Policy Research Working Paper 10928

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WORLD BANK GROUP
South Asia Region
Office of the Chief Economist
September 2024

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Abstract

Analyses of GDP per capita differences across countries focus almost exclusively on differences in productivity. This paper shows that there are also large differences in medium-run dynamics in the employment-to-population ratio. The paper finds a general tendency for productivity growth to be negatively correlated with changes in the employment to population ratio for a large sample of EMDEs—a phenomenon described using the term jobless development in this paper. The paper also shows that there are large differences in the steady state levels of the employment to population ratios that countries are converging to. There are also countries that experience substantial increases in their employment-to-population ratio during the development process. Using a two-stage procedure, the paper studies this issue in a large sample of EMDEs. In the first stage, the paper estimates differences in steady-state employment ratios across countries. In the second stage, it documents which institutional and policy factors are correlated with steady-state employment ratios. The paper finds particularly large differences across countries in steady-state employment ratios for women. Fewer legal protections of women's rights are associated with lower steady-state employment ratios for women, without an offsetting positive effect for men.

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Jobless Development*

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Originally published in the Policy Research Working Paper Series on *September 2024*.
This version is updated on *April 2025*.
To obtain the originally published version, please email prwp@worldbank.org.

JEL-codes: J11; J16; J21; F66; O41; O47

Key words: employment; emerging and developing countries; structural transformation; female labor force participation.

* We would like to thank Nina Arnhold; Margaret Arnold; Najy Benhassine; Ximena Del Carpio; Patricia Fernandes; Isis Gaddis; Jon Jellema; Nandini Krishnan; Robin Mearns; Gaurav Nayyar; Anna O'Donnell; Nethra Palaniswamy; Lokendra Phadera; Martin Raiser; and Javier Sanchez-Reaza for their helpful comments. The findings, interpretations and conclusions expressed in this paper are those of the authors and should not be attributed to the World Bank, its Executive Directors, or the countries they represent.

1. Introduction

Changes in GDP per capita are the most common metric used to track a country's overall development. Because GDP per capita is the product of GDP per worker and the employment-to-population ratio, changes in GDP per capita reflect changes in both productivity and the employment-to-population ratio. In particular, changes in the employment-to-population ratio over the medium run can either dampen or amplify the effects of productivity growth.

We coin the term *jobless development* to describe countries that experience decreases in their employment-to-population ratio during a period of productivity growth. While a large literature has studied the dynamics of productivity growth for emerging market and developing economies (EMDEs), the dynamics of the employment-to-population ratio for these countries have received very little attention. In this paper we address this gap in the literature by studying employment-to-population ratio dynamics among EMDEs in the post-1990 period.[1]

One reason for the lack of attention devoted to labor market outcomes in the context of macroeconomic development is the fact that the employment-to-population ratio is largely uncorrelated with the level of development in a broad cross-section of countries. This has led researchers to abstract from considering it as an important factor. But this near-zero correlation does not imply that differences in labor market outcomes are small; on the contrary, these differences are large in many cases and our analysis focuses on these differences.

The examples of South Korea and India serve to motivate our analysis. Both South Korea and India have experienced sustained periods of rapid growth as measured by increases in GDP per capita. In South Korea this period covered 1965-1987, when GDP per capita increased by 170 log points. In India, it covers 1990-2018 when GDP per capita increased by 130 log points. In both countries, periods of rapid growth in GDP per capita were also periods of rapid growth in productivity---GDP per worker rose by 140 log points in both countries.

However, South Korea's and India's development differs in one important respect. Figure 1 displays the time series of the log ratio of employment to the working age population (hereafter EWAP) for South Korea and India since 1960. Whereas South Korea's period of rapid growth coincided with a large increase in EWAP, India's period of rapid growth was associated with a large decrease in EWAP. This difference is quantitatively important: EWAP was 24 log points higher in India than South Korea in 1960, but as of 2019 it is 28 log points lower—a reversal of 52 log points. If one takes 2 percent as a standard value for "normal" annual growth in real GDP per capita, this reversal amounts to 26 years of growth.

[1] Several previous studies have estimated the correlates of employment growth in large cross-sections of countries (Crivelli, Furceri, and Toujas-Bernaté 2012; Kapsos 2005). See the meta-analysis in World Bank (2024).

Our perspective on EWAP dynamics in EMDEs is motivated by the literature on structural change. A key dynamic among EMDEs is the movement of economic activity out of agriculture and into non-agriculture. Labor markets in these two sectors have very different operating features: agricultural labor markets are dominated by self-employment in low-density rural areas, whereas non-agricultural labor markets are dominated by formal or informal employment in higher-density urban areas. Additionally, many policy and institutional differences are likely to have very different effects on labor markets in these two sectors. For these reasons, the process of structural change will plausibly give rise to dynamics in aggregate labor market outcomes, as activity switches from largely self-employment in rural areas to formal or informal employment in urban areas. Long-run labor market outcomes will thus reflect the steady state outcomes in the non-agricultural sector.

Our methodology for studying EWAP dynamics draws heavily on the growth literature that studies convergence patterns in cross-country panel data sets. Specifically, following the literature on conditional convergence, we include country fixed effects in our convergence regressions to allow for the possibility that each country is converging to its own steady-state level of EWAP. When implementing this procedure, we also control for two time-varying driving forces: productivity and population.

Our analysis of EWAP dynamics proceeds in two steps. The first step runs convergence regressions for EWAP. A by-product of this first step are country-specific steady-state values for the EWAP. In the second step, we examine the correlation between these steady-state levels and various indicators.

Our first step delivers three key results. First, while there are many countries with very similar steady-state EWAP levels, there are many countries with steady-state EWAP levels that display large deviations from the mean. Second, higher population growth is associated with significantly lower EWAP. Third, higher productivity growth is also associated with significantly lower EWAP. This third finding suggests that EMDEs may face a tradeoff between employment and productivity. This would be the case if these countries tend to have many individuals employed in low-productivity activities, as eliminating these jobs would increase productivity growth via composition effects.

Our second step identifies several factors that display significant correlations with long run levels of EWAP. These include greater openness to international trade; more efficient labor, land, and product markets; larger firm size; and better education outcomes. We emphasize that these results only reflect correlations and so do not necessarily imply causation. But we think these correlations are informative as a first step in thinking about the potential effects of various policies.

Our benchmark results are for the aggregate level of EWAP. We also repeat our analysis for EWAP levels by gender. We find that differences in steady-state EWAP levels for women are much more substantial than differences for men.

In this paper, we deliberately focus on the aggregate quantity of employment, assuming that employment is a policy goal in its own right. Individuals value jobs for the earnings, as well as for their contributions to self-esteem and happiness and jobs influence living standards and social cohesion (World Bank 2013). Switching jobs, especially into non-agriculture, is one of the most commonly used forms of climate adaptation by households. The quality of employment in terms of its various characteristics—labor productivity, labor income shares, wage rates, or contractual arrangements—is no less critical for the development process but is well-covered in the literature and beyond the scope of this paper.

Our paper is related to two literatures. Several papers have estimated the correlates of employment growth in large cross-sections of countries (Crivelli, Furceri, and Toujas-Bernaté 2012; Kapsos 2005). World Bank (2024) summarizes estimates of the elasticity of employment with respect to output growth from this body of literature. Relative to this literature, we have two key contributions. First, a key distinguishing feature of our analysis is that we examine changes in employment ratios, rather than employment growth. This is critical because many EMDEs have rapidly growing working-age populations, and it is difficult to interpret a given level of employment growth without controlling for population growth. Second, our analysis focuses on long run outcomes, whereas the above mentioned papers often focus on short run effects.

A second strand of literature uses the World Bank's Enterprise Surveys to study firm-level employment, often in specific countries. (See, for example, Aga and Francis 2015; Ayyagari, Demirgüç-Kunt, and Maksimovic 2011; Khan 2023). Relative to this literature, our key contribution is to use these Surveys to link long run aggregate employment outcomes to firm-level constraints. Ours is the first analysis of the extent to which government regulations on labor, land, finance, and trade help or hinder the absorption of a growing working-age population into employment in EMDEs.

The remainder of the paper is organized as follows. Section 2 documents the data and methodology. Section 3 summarizes patterns in steady-state EWAPs and the effect of productivity and population growth. Section 4 shows the correlates of these steady-state EWAPs. Section 5 concludes and discusses the policy implications.

2. Methodology and data

2.1 Conceptual framework

Economy-wide employment can be thought of as the equilibrium outcome of labor supply by households that need to earn income to consume and labor demand by firms that need labor as an input into production. The natural starting point for thinking about dynamics in aggregate productivity and employment is the one-sector growth model. One limitation of this framework for understanding dynamics in developing economies is that it abstracts from the process of structural transformation, which is another key dynamic process that potentially impacts both labor supply and labor demand. Herrendorf, Rogerson, and Valentinyi (2014) model a stylized economy with three sectors—agriculture, industry, and services—that together produce aggregate output Y. For our purposes it is sufficient to consider an economy with two sectors: agriculture (a) and non-agriculture (n). Each sector j uses a Cobb-Douglas function technology to produce output Y_j (sold at the price p_j) using labor L_j and other inputs K_j (including intermediate goods) with technology A_j:

$$Y_j = A_j K_j^{\alpha} L_j^{1-\alpha}$$

Aggregate output (and income) is then given by:

$$Y = p_a Y_a + p_n Y_n$$

This framework should be seen as a simple benchmark. One can generalize it along several dimensions: to allow for differences in factor intensity across sectors, richer patterns of substitution between factors, non-neutral forms of technical change, and multiple types of labor.

As in a one-sector model, increases in overall productivity in this framework will raise wages and income, and affect overall demand and supply of labor. But this framework also features additional

channels. In particular, changes in relative productivity across sectors will induce changes in relative prices across sectors and influence relative demand across sectors. Changes in overall productivity that induce changes in income, may also influence relative demand across sectors if income effects differ across sectors.

A key implication of these models is that the process of development is associated with a secular reallocation of labor out of the agriculture sector into the non-agricultural sectors, driven by the forces just mentioned. It follows that the long-run labor market equilibrium that an economy converges toward reflects outcomes in the non-agricultural sector.

Importantly, and from a practical perspective, the nature of labor supply and demand may vary across sectors. Individuals living in rural areas may have different levels of labor supply across sectors, and firms in different sectors may demand different types of workers. If this is the case, then the dynamics of structural transformation will potentially influence the dynamics of equilibrium in the labor market.

It is also plausible to think that the effect of various institutions and regulations have differential impact on both the demand and supply of labor across sectors. Regulations that disproportionately affect large establishments will likely have very different effects in agricultural versus non-agriculture. Policies that increase the cost of capital or access to credit will have differential impact across sectors if sectors differ in the importance of capital or credit. The implication of this observation is that the dynamics of labor market equilibrium may vary across countries with different labor market institutions. Moreover, the overall impact of a particular institution or regulation may differ along the development path: institutions that negatively affect labor demand in the non-agricultural sector will have a smaller aggregate impact in an economy in which almost everyone works in agriculture. A large body of research shows the effect on labor market equilibrium of such factors as labor market policies, institutions (societal norms, both formal, such as laws, and informal, such as traditions), and regulations on labor market equilibrium (Duval and Loungani 2019; McKenzie 2017; Nickell and Layard 1999).

The above framework models production at the sectoral level. It is likely relevant to also study production at a more granular level, as the overall level of labor demand within a given sector may also be influenced by policies that distort the demand for labor across individual firms. (Hsieh and Klenow 2009; 2014). That is, the productivity terms in the sectoral production functions may themselves be functions of the institutional and regulatory environment.

This conceptual framework has much in common with that used to study the dynamics of GDP per capita across countries (Barro and Sala-i-Martin 1992; Kremer, Willis, and You 2022; Patel, Sandefur, and Subramanian 2021). Like the framework used here, this literature views each country as having its own steady-state level, dictated by country-specific factors that reflect policies and institutions and allow for a dynamic process of convergence.

2.2 Methodology

To discern the relationship between EWAPs and their correlates, while remaining agnostic about causality, we conduct a two-stage exercise. In the first stage, we estimate fixed-effects panel regressions of the changes in EWAPs on lagged levels, controlling for other factors, to recover the long-run steady-state EWAP for each country. In the second stage, we estimate linear regressions of these steady-state EWAPs on policy variables that have been shown to correlate with employment generation in the literature. The analysis is conducted at different levels of

aggregation: for the whole economy, for men and women separately, for agriculture and non-agriculture separately and for women in non-agriculture.

2.2.1 First stage: Panel regression

We estimate a panel regression of the year-over-year changes in EWAPs. The main purpose of this analysis is to identify the steady-state EWAP that each country is converging towards. For this purpose, we control for labor productivity growth and working-age population growth, time and country fixed effects.

The baseline panel regression is as follows:

$$EWAP_{c,t} - EWAP_{c,t-1} = \alpha + \beta_1 \Delta Prod_{c,t} + \beta_2 \Delta WAP_{c,t} + \beta_3 EWAP_{c,t-1} + d_t + d_c + \varepsilon_{c,t} \qquad (1)$$

where the dependent variable is the change in country *c*'s EWAP (in percentage points) between the years *t-1* and *t*; $\Delta Prod_{c,t}$ is country *c*'s overall labor productivity growth (in percent) from *t-1* to *t*; $\Delta WAP_{c,t}$ is country *c*'s working-age population growth (in percent) over the same period; $EWAP_{c,t-1}$ is country c's EWAP (in percent) in year *t-1*; year dummies (d_t) control for common shocks over time, such as global recessions; and country fixed effects (d_c) capture country characteristics that do not change over time.

As noted previously, we estimate (1) for measures of EWAP at different levels of aggregation, considering both sector and gender. In the analysis by gender, gender-specific working-age population growth is used. In the analysis by sector, two sectors are considered: agriculture and non-agriculture. The linear analysis here does not separate industry and services because the literature has documented a nonlinear relationship for industry, a complexity that goes beyond the scope of the analysis here (Herrendorf, Rogerson, and Valentinyi 2014; Rodrik 2016; Timmer, de Vries, and de Vries 2015).

2.2.2 First stage: Country fixed effects

As noted earlier, our specification shares much in common with the literature on convergence properties for GDP per capita.[2] Without country fixed effects, the coefficient β_3 on lagged EWAP captures the extent of *unconditional convergence*, that is, the steady-state EWAP to which all countries converge. When country fixed effects are included as in (1), β_3 together with the country fixed effects d_c capture the presence and speed of *conditional convergence*, where each country is allowed to converge to a different steady-state EWAP. This parallels the discussion of convergence in GDP per capita in Barro and Sala-i-Martin (1992) and Durlauf, Johnson, and Temple (2005).

In the literature on convergence in output per worker, the growth of output per worker in a country is related to its distance from the steady-state level of output per worker. If all countries have the same steady state, then this "unconditional convergence" can be described by the following expression:

$$\log y_{it+1} - \log y_{it} = a + b\,(\log y_{it} - \log y^*),$$

[2] See, for example, Barro and Sala-i-Martin (1992), Kremer, Willis, and You (2022), and Patel, Sandefur, and Subramanian (2021).

where y_{it} is country i's output per worker, and y^* is a common steady state level for all countries. Since y^* is a constant, $b \times \log y^*$ can be combined into the constant term. This modification motivates running the following regression:

$$\log y_{it+1} - \log y_{it} = c + b \times \log y_{it}.$$

In the "conditional convergence" literature (for example, Barro and Sala-i-Martin 1992; 2003; Mankiw, Romer, and Weil 1992), each country i has its own steady state value y_i^*. The equation that captures the relationship between growth and steady state becomes:

$$\log y_{it+1} - \log y_{it} = a + b (\log y_{it} - \log y_i^*).$$

The value $b \times \log y_i^*$ is now a country-specific constant, which motivates the fixed effects regression:

$$\log y_{it+1} - \log y_{it} = c_i + b \times \log y_{it},$$

where the variation in steady-state levels across countries is embedded in the fixed effects c_i. These fixed effects imply differences in growth rates conditional on current levels, but they also capture differences in the steady-state output per worker to which each country is converging.

Returning to our regression specification (1), we can apply the same interpretation. Specifically, the country fixed effects d_c divided by the coefficient on the lagged EWAP β_3 are the deviation of each country c's steady-state EWAP from the sample average, after controlling for labor productivity and working-age population growth.

2.2.3 Second stage: Cross-country regression

In the second stage, we investigate how these country fixed effects are correlated with features of the economic environment and policies that have been associated with higher employment in the literature. Specifically, we estimate the following cross-country regression:

$$d_c = \gamma X_c + \eta_c \qquad (2)$$

where X_c is a policy variable that the literature has found to be correlated with faster employment growth, and hence could be correlated with higher steady-state EWAPs in our setup. The regression uses the average of each policy variable over 2000–2019, capturing the long-term average of these variables. Because many of the policy variables are correlated with each other, the regression is run separately for each variable. Our goal with this exercise is simply to determine which variables display statistically significant correlations with steady state employment. We believe this information is a useful input into future work that seeks to isolate the causal factors behind the differences in steady-state employment levels.

These policy variables serve as proxies for factors related to labor demand (such as trade, access to finance, and policies that directly affect firms) and labor supply (such as education and gender-biased policies). Effectively, this second-stage regression estimates the long-run correlates of steady state EWAPs.

A large body of research studies the effect on labor market equilibrium of such factors as labor market policies, institutions (societal norms, both formal, such as laws, and informal, such as traditions), and regulations on labor market equilibrium (Duval and Loungani 2019; McKenzie 2017; Nickell and Layard 1999). An important distinction between these studies and our procedure is that these studies focus on contemporaneous relationships between labor market policies and labor market outcomes, implicitly assuming that current outcomes reflect the steady-state effects of labor market policies. Our approach allows for the reality that the early stages of the

development process involve a large reallocation of activity from the agricultural sector to the non-agricultural sector, and that the nature of labor supply and demand may vary across sectors. Individuals living in rural areas may have different levels of labor supply across sectors, and firms in different sectors may demand different types of workers. If this is the case, then the dynamics of structural transformation will potentially influence the dynamics of equilibrium in the labor market.

It is also plausible to think that the effect of various institutions and regulations have differential impacts on both the demand and supply of labor across sectors. Regulations that disproportionately affect large establishments will likely have very different effects in agricultural versus non-agriculture. Policies that increase the cost of capital or access to credit will have differential impact across sectors if sectors differ in the importance of capital or credit. The implication of this observation is that the dynamics of labor market equilibrium may vary across countries with different labor market institutions. Moreover, the overall impact of a particular institution or regulation may differ along the development path: institutions that negatively affect labor demand in the non-agricultural sector will have a smaller aggregate impact in an economy in which almost everyone works in agriculture.

2.3 Data

The dataset includes 160 countries over 1960–2019. However, the baseline sample focuses on 103 EMDEs that are not small states for 2000–19, a period in which there is good data coverage for most EMDEs and which excludes the outlier years during the COVID-19 pandemic.

The main data sources include the World Bank's *World Development Indicators* (WDI) database, the International Labour Organization (ILO)'s *ILOSTAT* database, and the *Penn World Tables*.

Data for employment comes from the *Penn World Tables*, and includes both formal and informal (including subsistence) forms of work.[3] The data for baseline real output are from the World Bank's *Global Economic Prospects* database, supplemented with data from WDI for earlier years, spliced by sector using WDI's sectoral gross value-added data. Productivity is calculated as the ratio of real output to the number of workers.

Total and working-age population come from WDI. The working-age population is defined as the number of people aged 15–64 years. Data on employment, real output, and population spans 1960–2022 for 145 EMDEs. However, the analysis focuses on developments since 2000 because of limited data availability of policy variables for earlier years.

Data for the policy variables come from WDI, the World Bank's *Women, Business and the Law* database, the International Monetary Fund's *Financial Access Survey*, the World Bank's *Enterprise Survey*s, Bento and Restuccia (2021), and the Fraser Institute's *Economic Freedom of the World* (EFW) database.

3. First-stage regression results: Steady-state employment ratios

The first-stage regression results in Table 1 provide clear evidence that EWAPs in EMDEs converge toward country-specific steady-state levels. The baseline regression results also suggest that slower productivity growth and faster working-age population growth have been associated with significantly faster increases in EWAPs in EMDEs. This is the case for aggregate EWAPs

[3] For Nepal, adjusted employment data is drawn from Ruppert Bulmer, Shrestha, and Marshalian (2020), which also includes subsistence employment, consistent with the baseline employment measure.

(Column I) as well as EWAPs for women (Column II), men (Column III), non-agriculture (Column IV) and agriculture (Column V).

3.1 Correlates of annual changes in employment ratios

Higher productivity growth has been associated with slower increases in the EWAP, even controlling for working-age population growth. The coefficient estimates of Column I imply that, among country-year pairs in the top quartile of productivity growth, the aggregate EWAP decreased by 0.2 percentage points per year whereas among those in the bottom quartile (with productivity losses) it rose by 0.4 percentage points per year—a difference of over 0.5 percentage points.

This result is suggestive of a potential trade-off between productivity growth and employment and motivates our use of the term *jobless development*. In an economy in which there is a distribution of productivities across workers (and/or jobs), removing low productivity workers from employment, holding all else constant, will both lower the employment-to-population ratio and increase productivity. This effect serves as a cautionary note when interpreting differences in productivity growth across countries. Put differently, productivity growth comparisons across countries should be mindful of potential differences in employment dynamics.

Faster working-age population growth has also been associated with slower increases in EWAPs as labor markets struggled to absorb large numbers of labor market entrants. Again, the coefficient estimates in Column I of Table 1 imply that, among the EMDEs in the bottom quartile of working-age population growth (that is, mostly those with working-age population declines), EWAPs on average rose by 1.5 percentage points per year. In those in the top quartile, they fell by 0.4 percentage points. This pattern was present across gender and sector but was somewhat stronger for men than for women, and stronger in non-agriculture than in agriculture.

Finally, higher initial EWAPs have been associated with significantly slower increases in the EWAP. This suggests conditional convergence of EWAPs toward a country-specific steady-state level. This was the case for both men and women and in both agriculture and non-agriculture.

3.2 Steady-state employment ratios

The fixed effects that result from this first-stage estimation account for about 40–50 percent of the explained variation in changes in EWAPs overall (42 percent), for non-agriculture (39 percent), and for women (52 percent).

For aggregate EWAPs, 28 EMDEs are converging towards steady-state ratios that are statistically significantly below the EMDE average, on average by 19 percentage points (Table 2). This group includes two-thirds of EMDEs in the Middle East and North Africa, almost one-half of the EMDEs in Europe and Central Asia, and one-quarter of the EMDEs in Sub-Saharan Africa (Figure 2). Conversely, 18 EMDEs are converging towards above-average aggregate EWAPs and almost half of these countries are in Sub-Saharan Africa.

Commodity-importing EMDEs as a group are particularly likely to have relatively low steady-steady EWAP levels: more than one-third of them are converging towards steady-state ratios that are statistically significantly below-average but less than one-tenth towards ratios that are statistically significantly above-average. In contrast, among commodity exporters, these shares are comparable.

Steady-state EWAPs are fairly homogeneous for men, but vary widely for women. Only 21 EMDEs have significantly above- or below-average EWAPs for men (and those are mostly in Sub-Saharan Africa)—less than half the number of EMDEs (59 EMDEs) with significant deviations from the same average for women's EWAPs. More than three-quarters of the EMDEs in the Middle East and North Africa and South Asia are converging to significantly below-average EWAPs for women (see also World Bank 2024). The deviation is considerable: it averages 34 and 19 percent of the female working-age population, respectively. In contrast, two-thirds of the EMDEs in East Asia and the Pacific are converging towards above-average steady-state EWAPs for women.

The *aggregate* steady-state EWAPs that deviate statistically significantly from the EMDE average reflect pockets of weakness in countries' labor markets.[4] In Sub-Saharan Africa, these deviations in aggregate steady-state EWAPs seem to be significantly correlated with deviations in agricultural steady-state EWAPs (Figure 3). A linear regression of the steady-state EWAPs in aggregate on the steady-state EWAP in agriculture or non-agriculture illustrates the correlation (Table 3). In the steady state, for every 1 percentage point higher *agricultural* EWAP, the *aggregate* EWAP is also higher by 0.67 percentage point (broadly in line with the share of agricultural employment of 75 percent during 2000-19). Meanwhile, higher non-agricultural EWAPs are not associated with higher aggregate EWAPs in Sub-Saharan Africa.

In other EMDEs, the opposite is the case: for every 1 percentage point higher *non-agricultural* steady-state EWAP, the *aggregate* steady-state EWAP is 0.72 percentage point higher—almost twice as much as might be expected arithmetically, based on the share of non-agricultural employment in this group of countries (39 percent during 2000-19). In EMDEs outside Sub-Saharan Africa, agricultural and aggregate steady-state EWAPs are much less closely linked than in Sub-Saharan Africa and also less closely linked than non-agricultural and aggregate ratios outside Sub-Saharan Africa.

For the vast majority of EMDEs (i.e., those outside Sub-Saharan Africa), this is consistent with the assumption that aggregate steady-state EWAPs are, in the long-run, determined by the non-agricultural sector. In the remainder of this paper, we therefore focus on the correlates of non-agricultural EWAPs.

3.3 Robustness

These regression results for the first stage are robust to using different samples. Table 4 compares the results between the baseline sample (Column I) and alternative samples, including: a sample of all countries including both advanced economies and EMDEs since 1960 (Column II), for all EMDEs including small states since 1960s (Column III), and for a trimmed sample of all EMDEs that excludes countries whose real output growth or EWAP growth is in the top or bottom 1 percent (Column IV).

In addition, some studies in the growth literature have used 10-year average changes instead of year-over-year changes as the dependent variable (e.g., Kremer, Willis, and You 2022). This alternative calculation would smooth out variations across years within the decade. Column V

[4] While there is a significant difference between the correlations of non-agricultural and agricultural steady-state employment ratios with aggregate ones, there is no material difference between correlation between men's and women's steady-state employment ratios and aggregate ratios.

reports the results using this alternative method where the dependent variable is the annual average change in EWAP during a decade (the 2000s and 2010s).

The baseline results are robust to these same changes: greater changes in EWAPs are statistically significantly correlated with slower productivity and working-age population growth and there is significant convergence towards country-specific steady-state EWAPs. The fixed effects generated by these alternative samples are highly correlated with those from the baseline regression, with a correlation coefficient above 0.96 between the baseline specification and the various specifications with EMDEs (Table 5).

It is well-known that women's labor force participation follows a U-shaped curve relative to the level of development (Bussolo et al. 2024; Goldin 1995). This has been attributed to the gradual labor market exit of women from agriculture, where most of them tend to be employed in low-productivity tasks at early stages of development. This U-shape makes the results from a linear regression potentially hard to interpret. For this reason, we include a robustness check in which we focus on women's non-agriculture EWAP (Column VII of Table 4)—to the extent that the U-shape in women's total employment is driven by the labor force exit of women previously in agriculture, the relationship between women's sectoral EWAP and level of development could be linear. In fact, Figure 4.B shows the linear relationship between women's steady-state non-agriculture EWAP and income per capita. When we carry out our analysis using women's non-agricultural EWAP the results are qualitatively similar to the baseline for women's total EWAP (Column VI). We conclude that our results are not an artifact of the U-shaped relationship between female EWAP and development.

4. Second-stage regression results: Correlates of steady-state employment ratios

The first-stage results suggest that some EMDEs are converging towards labor market equilibrium that diverge significantly from the average EMDE. The second-stage regressions examine the country features that may account for these deviations. The literature has suggested a large number of potential correlates of labor market outcomes, including employment.

We examine the relationship between each candidate factor and our steady-state EWAPs in a series of cross-country linear regressions. In each regression, the estimated fixed effect (from our first-stage regressions) is regressed on one of these correlates. Table 6 shows the coefficient estimates on each correlate from a series of linear regressions of the country fixed effects from the first-stage regressions in Table 1. As this table shows, few of these correlates seem to be associated with systematically higher *aggregate* EWAPs, but many are associated with systematically higher *non-agricultural* EWAPs.

4.1 Correlates identified in the literature

The literature offers several structural factors that could explain heterogeneity in steady-state EWAPs. These include greater trade openness to increase competitive pressures and boost aggregate demand; financing for infrastructure investment to broaden pools of labor and jobs by reducing transport cost; a relaxation of excessively restrictive labor laws to reduce the cost of hiring; more efficient land regulation to encourage firms' entry and job creation; and streamlined taxation to avoid penalizing firms' growth and employment. In this subsection, we provide a brief discussion of various factors that might plausibly affect steady-state employment levels and note previous empirical studies.

Openness to international trade and finance

Empirically, greater openness to international trade and related trade reforms have been shown to displace workers in the most directly affected firms, sectors, or regions. The impact on economy-wide employment, however, can be positive or negative, depending on country characteristics and circumstances.

There have been many empirical findings of localized employment losses resulting from trade. Increased imports from China have been associated with employment losses in the United States (D. H. Autor, Dorn, and Hanson 2013a; 2013b; 2016). Increased outsourcing of business services has also been associated with localized, but not necessarily aggregate, employment losses in the United States (Amiti and Wei 2005; Ebenstein et al. 2014). Larger numbers of applicants for trade adjustment assistance from the federal government have been associated with larger local employment losses in the United States (Kondo 2018). Tariff cuts and trade liberalization have been associated with employment losses in the most affected regions of Brazil, with displaced workers moving into informal employment (Dix-Carneiro and Kovak 2017; 2019). Trade liberalization in India has been associated with more job-rich growth in regions and industries with less restrictive labor regulations (Hasan, Mitra, and Ramaswamy 2007).

The evidence is mixed on whether increased openness to trade raised or lowered economy-wide employment. Trade reforms in Latin America in the 1980s and 1990s were followed by a period of slow employment growth, but this has been attributed to weak output growth rather than the trade reforms (Stallings and Peres 2000). Trade liberalization in East Asian EMDEs has been associated with increased employment, in part because of rapid growth in manufacturing (Ghose 2000). In a large sample of countries for 1991–2007, increased trade openness has been associated with higher EWAPs (Kamar, Bakardzhieva, and Goaied 2019).

In our regression, we use multiple measures of openness. We proxy openness to international trade and finance by total exports, goods exports, services exports as well as net inflows of foreign direct investment (FDI), all in percent of GDP and all from WDI.

Finance for investment and technologies

Greater access to finance can stimulate investment, which in turn can lead to productivity growth, firms' expansion, and employment growth. Investment, especially infrastructure investment, has often been associated with employment growth. Beyond its short-term, direct effects on construction employment, infrastructure investment can raise employment over the long term (Lakshmanan 2007; 2011). These growth-accelerating processes favor job creation.

- *Road* transportation infrastructure investment has been associated with local employment gains, including the construction of interstate highways in the United States (Jiwattanakulpaisarn et al. 2009; Sobieralski 2021) and municipal and national roads in Portugal (Pereira, Pereira, and Rodrigues 2021). However, highway infrastructure investment has also been associated with employment losses around existing transport networks (Jiwattanakulpaisarn et al. 2009).
- Results for *airport* infrastructure investment are more mixed, with uncertain and mixed employment gains found for regional airports in the United States (Bilotkach 2015; Cidell 2015) and Norway (Tveter 2017), but significant gains found for Italy (Percoco 2010) and Portugal (Pereira, Pereira, and Rodrigues 2021).
- *Rail* infrastructure investment has been associated with job creation. High-speed rail lines were accompanied by greater employment in Spain (Carbo et al. 2019; Pereira, Pereira,

and Rodrigues 2021) and China (Cheng, Loo, and Vickerman 2015). Public transit in the United States was accompanied by greater hiring in general or of minority workers (Holzer, Quigley, and Raphael 2003; Tyndall 2017).

A boost to public, private or foreign direct investment could also unlock the technological progress and productivity gains needed to fuel aggregate demand and create jobs. Similar to trade openness or liberalization, technological change has been associated with localized employment losses, yet it had mixed aggregate effects and effects in EMDEs.

Automation or robotization provides an example. In the United States, increased use of robots has been accompanied by employment declines in specific commuting zones and industries, but aggregate effects have been found to be mixed (Acemoglu and Restrepo 2018; 2020; D. Autor and Salomons 2018). A classification of the occupations at risk from new technologies yielded net employment gains in the United States (Vermeulen et al. 2018). The introduction of robots has not been associated with aggregate changes in hours worked in a broader group of countries in the Organisation for Economic Co-operation and Development, or with net employment losses in Germany (Dauth et al. 2017; Graetz and Michaels 2018). Few studies have examined the employment impact of new technologies in EMDEs, but those that have found either net employment losses (Carbonero, Ernst, and Weber 2020) or no strong evidence of employment changes (Maloney and Molina 2016).

An array of investment-related variables is used to capture the dynamism of investment and technology improvements. Gross capital formation and credit to the private sector—in percent of GDP—are used to proxy for total and private investment. Data is drawn from the WDI. Variables capturing access to finance are included to proxy for potential investment, including the number of commercial bank branches per 100,000 adults, log per capita outstanding loans and outstanding deposits in commercial banks, all from the International Monetary Fund's *Financial Access Survey*. Implicitly, this assumes that private credit and banking sector activities are used for purposes that correlate with job creation and predominantly in the private sector. This assumption may not hold if a large part of private credit is extended to state-owned enterprises or for other purposes than job creation.

Product and labor market flexibility

Labor laws allowing firms more flexibility can boost employment, especially in the formal sector. A review of the literature has documented the adverse effects of restrictive labor laws on employment (Betcherman 2015). Most (but not all) studies find that minimum wage legislation in EMDEs has been associated with modest but significant employment losses, especially in the formal sector and among low-wage workers. Studies on the employment impact of employment protection legislation typically find no significant impact. Active labor market programs—which seek to encourage hiring through job training, wage subsidies, and job search assistance—have not been shown to have any significant employment effects in EMDEs (McKenzie 2017).

For India, two labor-related policies have been most studied. First, the Industrial Disputes Act (IDA) provides employment protection to workers. The law has been found to increase labor market rigidity (Datta-Chaudhuri 1996); reduce employment and output, and increase temporary or contract labor (Besley and Burgess 2004; Dutta 2003; Hasan, Mehta, and Sundaram 2021; Ramaswamy 2003); and dampen the employment benefits of trade liberalization (Hasan, Mitra, and Ramaswamy 2007). Second, the National Rural Employment Guarantee Act (NREGA) program, the largest public works program in the world, provides guaranteed employment to rural workers at the state-defined minimum wage. The program has been found to crowd out private

sector work, increase private sector wages (Bahal 2022; Berg et al. 2018; Imbert and Papp 2015), and increase output, although unevenly across districts (Cook and Shah 2022). However, with regard to overall effects, Muralidharan, Niehaus, and Sukhtankar (2023) find that the program raised private employment, increased workers' reservation wages (the lowest wage that a worker will accept for a job), and boosted local demand.

Our proxies for product and labor market regulations are the product market policies index and the labor market regulation index from the Fraser Institute's *Economic Freedom of the World*. A higher product market policies score suggests greater flexibility in the product market, such as low costs of bureaucracy, low regulatory burdens, and low cost of tax compliance. A higher labor market score indicates more flexible labor market regulations, such as more flexible minimum wage regulations. The sub-indexes of the overall labor market score capture labor regulations and minimum wage policies, hiring and firing practices, flexibility in wage determination, regulation of working hours, costs associated with worker dismissal, and conscription. In our exercise here, we focus on the total labor market score and the labor regulation and minimum wage index.

Tax regimes

Higher taxes have been associated with lower EWAPs. Corporate tax increases have reduced employment in U.S. counties and tax cuts have raised employment if implemented during recessions (Ljungqvist and Smolyansky 2016). Labor taxes, including payroll taxes, have been associated with slower employment growth in the European Union (Dolenc and Laporšek 2010).

Many studies identify employment effects of tax changes on a wide range of affected groups, especially in advanced economies. In France, following the introduction of a differential payroll tax regime, payroll tax increases were associated with significantly lower employment among affected workers, whereas decreases had no significant effects (Kramarz and Philippon 2001). In the United Kingdom, a tax regime that favored self-employment in the construction industry was associated with significantly higher self-employment (Briscoe, Dainty, and Millett 2000). In Switzerland, employment was higher in cantons with lower corporate and personal income taxes (Feld and Kirchgässner 2003).

Given the low tax collection prevalent in most EMDEs, we emphasize the firm-side of factors related to tax regimes. These variables are proxied using data from the World Bank's *Enterprise Survey*, which asks firms whether tax rates or tax administration constitute a major constraint on their activities. The variable used here is the percent of firms that identified tax rates or tax administration as a major constraint.

Policy uncertainty

Political instability and corruption have been associated with weaker investment and weaker growth of firms, especially among mid-sized firms that often account for a large part of employment (Aterido, Hallward-Driemeier, and Pagés 2011; Batra and Stone 2008). We use two measures of policy uncertainty: political instability and corruption. Both measures are captured by the percent of firms citing the factor as major constraint in conducting business, as reflected in the World Bank's *Enterprise Survey*.

Land constraints

Inefficient input markets, such as for land, may also constrain firms' growth. Most research on land reforms has focused on the agricultural sector, where land redistribution, tenancy reforms, and consolidation have been shown to improve agricultural productivity, at least in some instances as seen in India (Banerjee, Gertler, and Ghatak 2002; Besley and Burgess 2000) and Ethiopia

(Chen, Restuccia, and Santaeulàlia-Llopis 2022). But the impact of higher agricultural productivity on economy-wide employment is ambiguous. Although increased agricultural productivity may reduce the need for agricultural employment, it may also expand opportunities in other sectors (such as food processing and transportation) and free up labor to work elsewhere (Deininger et al. 2014 for China; Do and Iyer 2008 for Vietnam). What happens to economy-wide EWAPs in the short term depends on how quickly demand and supply adjust in other sectors.

Rapid urbanization can be part of the process of structural transformation from agriculture to manufacturing and services. There is evidence that urbanization results in income and productivity gains, but employment gains are often modest and occur, at least initially, in the informal sector (Turok and McGranaham 2013). That said, agglomeration benefits such as economies of scale and lower transaction costs in urban centers can reduce the length of unemployment spells and facilitate quick reentry into employment (Annez and Buckley 2009).

The World Bank *Enterprise Survey* asks firms whether access to land constitutes a constraint on doing business. We include percent of firms that identified access to land as a major constraint.[5]

Establishment size

Larger firms hire more workers. But many factors can hold back firms' growth. Tax and regulatory policies are often size-dependent—that is, they affect larger firms more than smaller ones. Inefficient input markets, such as for land, capital, and labor, or uneven playing fields in product markets prevent firms from growing and slow firm entry. The heavier regulatory burden on larger firms can discourage firms' growth and promotes informal sector activity. Informal firms, which tend to be smaller, also tend to grow more slowly and this holds back aggregate employment and productivity growth (Ohnsorge and Yu 2022). Indeed, greater policy distortions have been associated with smaller firm size which, in turn, has been associated with slower aggregate employment growth (Bento and Restuccia 2021; Restuccia and Rogerson 2017). In cross-country studies, smaller establishment sizes have been associated with institutional features that discourage productive firms from hiring labor (Bento and Restuccia 2021; Hsieh and Klenow 2014).

We include the average establishment size for the services and manufacturing sectors among the correlates. The data is from Bento and Restuccia (2021).

Human capital

Human capital growth, including improvement in education, training, and health, plays an important role in the shift from agriculture to non-agriculture activities (Lee and Malin 2013; Porzio, Rossi, and Santangelo 2022). A workforce that has inadequate education, training and/or health care (hence, weak human capital) makes sectoral shifts more challenging. We include literacy rates, government spending on education as a percent of GDP, and the gender gap in secondary education attainment to capture a country's level of human capital. These data are drawn from the WDI.

Gender-related laws

Finally, laws that promote gender equality (in the workplace, in pay, and in marriage) can increase women's employment, while laws that protect women's mobility have been shown to increase women's willingness to travel for better work opportunities (Braunmiller et al. 2023a; 2023b; Roy

[5] We also tested for significant correlations with population density and the urban population share but found none.

2019). Such laws are proxied using various indices from the World Bank's *Women, Business and the Law* surveys (Hyland, Djankov, and Goldberg 2020).

4.2 Second-stage results for aggregate steady-state employment ratios

Table 6 shows the coefficient estimates on each correlate from a series of linear regressions of the country fixed effects from the first-stage regressions in Table 1. For these regressions, all correlates are country averages for 2000-19. Few of the correlates identified in the literature are significantly correlated with our estimated steady-state EWAPs for *aggregate* employment.

Policy uncertainty. We find, as expected, that greater political instability or corruption have been associated with significantly lower steady-state EWAPs. These effects appear to have been associated less with sectoral shifts and more with economy-wide employment losses, especially among women.

Tax regimes. The econometric analysis conducted here supports the earlier findings in the literature. Tax-related complaints by firms, including about tax rates and tax administration, have been associated with significantly lower steady-state EWAPs. These constraints manifested themselves in lower economy-wide EWAPs rather than as shifts of workers from one sector to another.

4.3 Second-stage results for non-agricultural steady-state employment ratios

In contrast to steady-state EWAPs for aggregate employment, those for non-agricultural employment account are correlated with many of the factors identified in the literature. Table 5 shows the estimate regression coefficients or these correlates.

Increased exports have also been associated with significantly higher steady-state EWAPs in non-agriculture. These differences have been not only statistically significant but also economically meaningful. EMDEs in the bottom quartile of export-to-GDP ratios have, on average, had lower steady-state non-agricultural EWAPs than those in the top quartile, by 11 percentage points.

Better access to finance—as proxied by the number of commercial bank branches per capita, the proportion of firms' working capital that is financed by banks, or the percent of firms citing access to finance as a major constraint—has been associated with a significantly higher steady-state EWAP in non-agriculture. Again, the differences are economically meaningful. Compared with EMDEs in the bottom quartile by number of commercial bank branches per capita, those in the top quartile have had, on average, 5 percentage points higher steady-state EWAPs in non-agriculture. Compared with EMDEs in the top quartile by the percent of firms reporting major constraints in access to finance, those in the bottom quartile have had, on average, 10 percentage points higher steady-state EWAPs in non-agriculture.

More flexible product and labor markets have been associated statistically significantly with higher non-agricultural EWAPs among EMDEs. The regression coefficients suggest that EMDEs in the top quartile of product or labor market flexibility have had 7-10 percentage points higher non-agricultural EWAPs than EMDEs in the bottom quartile.

Land constraints have been associated with lower steady-state EWAPs. The steady-state non-agricultural EWAP has been significantly lower in EMDEs where a larger share of firms reported major constraints in accessing land. Compared with the quartile of EMDEs in which firms most often cited access to land as a constraint to doing business, the average EMDE in the quartile with

the least firms' complaints has had almost 8 percentage points higher steady-state EWAPs in non-agricultural sectors.

Larger establishment sizes in non-agricultural sectors, regardless of whether in manufacturing or in services, have been associated with significantly higher steady-state non-agricultural EWAPs. The coefficient estimates suggest that, in the quartile of EMDEs with the largest average firm sizes in manufacturing or services, steady-state EWAPs in the non-agricultural sectors have been 5-8 percentage points higher.

Legal protection of women's rights. Our regressions include several indicators of stronger and more comprehensive legal protection of women's rights, such as rights to own assets, work or receive equal pay. The protection of women's rights for entrepreneurial activities has been associated with higher steady-state EWAPs economy-wide, as well as in non-agriculture, in line with findings by Chiplunkar and Goldberg (2023). On average, EMDEs in the top quartile in terms of legal protection of women's rights had 6–12 percentage points higher steady-state EWAPs for women than those in the bottom quartile. Meanwhile, these legal protections of women's rights have not had any significant impact on steady-state EWAPs for men—a concern often cited in this context (Bussolo et al. 2024)—or economy-wide.

Women in the non-agriculture sector. The regression results suggests that women's employment in non-agriculture has faced a dual challenge from the economic and institutional environment and gender-unequal laws. Similar to non-agricultural employment overall, women's EWAPs in non-agriculture sectors have been statistically significantly lower in countries with poorly functioning product, labor, land and financial markets; small firm sizes; burdensome tax regimes and policy uncertainty; lack of trade openness and access to finance; and lack of human capital. In addition, similar to women in all sectors, their EWAPs in the non-agriculture sector have been significantly lower in EMDEs with more unequal gender-related laws.

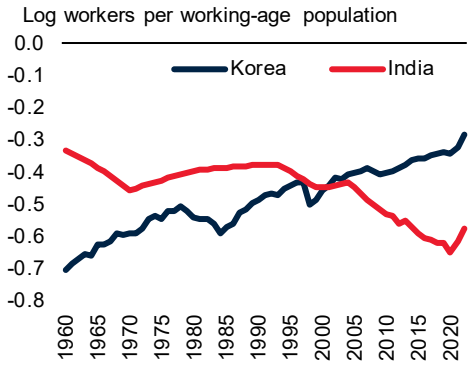
5. Conclusion and policy implications

In this paper, we study the dynamics of employment to population ratios for a large set of EMDEs over the period 1990-2019. We document a phenomenon that we label as *jobless development*: a general tendency for higher productivity growth to be accompanied by falling employment ratios over long periods of time. This phenomenon is surprisingly common and presents a missed opportunity for countries' long-term development. In part, a broken link in structural transformation appears to be at the root of jobless development: an agricultural sector that sheds unproductive workers, and a non-agricultural sector that struggles to absorb them. The phenomenon is associated with a number of policy weakness that obstruct factor reallocation and firm dynamism.

Also, we show that, after controlling for productivity growth, many EMDEs are converging towards steady-state aggregate EWAPs that differ widely from the EMDE average. Outside Sub-Saharan Africa, these differences are strongly correlated with differences in steady-state EWAPs in the non-agricultural sector. Lower steady-state EWAPs in the non-agricultural sector are associated with smaller firm size; lower trade openness and access to finance; less efficient labor, land, and product markets; and a less educated workforce are associated with lower non-agricultural EWAPs. Whereas steady-state EWAPs for men are fairly homogeneous across countries, those for women vary widely. Fewer legal protections of women's rights have been associated with lower steady-state EWAPs for women, without benefiting steady-state EWAPs for men.

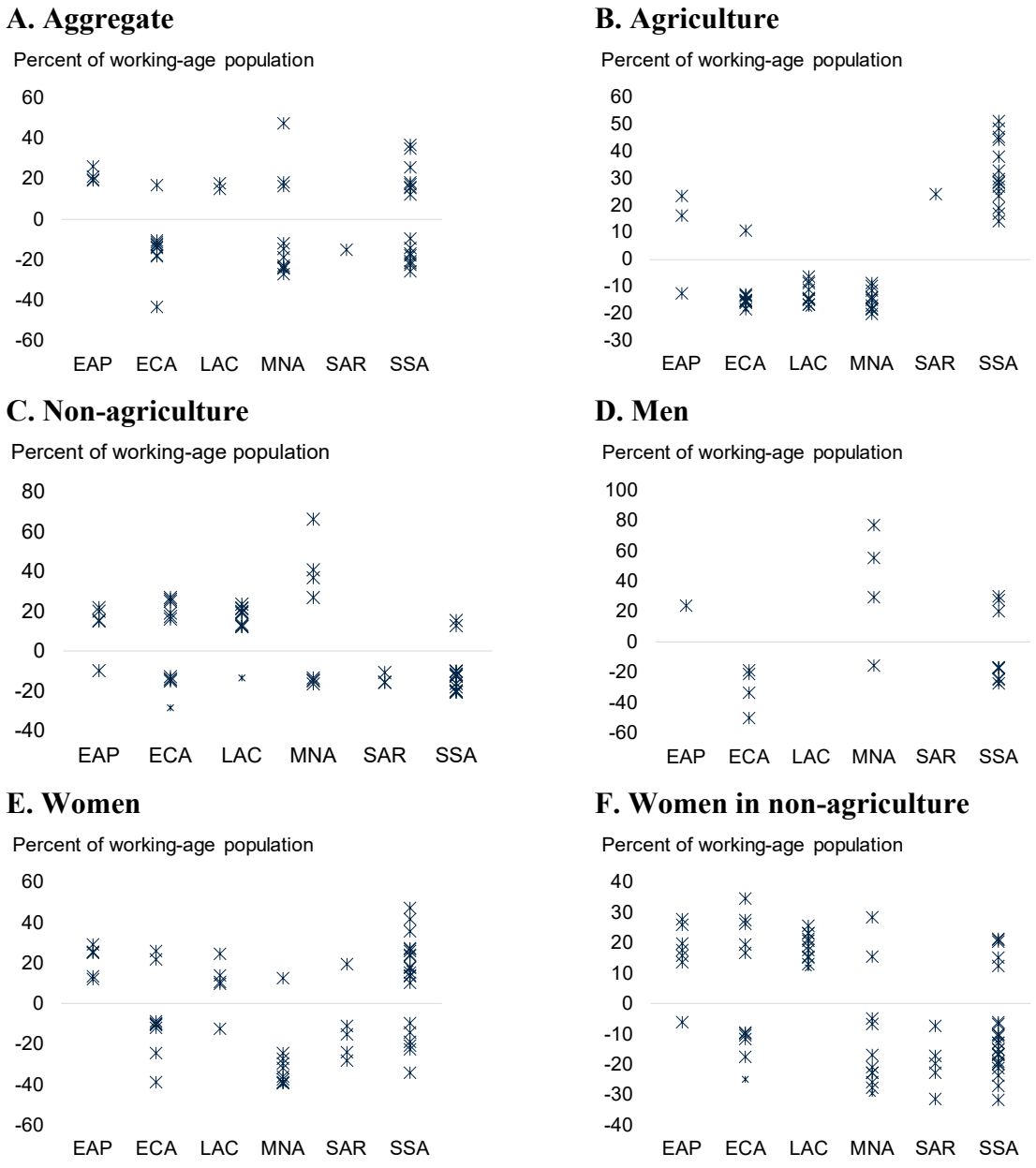
While our econometric exercise cannot determine causality, it is suggestive of policies that could help raise employment. That said, specific policy priorities will depend on country characteristics and circumstances.

Figure 1. Evolution of employment to working-age population ratio in Korea and India



Sources: World Development Indicators (WDI); Penn World Tables.

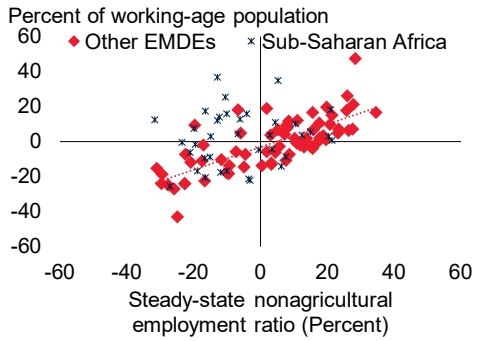
Figure 2. Statistically significant deviations of steady-state employment ratios from sample average



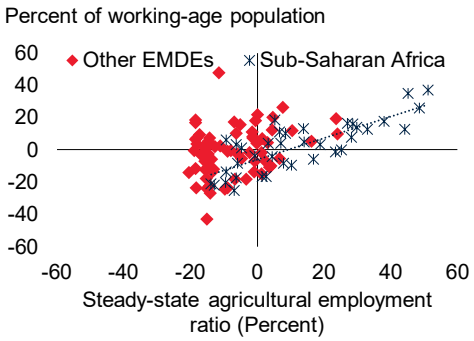
Source: Authors' estimates.
Note: Deviation of steady-state employment ratios from sample average. Each asterisk stands for a country. Charts show only deviations that are at least one standard deviation away from zero. Derived from estimated fixed effects from Table 1, divided by estimated coefficient on the lagged employment ratio.

Figure 3. Deviation of steady-state employment ratios from sample average

A. Aggregate and non-agriculture



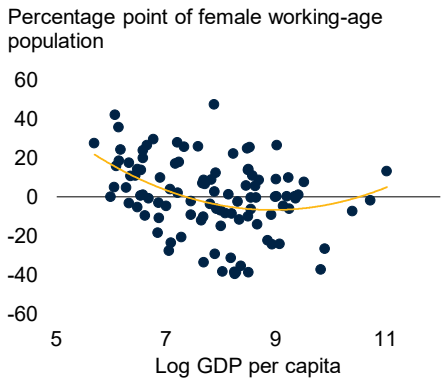
B. Aggregate and agriculture



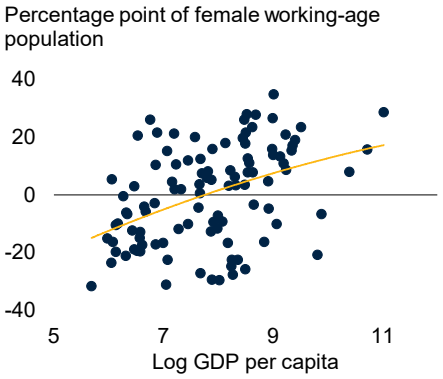
Source: Authors' estimates.
Note: Deviation of steady-state employment ratios from sample average for aggregate employment (A, B) and non-agricultural employment (A) and agricultural employment (B). Derived from estimated fixed effects from Table 1, divided by estimated coefficient on the lagged employment ratio. The correlations are shown as OLS regression estimates in Table 3.

Figure 4. Deviation of women's steady-state employment ratios from sample average

A. All women



B. Women in non-agriculture



Source: Authors' estimates.
Note: Logarithm of per capita GDP (in 2015 PPP U.S. dollars) and deviation of steady-state employment ratios from sample average for all women (A) or women in non-agricultural employment (B). Derived from estimated fixed effects from Tables 1 and 4, divided by estimated coefficient on the lagged employment ratio. The sample includes 102 EMDEs for 2000-2019.

Table 1. First-step regression: Fixed effects panel regression of annual changes in employment ratios

	I	II	III	IV	V
Dependent variable: Annual change in EWAP	**Aggregate**	**Female**	**Male**	**Non-agriculture**	**Agriculture**
Labor productivity growth	-0.1192***	-0.1043***	-0.1308***	-0.0404***	-0.0797***
	[0.0218]	[0.0192]	[0.0250]	[0.0146]	[0.0130]
Working-age population growth					
Total	-0.1947***			-0.1210***	-0.0730***
	[0.0368]			[0.0342]	[0.0194]
Female		-0.1879***			
		[0.0355]			
Male			-0.2520***		
			[0.0492]		
Lagged EWAP					
Total	-0.0622***				
	[0.0124]				
Female		-0.0589***			
		[0.0101]			
Male			-0.0607***		
			[0.0189]		
Non-agriculture				-0.0512***	
				[0.0190]	
Agriculture					-0.0485***
					[0.0146]
Constant	4.4334***	3.4728***	5.2174***	2.2074***	1.4587***
	[0.7700]	[0.5260]	[1.4031]	[0.6268]	[0.4167]
Observations	2058	2058	2058	2058	2058
Numbers of countries	103	103	103	103	103
Adjusted R-squared	0.234	0.192	0.208	0.082	0.154
Year dummies	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes

Sources: Authors' estimates. International Labour Organization; Penn World Tables (database); WDI (database); World Bank.

Note: *** indicates significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Robust standard errors reported in brackets. Country fixed effects and year dummies are included. Columns show the results from regressions of the change in aggregate, women's, men's, non-agriculture, and aggregate employment ratios. Sample includes 103 emerging market and developing economies (EMDEs) that are not small states during 2000–19.

Table 2. EMDEs with statistically significantly above-average or below-average employment ratios (continued)

	Significantly below-average			Significantly above-average		
	Number of countries	Percent of countries	Average deviation	Number of countries	Percent of countries	Average deviation
Aggregate EWAP:						
East Asia and Pacific	0	0	…	4	40	22
Europe and Central Asia	9	47	-17	1	5	17
Latin America and the Caribbean	0	0	…	2	11	17
Middle East and North Africa	9	69	-21	3	23	28
South Asia	1	20	-15	0	0	…
Sub-Saharan Africa	9	24	-18	8	22	22
Commodity exporters	15	22	-18	15	22	22
Commodity importers	13	37	-19	3	9	22
Non-agricultural EWAP:						
East Asia and Pacific	1	10	-10	4	40	18
Europe and Central Asia	5	26	-17	6	32	22
Latin America and the Caribbean	1	5	-13	10	53	17
Middle East and North Africa	4	31	-15	4	31	43
South Asia	3	60	-14	0	0	…
Sub-Saharan Africa	22	59	-18	2	5	14
Commodity exporters	26	38	-18	15	22	25
Commodity importers	10	29	-16	11	31	25
Agricultural EWAP:						
East Asia and Pacific	1	10	-13	2	20	20
Europe and Central Asia	12	63	-16	1	5	10
Latin America and the Caribbean	11	58	-13	0	0	…
Middle East and North Africa	12	92	-15	0	0	…
South Asia	0	0	…	1	20	24
Sub-Saharan Africa	5	14	-10	16	43	30
Commodity exporters	21	31	-14	19	28	28
Commodity importers	20	57	-14	1	3	28

Table 2. EMDEs with statistically significantly above-average or below-average employment ratios (concluded)

	Significantly below-average			Significantly above-average		
	Number of countries	Percent of countries	Average deviation	Number of countries	Percent of countries	Average deviation
Women's EWAP:						
East Asia and Pacific	0	0	…	6	60	22
Europe and Central Asia	8	42	-15	2	11	24
Latin America and the Caribbean	1	5	-12	4	21	15
Middle East and North Africa	10	77	-34	1	8	13
South Asia	4	80	-19	1	20	20
Sub-Saharan Africa	6	16	-20	16	43	24
Commodity exporters	13	19	-24	24	35	22
Commodity importers	16	46	-22	6	17	21
Men's EWAP:						
East Asia and Pacific	0	0	…	1	10	24
Europe and Central Asia	4	21	-30	0	0	…
Latin America and the Caribbean	0	0	…	0	0	…
Middle East and North Africa	1	8	-15	3	23	54
South Asia	0	0	…	0	0	…
Sub-Saharan Africa	9	24	-22	3	8	26
Commodity exporters	11	16	-22	6	9	40
Commodity importers	3	9	-32	1	3	24

Source: Authors' estimates.

Note: Number (or share of each group) of EMDEs whose steady-state employment ratios are at least one standard deviation below or above the sample average. Total sample includes 103 EMDEs with data for 2000-19 and are not small states. Deviations in steady-state employment ratios from the sample average are the estimated fixed effects from the regressions of Table 1 divided by the coefficient estimate for the lagged employment ratio.

Table 3. Correlations with aggregate steady-state employment ratios

	I	II	III	IV	V	VI
Dependent variable: Aggregate steady-state EWAP	Sub-Saharan Africa	Other EMDEs	Sub-Saharan Africa	Other EMDEs	All	All
Non-agricultural steady-state EWAP	0.177	0.718***				
	[0.227]	[0.072]				
Agricultural steady-state EWAP			0.666***	0.440**		
			[0.085]	[0.175]		
Female steady-state EWAP					0.689***	
					[0.041]	
Male steady-state EWAP						0.768***
						[0.048]
Constant	3.916	-5.460***	-6.221***	1.966	0.0159	-0.002
	[3.547]	[1.250]	[1.881]	[2.162]	[0.779]	[0.801]
Observations	37	66	37	66	103	103
R-squared	0.017	0.611	0.637	0.091	0.735	0.720

Source: Authors' estimation.

Note: *** indicates significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Results from a cross-country OLS regression of deviations of steady-state employment ratios for aggregate employment on those for sub-components of employment. Deviations of steady-state employment ratios are derived from the estimates of Table 1. Standard errors in brackets.

Table 4. Robustness check: First-stage fixed effects panel regression

	I	II	III	IV	V	VI	VII
	Aggregate EWAP					Women's EWAP	
Dependent variable: Change in EWAP	Baseline	All countries, 1960-2019	All EMDEs	All EMDEs with trimmed sample	Baseline with 10-year averages	Baseline (all women)	Women in non-agriculture
Labor productivity growth	-0.1192***	-0.0527***	-0.1069***	-0.1671***	-0.0503***	-0.1043***	-0.0387***
	[0.0218]	[0.0114]	[0.0211]	[0.0151]	[0.0191]	[0.0192]	[0.0113]
Working-age population growth	-0.1947***	-0.2726***	-0.1882***	-0.2365***	-0.0896***	-0.1879***	-0.1038***
	[0.0368]	[0.0800]	[0.0353]	[0.0302]	[0.0331]	[0.0355]	[0.0342]
Lagged EWAP	-0.0622***	-0.0437***	-0.0696***	-0.0598***	-0.0783***	-0.0599***	-0.0481**
	[0.0124]	[0.0086]	[0.0116]	[0.0108]	[0.0102]	[0.0101]	[0.0189]
Constant	4.4334***	3.5284***	4.8639***	4.4522***	5.2580***	3.4728***	1.6094***
	[0.7700]	[0.6423]	[0.7126]	[0.6673]	[0.6820]	[0.5260]	[0.4880]
Observations	2058	6799	2447	2378	206	2058	2058
Number of countries	103	160	124	124	103	103	103
Adjusted R-squared	0.234	0.152	0.222	0.303	0.54	0.192	0.069
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Authors' estimation.

Note: *** indicates significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Robust standard errors reported in brackets. Small states are excluded from the sample. Country fixed effects and year dummies are included. Columns show the results from regressions of the change in employment ratios using different samples. Column I, for the baseline sample, includes all EMDEs that are not small states during 2000–19. Column II includes all countries including advanced economies and EMDEs during 1960–2019. Column III includes all EMDEs during 2000–19. Column IV includes all EMDE during 2000–2019, excluding those whose real output growth or employment ratio growth is in the top or bottom 1 percent. Column V uses the baseline sample of Column I but using the 10-year average annual change in employment-to-working-age-population ratio as dependent variable.

Table 5. Robustness check: Correlation of country fixed effects across specifications

	II	III	IV	V
Country fixed effects from specification:	All countries, 1960-2019	All EMDEs	Baseline with trimmed sample	Baseline with 10-year averages
Correlation with country fixed effects from baseline specification (Column I of Table 4)	0.8384	0.9991	0.9674	0.9749

Source: Authors' calculation.

Note: Table shows the correlation between country fixed effects from the baseline specification (Column I of Table 4) and alternative specifications reported in Columns II-V of Table 4.

Table 6. Correlations with steady-state employment ratios and country characteristics (continued)

Correlate	Number of observations	I Total	II Women	III Men	IV Non-agriculture	V Women in non-agriculture
Trade-related variables						
Total exports (percent of GDP)	101	0.0065	-0.0017	0.0123*	0.0249***	0.0166***
Goods exports (percent of GDP)	100	0.0073	-0.0003	0.0127	0.0232***	0.0153***
Services exports (percent of GDP)	100	-0.0172	-0.0197	-0.0138	0.0250**	0.0212
Finance-related variables						
Credit to the private sector (percent of GDP)	103	-0.0026	-0.0066	0.0005	0.0110***	0.0069***
Number of commercial bank branches (per 100000 adults)	102	-0.0114	-0.0193*	-0.0045	0.0224***	0.0155***

Table 6. Correlations with steady-state employment ratios and country characteristics (continued)

Correlate	Number of observations	I Total	II Women	III Men	IV Non-agriculture	V Women in non-agriculture
Average establishment size (Bento and Restuccia 2021)						
Non-agriculture	46	0.1993***	0.0505	0.3119***	0.2968***	0.1601***
Manufacturing	60	0.0157	-0.0024	0.0278	0.0493**	0.0293**
Services	55	0.2019***	0.0293	0.3292***	0.3287***	0.1629***
Product market regulation index (EFW)						
Overall index	103	0.0779	-0.0929	0.2105	0.3089***	0.1666**
Bureaucracy cost	103	0.0827	0.0412	0.1003	0.2491***	0.2071***
Impartial public	103	-0.0181	-0.0256	-0.0198	0.1436***	0.1348***
Labor market regulation index (EFW)						
Overall index	103	-0.0474	-0.0400	-0.0662	0.1265*	0.1086
Labor regulations and minimum wage	103	0.0781	0.0192	0.1199**	0.1658***	0.1136***
Firms identifying major constraint in (percent of firms, *Enterprise Survey*)						
Tax rate	95	-0.0134***	-0.0132**	-0.0127***	-0.0069	-0.0065
Tax administration	95	-0.0134**	-0.0146**	-0.0106**	-0.0102*	-0.0099
Access to land	95	-0.0037	0.0004	-0.0060	-0.0270***	-0.0233***
Political instability	95	-0.0108**	-0.0155***	-0.0053	-0.0072**	-0.0107***
Corruption	95	-0.0094*	-0.0152***	-0.0021	-0.0056	-0.0083*
Access to finance	95	-0.0032	0.0036	-0.0086*	-0.0200***	-0.0150***
Source of finance for firm working capital (percent of working capital, *Enterprise Survey*)						
Internal fund	95	0.0054	0.0075	0.0032	-0.0179***	-0.0184**
Banks	95	-0.0020	-0.0085	0.0025	0.0416***	0.0364***

Table 6. Correlations with steady-state employment ratios and country characteristics (concluded)

Correlate	Number of observations	I Total	II Women	III Men	IV Non-agriculture	V Women in non-agriculture
Education-related variables						
Literacy rate (percent of people 15+)	99	-0.0033	-0.0083**	0.0004	0.0222***	0.0163***
Government expenditure on education (percent of GDP)	100	-0.0949*	-0.1079	-0.0862	0.0908*	0.0766*
Gender education gap (female-male difference in secondary education rate)	97	0.0358**	0.0005	0.0648***	0.0646***	0.0398***
Women, Business and the Law						
Overall index	103	0.0062	0.0252***	-0.0124	0.0048	0.0223***
Entrepreneurship	103	0.0021	-0.0010	0.0042	0.0148***	0.0125***
Mobility	103	0.0035	0.0135***	-0.0060	-0.0000	0.0084***
Workplace	103	0.0036	0.0088**	-0.0016	0.0010	0.0065**
Pay	103	0.0040	0.0112***	-0.0029	0.0019	0.0083***
Marriage	103	0.0059	0.0155***	-0.0040	0.0042	0.0123***
Assets	103	0.0052	0.0130***	-0.0031	0.0068**	0.0139***

Source: Authors' estimates.

Note: *** indicates significance at the 1 percent level, ** at the 5 percent levels, and * at the 10 percent level. Regression coefficients from a series of linear regressions of country fixed effects from the first-stage regressions shown in Table 1 on each correlate variable, one at a time. Estimates for intercepts and standard errors are not reported here but are available upon request.

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