B.2 shows robustness to alternative denominator definitions.

A.3 Sample Construction for Within-Country Analysis

We use the Brazilian and Colombian EE data for the within-country analyses, constructing samples at the region level for each country separately. In Brazil, we exclude the Federal District, where the formal sector is dominated by public servants whose wages follow a distinct seniority-based progression. The analysis covers the remaining 26 states: Acre, Alagoas, Amapá, Amazonas, Bahia, Ceará, Espírito Santo, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Pará, Paraíba, Paraná, Pernambuco, Piauí, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, Rondônia, Roraima, Santa Catarina, São Paulo, Sergipe, and Tocantins. In Colombia, we exclude nine departments that are highly rural and where the small formal sector consists primarily of public servants. The analysis covers the remaining 23 departments: Antioquia, Atlántico, Bogotá D.C., Bolívar, Boyacá, Caldas, Caquetá, Cauca, Cesar, Chocó, Córdoba, Huila, La Guajira, Magdalena, Meta, Nariño, Norte de Santander, Quindío, Risaralda, Santander, Sucre, Tolima, and Valle del Cauca.

The within-country cross-region analyses presented in Section 2 mirror the cross-country sample construction described in Appendix A.2, replacing country-period units with region-period units. For each country, we divide the data into non-overlapping four-year periods (1994–2017 for Brazil; 2010–2021 for Colombia) and, within each period, construct a monthly panel of individuals between 18 and 49 years old. The panel is organized at the year-month-employer-employee level, retaining a single job per individual per month using the same sequential rule as in the cross-country sample. For each individual, we then compute the number of distinct jobs held and the total number of months spent in formal employment over the period, and average these measures across individuals to obtain region-period estimates.

The life-cycle wage growth analyses presented in Section 3 use a different sample. We construct an individual-level longitudinal panel for each country separately, keeping one observation per individual per year across all available years. For Brazil, we use December as the reference month, as wages recorded in December are the most precise. We identify all individuals who appear at least once in December between 1994 and 2017 with a formal job, at least one month of tenure in that year, and age between 18 and 49, and we track their formal employment history in every December across all available years. For Colombia, we follow an analogous procedure using September as the reference month for the same reason. We identify all individuals formally employed at least once between 2010 and 2021 and aged between 18 and 49, and track their formal employment history in every September across all available years. In both countries, a job change is defined as a change of employer between two consecutive reference-month observations.

A.4 GDP per capita

We proxy levels of economic development by (log) GDP per capita for the relevant period. For the cross-country analysis, GDP per capita is measured in constant 2015 USD using data from the World Bank Open Data (World Bank, 2025). For the within-country analysis, regional GDP per capita data for Brazil and Colombia are from IBGE (Instituto Brasileiro de Geografia e Estatística) and DANE (Departamento Administrativo Nacional de Estadística), respectively. IBGE reports state-level GDP in 2010 BRL, which we convert to 2015 BRL. DANE reports GDP in 2015 COP. All figures are then converted to 2015 USD using the 2015 exchange rate.

Table A.1: Summary Statistics

Country	GDP per Capita (thousand)	Population (thousand)	EE Data Source	Year	Avg # Employee (thousand)	Avg # Employer (thousand)	LF Data Source	Note
Brazil	7,648	184,215	RAIS	1994-2017	23,552	2,038	PNAD	PNAD in September
Chile	13,404	18,154	AFC	2011-2023	3,615	570	ENE	
Colombia	5,997	47,647	PILA	2010-2021	7,925	1,207	GEIH	
Ecuador	5,659	15,430	IESS	2006-2017	2,549	348	ENEMDU	ENEMDU quarterly
Kenya	1,599	50,706	PAYE	2017-2020	2,528	49	KPHC	KPHC in 2019
South Africa	6,150	56,773	PAYE	2010-2021	9,709	250	LFS	LFS in 3rd quarter
Thailand	5,243	68,796	SSO	2002-2021	8,163	319	NSO	
Uruguay	12,005	3,285	BPS	1997-2013	473	64	ECH	

Note: This table provides summary statistics for the data we use. GDP per capita is measured in thousands of 2015 USD and represents the average across the available years of the linked employer-employee (EE) data source. GDP per capita and population are from the World Bank Database. The average number of employees is computed across the years from the EE data for individuals aged between 18 and 49, except for Kenya where we average across all individuals. Administrative EE data abbreviations are RAIS (Relação Anual de Informações Sociais), AFC (Administradora de Fondos de Cesantía), PILA (Planilla Integrada de Liquidación de Aportes), IESS (Instituto Ecuatoriano de Seguridad Social), PAYE (Pay As You Earn), SSO (Social Security Office), and BPS (Banco de Previsión Social). Labor force suvey data abbreviations are PNAD (Pesquisa Nacional por Amostra de Domicílios), ENE (Encuesta Nacional de Empleo), GEIH (Gran Encuesta Integrada de Hogares), ENEMDU (Encuesta Nacional de Empleo, Desempleo y Subempleo), KPHC (Kenya Population and Housing Census), LFS (Labor Force Survey), NSO (National Statistical Office), and ECH (Encuesta Continua de Hogares). This table is discussed in Section 1.

B Robustness Tests

Table B.1: Robustness to the Choice of Time Window

Outcome	Baseline (4-year)	3-year	6-year
Formality rate	0.179	0.180	0.182
	(0.013)	(0.013)	(0.013)
Extensive margin	0.304	0.281	0.448
	(0.015)	(0.017)	(0.027)
Intensive margin	0.013	-0.007	0.001
	(0.014)	(0.013)	(0.010)
Average number of job	0.316	0.251	0.328
	(0.033)	(0.028)	(0.036)
Time per job	-3.190	-2.576	-2.983
	(0.476)	(0.408)	(0.515)
Time between job	-3.153	-1.544	-5.407
	(0.617)	(0.394)	(0.743)

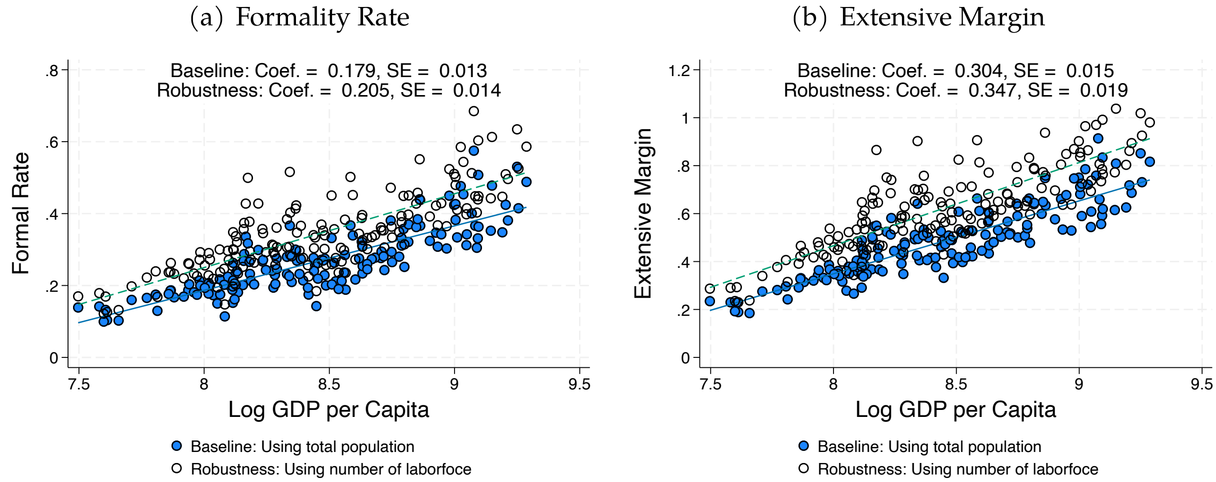
Note: This table examines the robustness of the results in Figures 1 and 2 to varying the length of the time period used to construct the statistics, using the administrative EE and survey data from Brazil. Reported values are the correlations between the outcome and log GDP per capita. Standard errors are clustered at the region level and are in parentheses. This table is discussed in Section 2.1.

Table B.2: Robustness to Alternative Denominator for Kenya

	Baseline (Ages 15–49)	Alternative (Ages 15–64)	Alternative (Ages 18—49)	Alternative (Ages 18–64)
Formality Rate	0.086	0.076	0.100	0.087
Extensive Margin	0.140	0.123	0.163	0.141

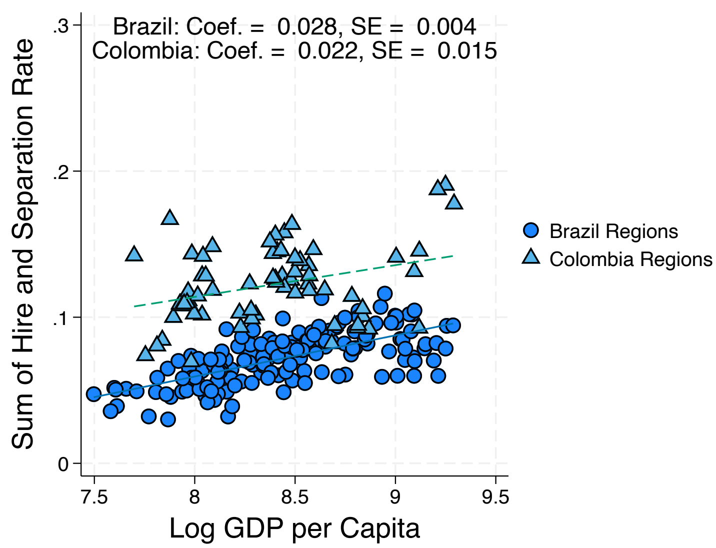
Note: This table presents the robustness of the formality rate and extensive margin for Kenya to different survey denominators. In the baseline, both measures use the Kenyan survey population aged 15–49 as the denominator. The alternative version expands this denominator to the population aged 15–64. In all cases, the numerator includes formal workers of all ages, as age information is unavailable in the Kenyan EE data. This table is discussed in Section 2.1.

Figure B.1: Robustness to Using Labor Force as Denominator for the Formality Rate



Note: This figure examines the robustness of our results regarding the gradient of the formality rate and its extensive margin rate with log GDP per capita, to the choice of denominator for the computation of formality rates. We use the administrative EE and survey data from Brazil and consider the correlations across region-period observations within Brazil. The baseline specification (blue circles) uses the total population aged 18–49, while the robustness specification (hollow circles) uses the number of individuals in the labor force (employed or seeking employment) aged 18–49 as denominator in the formality rate. This figure is discussed in Section 2.1.

Figure B.2: Robustness to an Alternative Measure of Labor Market Flows

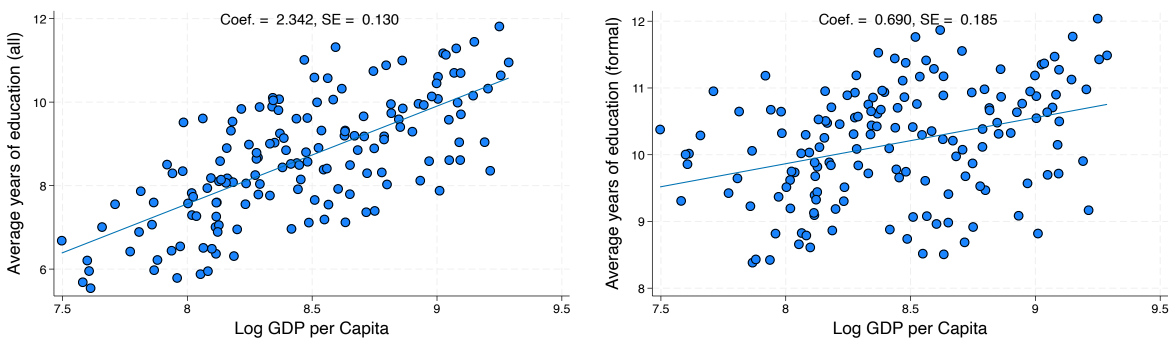


Note: This figure examines the robustness of our results regarding the gradient of formal labor market flows with GDP per capita, to using a firm-level measure of labor market flows. We use the administrative EE data from Brazil and Colombia, and consider the correlations across region-period observations within both countries. Following Haltiwanger et al. (2013), we construct firm-level hiring and separation rates as $h_{it} = H_{it}/X_{it}$ and $s_{it} = S_{it}/X_{it}$, where H_{it} and S_{it} are the average monthly number of hires and separations for a firm in year t, and $X_{it} = 0.5 \cdot (E_{it} + E_{it-1})$ is the two-year average of the firm's monthly employment. We aggregate these firm-level rates to the region-year level using X_{it} as the employment weight, and then average across years within each period. The figure plots the resulting region-period rates against log GDP per capita. This figure is discussed in Section 2.2.

C The Role of Workforce and Industrial Composition

Figure C.1: Education Levels and Development

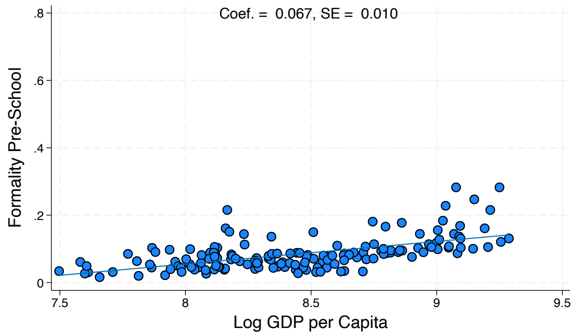
(a) Working-age population (b) Formal workers



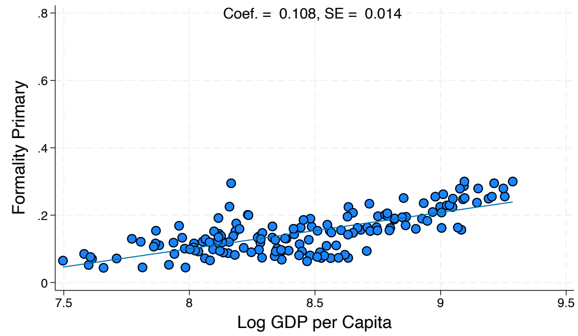
Note: This figure shows the relationship between years of education and log GDP per capita, averaged across region-period observations, using Brazilian survey data. Panels (a) and (b) consider all working-age individuals and only formal workers, respectively. Standard errors are clustered at the region level. This figure is discussed in Section 2.3.

Figure C.2: Formality Rate by Education Levels and Development

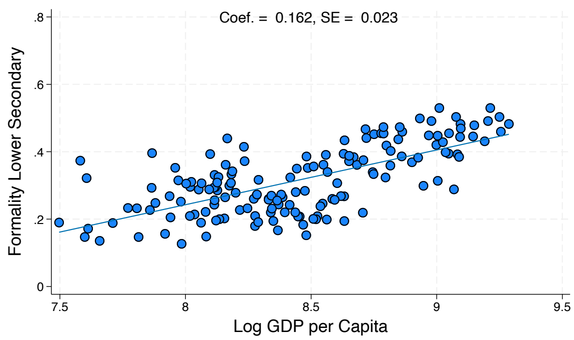
(a) Pre-School



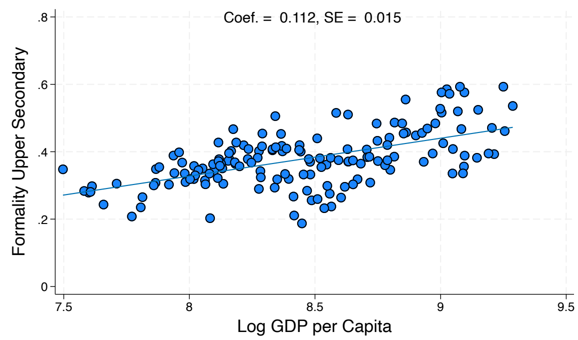
(b) Primary Education



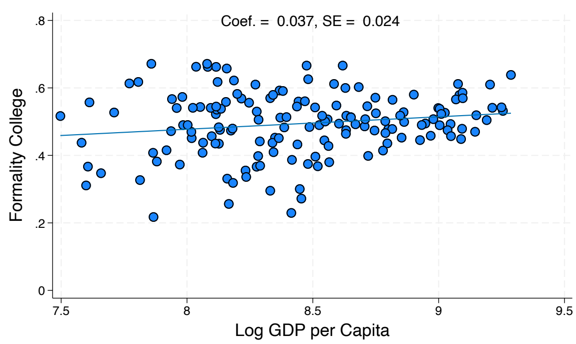
(c) Lower Secondary Education



(d) Upper Secondary Education



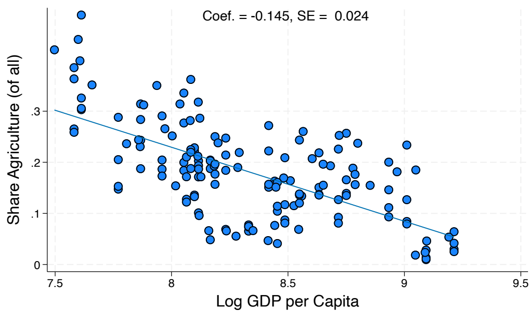
(e) College Education



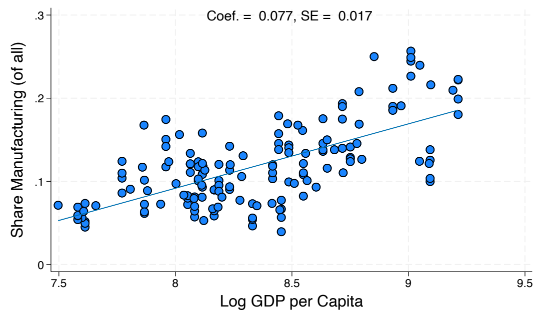
Note: This figure shows the relationship between formality rates and log GDP per capita, averaged across region-period observations, using Brazilian administrative EE and survey data. Panels (a)–(e) consider this relationship separately for five education categories. Standard errors are clustered at the region level. This figure is discussed in Section 2.3.

Figure C.3: Employment Share Across Industries and Development

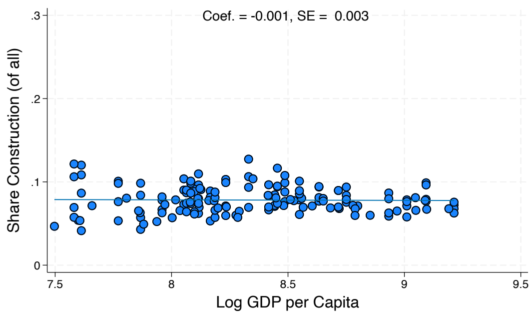
(a) Agriculture



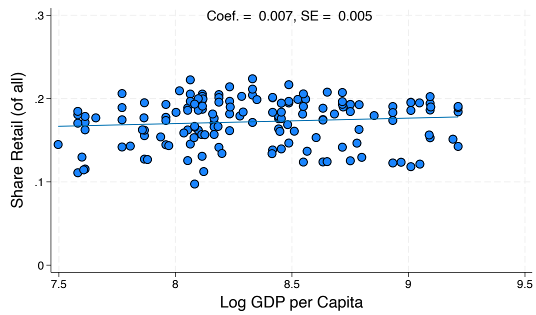
(b) Manufacturing



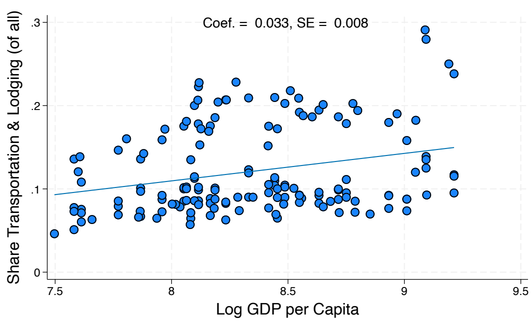
(c) Construction



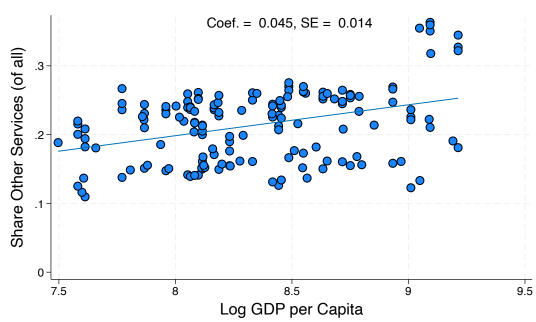
(d) Retail



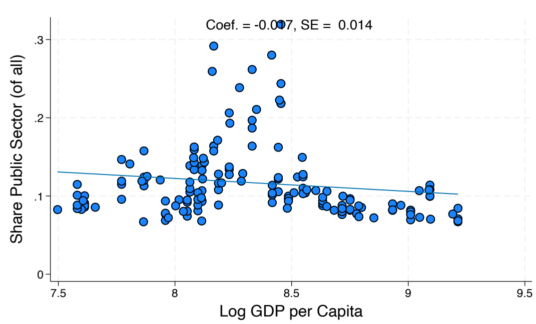
(e) Transportation, Lodging, Food



(f) Other Services



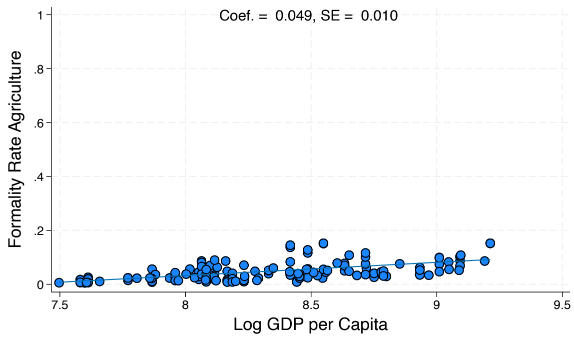
(g) Public Sector



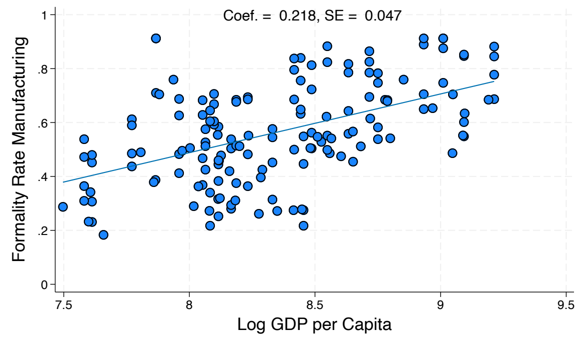
Note: This figure shows the relationship between employment shares and log GDP per capita, averaged across region-period observations, using Brazilian survey data. Employment shares are defined as the number of individuals aged 18–49 employed in an industry (regardless of formality status) divided by the total population in that age group. Panels (a)–(g) consider this relationship separately for seven industry categories. Standard errors are clustered at the region level. This figure is discussed in Section 2.3.

Figure C.4: Formality Rate Across Industries and Development

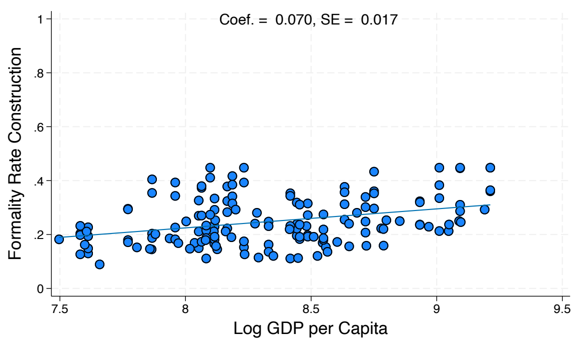
(a) Agriculture



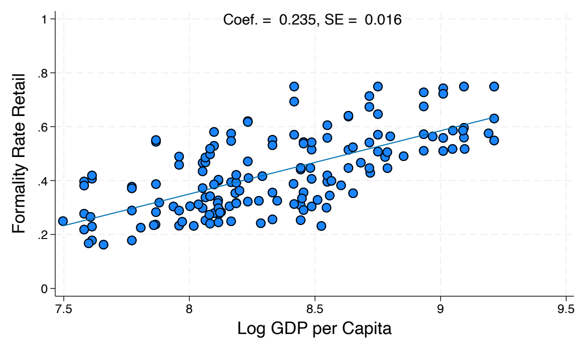
(b) Manufacturing



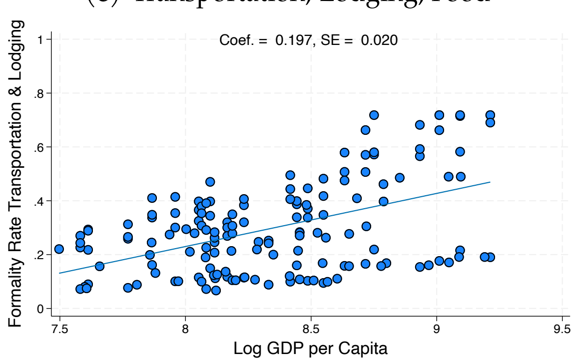
(c) Construction



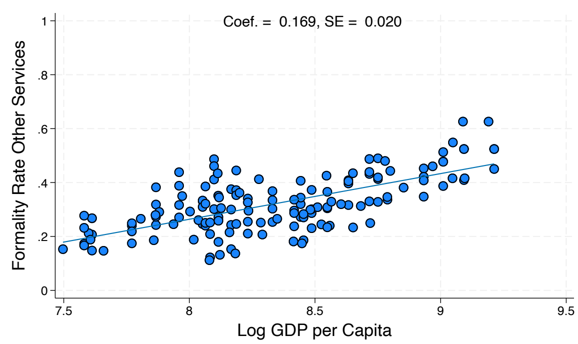
(d) Retail



(e) Transportation, Lodging, Food



(f) Other Services

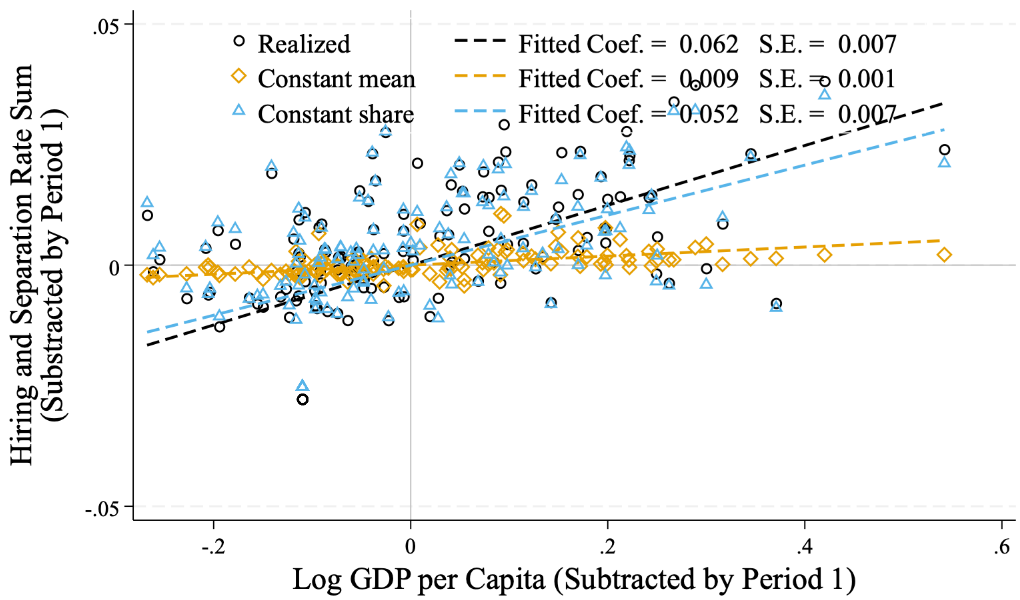


Note: This figure shows the relationship between formality rates and log GDP per capita, averaged across region-period observations within Brazil. Panels (a)–(f) consider this relationship separately for six industry categories (public-sector employees are formal by definition). The formality rate is defined as the number of formally employed individuals aged 18–49 (from administrative EE data) divided by the total number of workers in the same age range and industry (from survey data). Standard errors are clustered at the region level. This figure is discussed in Section 2.3.

Figure C.5: Formal Employment Share Across Industries and Development

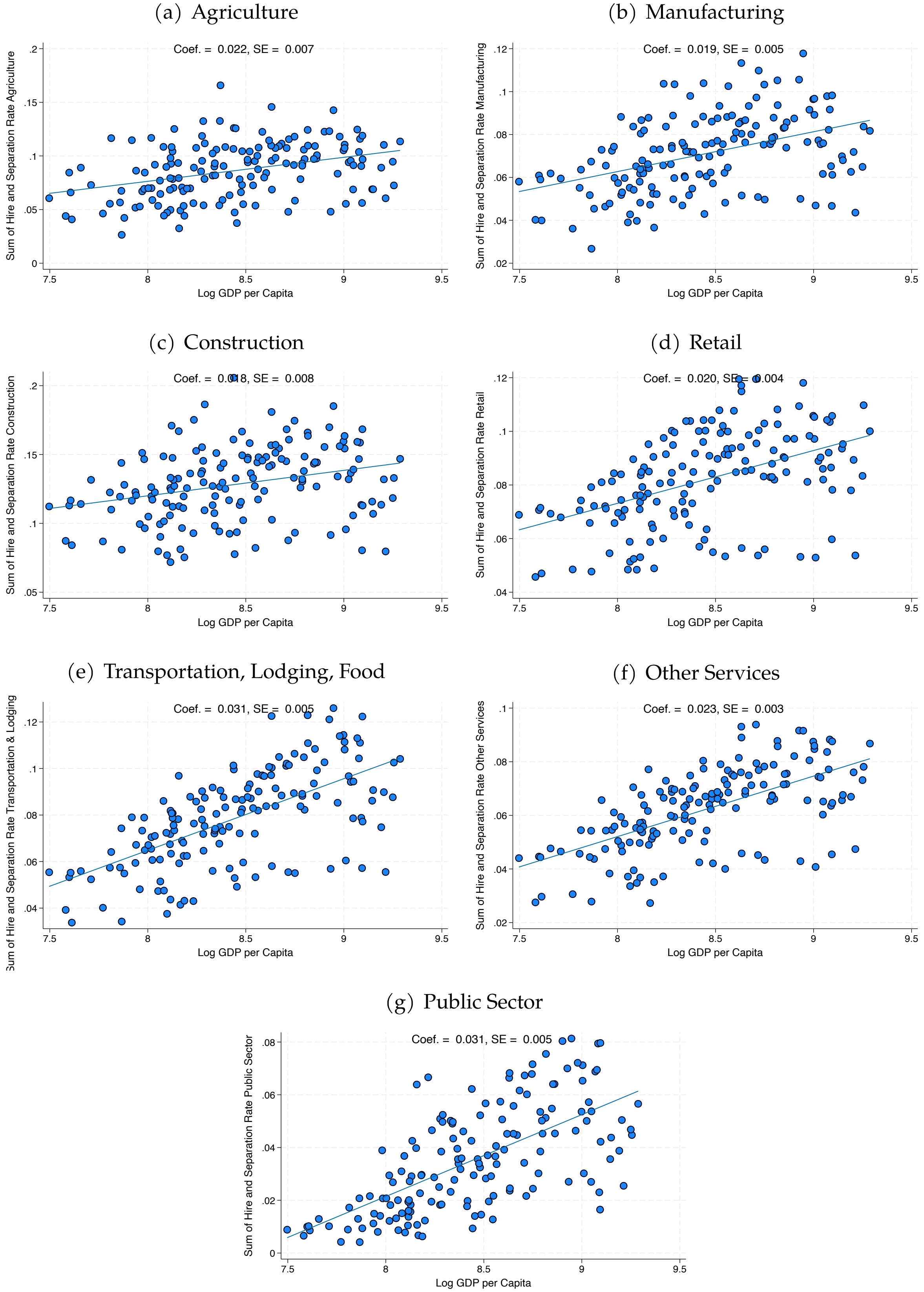
Note: This figure shows the relationship between *formal* employment shares and log GDP per capita, averaged across region-period observations, using Brazilian administrative EE data. Panels (a)–(g) consider this relationship separately for seven industry categories. The formal employment share is defined as the number of formally employed individuals aged 18–49 in an industry divided by the total number of individuals in that age range within the administrative EE data. Standard errors are clustered at the region level. This figure is discussed in Section 2.3.

Figure C.6: The Role of Industrial Composition for the Sum of Hiring and Separation Rates



Note: Analogous to Figure 3, this figure presents an Oaxaca-Blinder decomposition of the changes in the firm-level measure of labor market flows presented in Figure B.2 relative to the first period (p_0), using the Brazilian administrative EE data. We use the same seven industry categories as in Figure C.3. The "constant-mean" component captures changes predicted solely by shifts in industrial composition (changing weights ω, as in equation (5)). The "constant-share" component captures changes holding industrial composition fixed (changing outcomes y, as in equation (6)). This figure is discussed in Section 2.3.

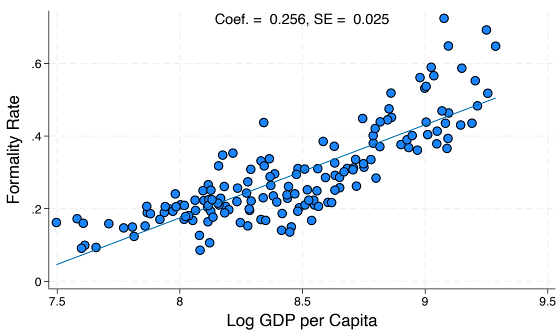
Figure C.7: Sum of Hiring and Separation Rates Across Industries and Development



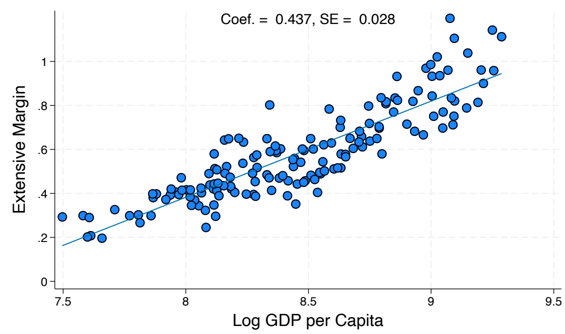
Note: This figure shows the relationship between the firm-level measure of labor market flows presented in Figure B.2 and log GDP per capita, averaged across region-period observations, using Brazilian administrative EE data. Panels (a)–(g) consider this relationship separately for seven industry categories. Standard errors are clustered at the region level. This figure is discussed in Section 2.3.

Figure C.8: Formal Labor Market Flows and Development (Private Sector Only)

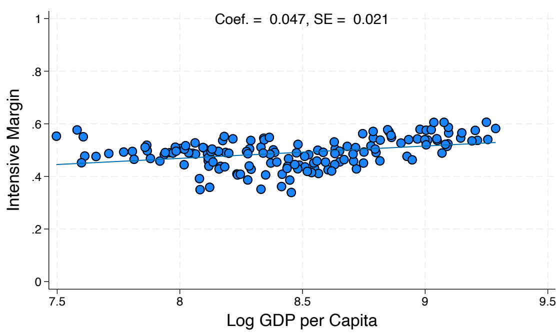
(a) Overall Formality Rate



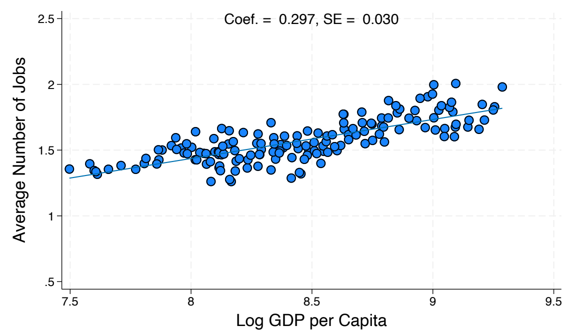
(b) Extensive Margin Formality Rate



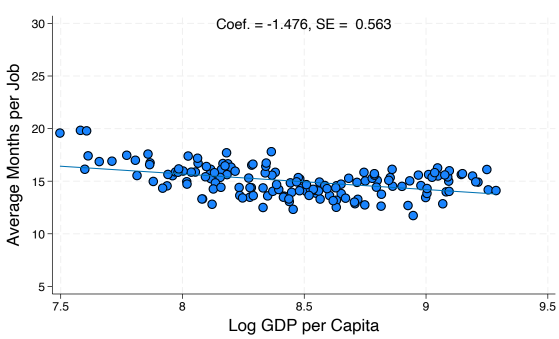
(c) Intensive Margin Formality Rate



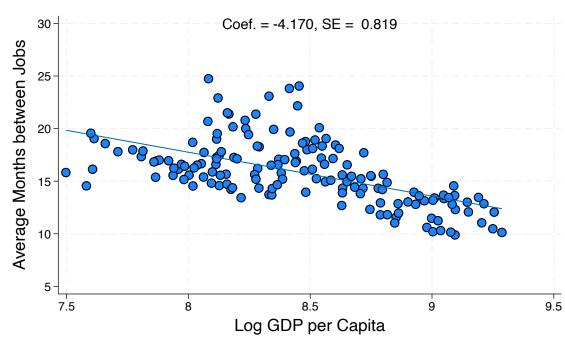
(d) Average Number of Jobs



(e) Average Time per Job



(f) Average Time Between Jobs

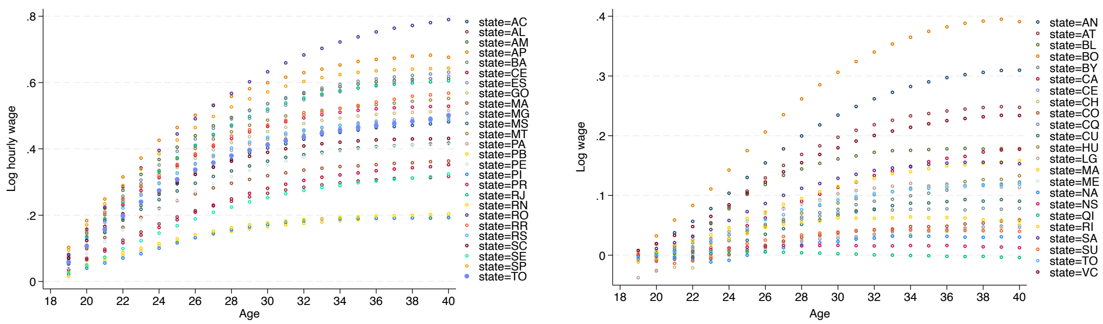


Note: This figure examines the robustness of the results in Figure 1 and 2 excluding public-sector employees in Brazilian administrative EE data. Standard errors are clustered at the region level. This figure is discussed in Section 2.3.

D Additional Results on Wage Growth and Fluidity

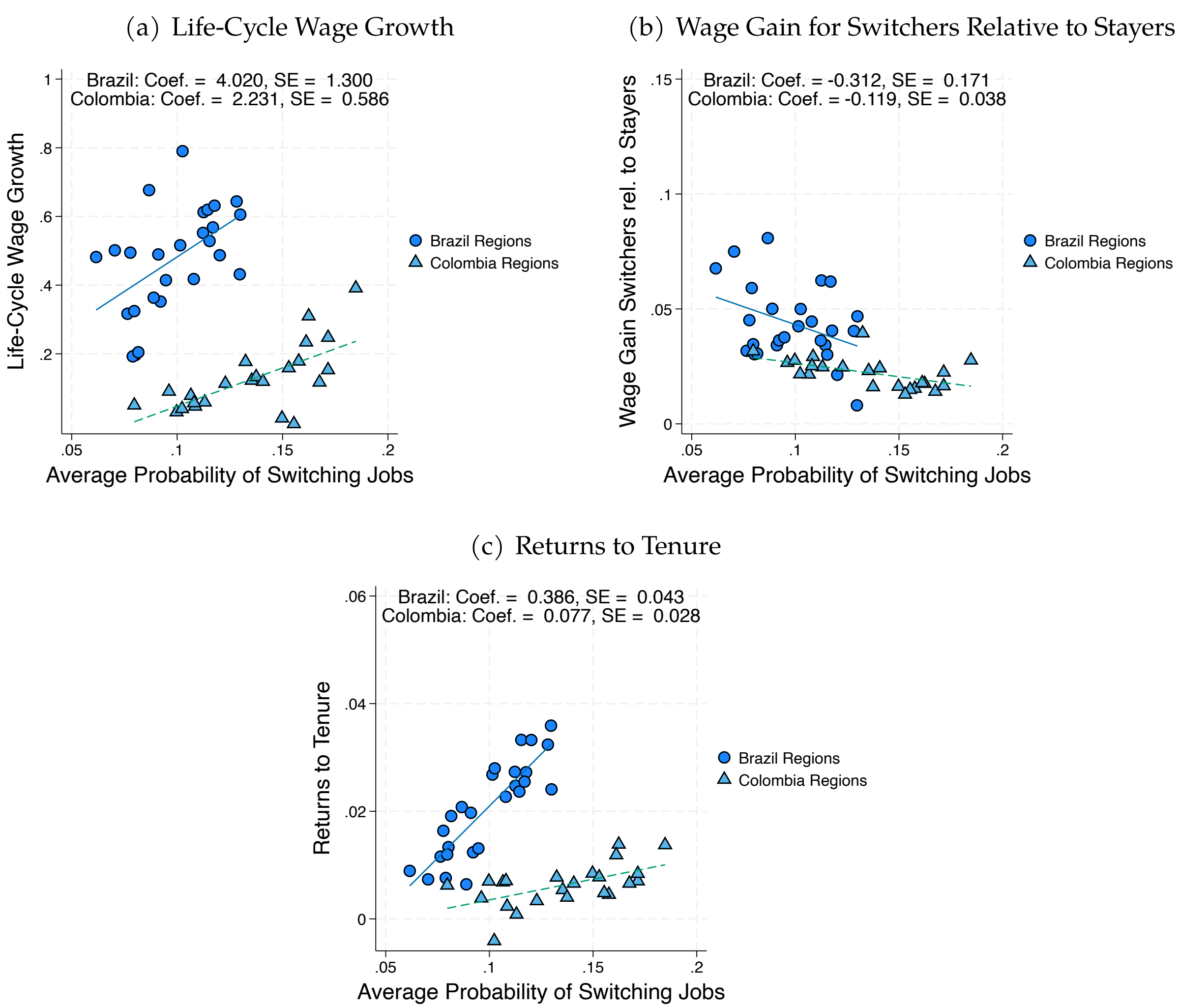
Figure D.1: Formal Life-Cycle Wage Growth Over the Life Cycle

(a) Coefficient estimates for Brazil (b) Coefficient estimates for Colombia



Note: This figure displays the estimated age coefficients from equation (7) by region, using administrative EE data from Brazil and Colombia. This figure is discussed in Section 3.

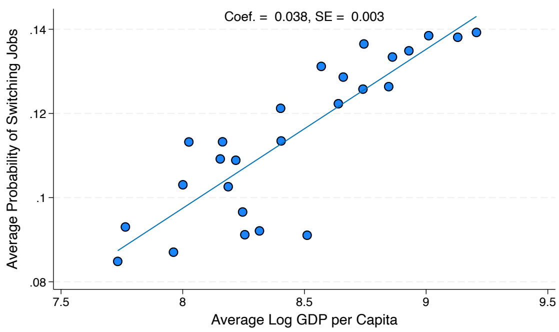
Figure D.2: Formal Life-Cycle Wage Growth and Labor Market Fluidity



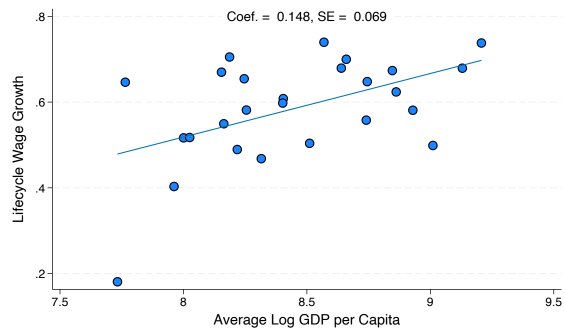
Note: This figure shows the relationships between the same outcomes as in Panels (b), (e), and (f) of Figure 4 and the labor market fluidity measure presented in that same figure, using administrative EE data from Brazil and Colombia. Standard errors are clustered at the region level. This figure is discussed in Section 3.

Figure D.3: Formal Labor Market Fluidity, Life-Cycle Wage Growth and Development (Private Sector Only)

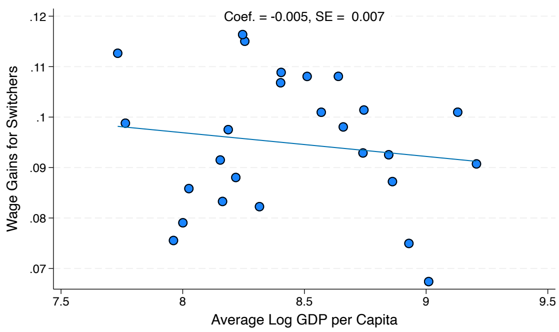
(a) Labor Market Fluidity



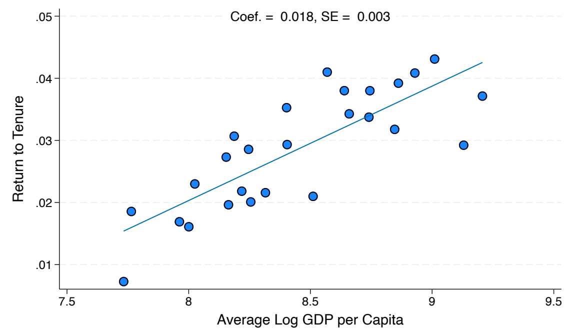
(b) Life-Cycle Wage Growth



(c) Wage Gain for Switchers Relative to Stayers



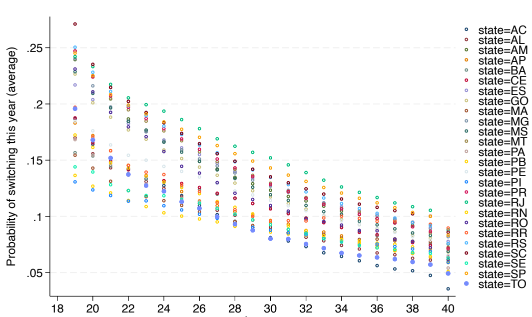
(d) Returns to Tenure



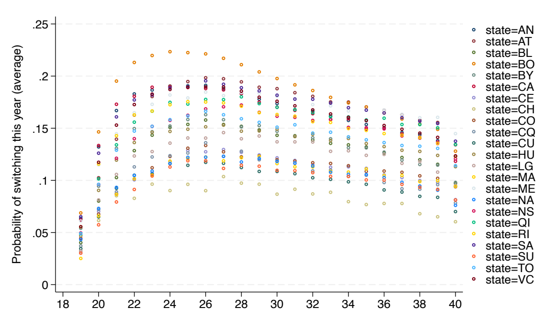
Note: This figure is analogous to Panels (a), (b), (e), and (f) of Figure 4, excluding public-sector employees from the Brazilian EE data. Standard errors are clustered at the region level. This figure is discussed in Section 3.

Figure D.4: Formal Labor Market Fluidity Over the Life Cycle

(a) Brazil

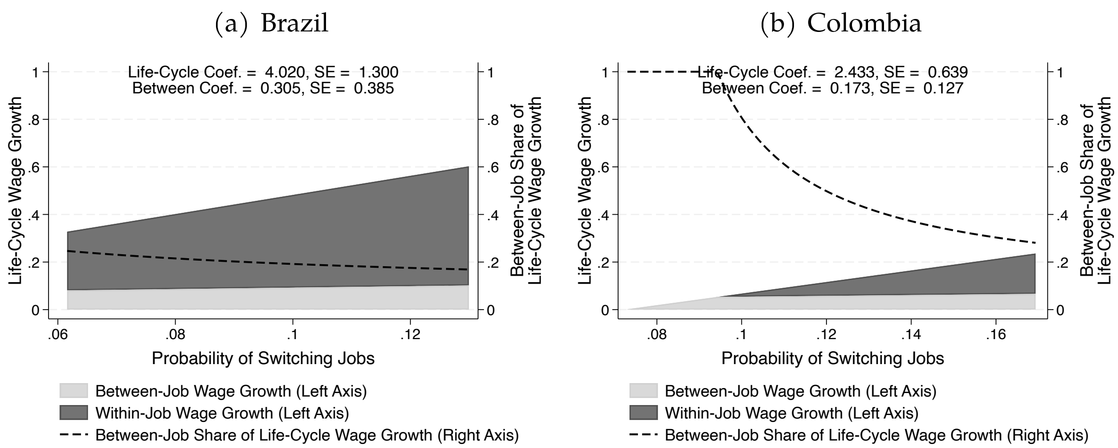


(b) Colombia



Note: This figure displays the formal labor market fluidity measure presented in Figure 4 by age bin for each region within Brazil and Colombia, using administrative EE data. This figure is discussed in Section 3.

Figure D.5: Components of Formal Life-Cycle Wage Growth and Labor Market Fluidity



Note: This figure shows the relationships between the same outcomes as in Figure 5 and the labor market fluidity measure presented in Figure 4, using Brazilian and Colombian administrative EE data in Panels (a) and (b), respectively. For each region, we compute the between-job component as the product of three terms: the average wage gain of job switchers relative to stayers, the annual job-switching rate, and the length of the working life (40 minus 18 years). The within-job component is obtained residually as the difference between total life-cycle wage growth and the between-job component. In each panel, the upper boundary of the light grey area is the fitted line from a regression of the between-job component on labor market fluidity, and the upper boundary of the dark grey area is the fitted line from a regression of total life-cycle wage growth on labor market fluidity. The light and dark grey areas thus represent the between- and within-job components, respectively. The dashed line represents the share of the between-job component relative to the total life-cycle wage growth. In each panel, the y-axes on the left- and right-hand sides apply to the level of the two components and the share of the between-job component, respectively. Reported coefficients indicate the slope of each component with respect to labor market fluidity. Standard errors are clustered at the region level. This figure is discussed in Section 3.