Buffering Recessions: Labor Market Asymmetries and the Role of Self-Employment

Prakash Loungani, Emiliano Luttini, and Hayley Pallan*

March 2025

Abstract

The employment structure in emerging markets and developing economies (EMDEs) differs markedly from that in advanced economies, which has implications for its adjustment to cyclical conditions. This paper examines the cyclicality of employment in advanced economies and EMDEs. Although EMDEs exhibit a more violent GDP cycle than advanced economies, advanced economies present a steeper and more violent employment cycle. In the short term, an employment composition that is more biased toward self-employment, which is less cyclical, explains about 70 percent of these differences, while in the medium-term it accounts for about 40 percent. These characteristics explain why, during recessions, employment in advanced economies is more sensitive to economic fluctuations than in EMDEs.

Keywords: Unemployment, Employment, Output fluctuations, Informality

JEL Codes: E24, E26, E32

*Loungani: Johns Hopkins University (ploungani@jhu.edu). Luttini: World Bank (eluttini@worldbank.org). Pallan: World Bank (hpallan@worldbank.org). We thank Jaroslav Horvath, Alan Finkelstein Shapiro, and participants at World Bank seminars for useful comments and suggestions. We also thank Donika Limani for providing guidance about the International Labor Organization statistics. The findings, interpretations and conclusions expressed in this paper are those of the authors and should not be attributed to the World Bank or to any institution the authors are affiliated with.

1 Introduction

The structure of employment in emerging markets and developing economies (EMDEs) differs markedly from that in advanced economies. In EMDEs self-employment is a larger proportion of jobs and this feature tends to be inversely related with the level of economic development (Figure 1). For example, the share of self-employment in total employment is nearly three times as large in EMDEs compared to advanced economies. This fact reflects structural differences in labor markets, as self-employment is frequently linked to informal employment in EMDEs. In addition, Figure 2 indicates that recessions affect labor markets in advanced economies more than EMDEs; relative to changes in overall economic activity, unemployment rises substantially more in advanced economies than in EMDEs. In this article, we aim to combine these pieces to document how the composition of labor markets—specifically, the share of wage and self-employment—shapes the cyclical response of employment.

This paper examines the cyclicality of employment using a sample of 28 advanced economies and 30 EMDEs. We revisit the empirical fact that labor markets in advanced economies tend to respond more strongly to output fluctuations. We empirically test the employment, wage, and self-employment response and find differences in their cyclical properties. Our results demonstrate that the divergence in the employment-to-output elasticities—which we also refer to as Okun's coefficient—between country groups is explained by a different sectoral composition of employment that shapes a more nuanced response of the labor market during recessions. During economic contractions, labor markets in advanced economies respond more sharply than in EMDEs, while labor market cyclicality in both country groups is similar during expansions.

Although EMDEs exhibit a more violent GDP cycle than advanced economies, with similar asymmetry across both groups, these features do not necessarily translate into comparable patterns for employment. The differences between the adjustment of GDP expansions relative to recessions—the cycle's violence—show that recessions are more violent in EMDEs than in advanced economies. Additionally, the skewness coefficient—used to test whether contractions, on average, are steeper than expansions—shows that recessions occur

more rapidly than recoveries in GDP for both country groups. Surprisingly, none of these properties holds for employment. Employment adjustment is more violent during economic contractions in advanced economies than in EMDEs. Moreover, advanced economies show a more pronounced skewness in employment compared to GDP, while the opposite is true for EMDEs. These facts have implications for the average response of employment to output fluctuations; over the short-term, a one-year horizon, a one percentage point increase in GDP growth is associated with only a 0.2 percentage point increase in employment growth in EMDEs, compared to a 0.4 percentage point increase in advanced economies. Similarly, in the medium-term, three-year horizon, a one percentage point increase in GDP growth is associated with a 0.3 and 0.6 percentage point increase in employment growth in advanced economies and EMDEs, respectively. Taken together, the evidence suggests that labor market fluctuations are more detached from activity in EMDEs relative to advanced economies.

We explain the more nuanced adjustment in headline employment in EMDEs compared to advanced economies by examining the statistical properties of wage and self-employment throughout the business cycle, emphasizing self-employment's larger role in EMDEs. Wage employment in advanced economies exhibits a more pronounced asymmetric cyclical pattern, contracting sharply during recessions and recovering more gradually during expansions, while wage employment in EMDEs displays a symmetric adjustment pattern. Nevertheless, wage employment contracts during recessions with similar violence in both advanced economies and EMDEs. Self-employment, while generally less cyclical in both groups, follows different recession dynamics: it declines amid a downturn in advanced economies but expands in EMDEs.[1] The combination of similarly severe recessions and lower skewness in wage employment growth indicates that advanced economies are more prone to large negative shocks and less likely to see sizable positive corrections—resulting in a more prolonged impact and

[1]For a sample of OECD countries, early evidence of self-employment behaving less cyclically is discussed in Blanchflower (2000). In this context, the self-employed reported higher levels of job satisfaction than wage employees and displayed more rigid behavior, as they were less willing to move from their neighborhoods. More recently, using survey data from the Italian, UK, and US labor markets, Boeri et al. (2020) suggest that self-employment with employees is different from solo self-employment, emphasizing that solo self-employment is associated with underemployment and lower earnings compared to self-employment with employees.

less robust employment recoveries compared to EMDEs.

Differences in sectoral composition account for a substantial portion of the difference in the headline employment elasticity in the short term, though its explanatory power decreases over time. When placing together employment and output fluctuations, Okun's coefficients for wage and self-employment show that the elasticities for both types of employment tend to be lower in EMDEs than in advanced economies. In general, the differences are smaller when considering short- rather than medium-term elasticities, and in all cases, they remain more similar than suggested by headline employment figures. A critical contribution of this article is to quantify how much of the difference in the headline employment-to-output elasticity between advanced economies and EMDEs can be explained by the different composition of employment in the two groups. To do so, we build a counterfactual EMDE employment-to-output elasticity. The counterfactual elasticity is built using the average advanced economy employment shares and the sectoral elasticities estimated for EMDEs. This evidence suggests that while employment composition explains about 70 percent of the short-term adjustment differences between these economies, other structural factors account for roughly 60 percent of the medium-term dynamics.

Allowing economic expansions and contractions to affect employment and unemployment differently, we trace the difference in Okun's coefficient between advanced economies and EMDEs to a greater sensitivity of labor markets in advanced economies during recessions. Different elasticities between recessions and expansions are incorporated in the empirical strategy due to the asymmetric patterns noted previously. The employment- and unemployment-to-output elasticities for advanced economies and EMDEs overlap substantially during expansions. Short- and medium-term elasticities differ statistically between advanced economies and EMDEs during recessions. Advanced economies have higher elasticities during recessions than expansions, while EMDEs elasticities remain similar across different business cycle phases. In terms of wage and self-employment, there is also some evidence that they react more strongly during recessionary spells in advanced economies than in EMDEs. However, the differences are less marked than for headline employment. The similar elasticities reinforce the important role of sectoral composition in dampening the employment response to the cycle during recessions in EMDEs.

Although these results generally hold across financial and non-financial recessions, the COVID-19 pandemic recession provides an important lesson about what can happen when self-employment does not provide its buffering role. GDP contractions are more pronounced in EMDEs during non-financial and COVID-19 recessions but comparable across EMDEs and advanced economies during financial recessions. Employment indicators reveal that while financial and non-financial recessions are economically and statistically harsher in advanced economies, the COVID-19 recession was markedly more severe in EMDEs. These differences largely reflect distinct behaviors of wage employment and self-employment across economies: wage employment adjustments tend to be similar between advanced economies and EMDEs during non-COVID recessions; self-employment expands and remains stable in EMDEs but remains stable and contracts in advanced economies during non-financial and financial recessions, respectively. However, the COVID-19 recession uniquely disrupted both wage and self-employment in EMDEs more violently than in advanced economies, highlighting how the pro-cyclical response of self-employment heightened labor market vulnerabilities in EMDEs during the pandemic.

Additional exercises focused on the response of employment by demographic groups provide further support for the finding that labor market adjustments are stronger during recessions in advanced economies than in EMDEs. However, employment-to-output elasticities tend to be largest for youth and those with only a basic level of education, compared to other age groups and education levels. As self-employment helps to smooth employment in response to GDP fluctuations, self-employment may contribute to smaller employment losses during recessions in EMDEs regardless of age group and for those with the lowest level of education. Overall, the results here support the difference in the advanced economy and the EMDE cyclical adjustment driven by the response during recessions, as employment tends to fall more sharply in advanced economies across a range of demographic groups.

Related literature: The view that labor market outcomes reflect an interaction of shocks and institutions has been prevalent since the work of Nickell and Layard (1999) and Blanchard and Wolfers (2000), which compared labor adjustment in the United States and Europe and among European countries. Using a similar perspective, this paper compares the response of employment to cyclical shocks between advanced economies and EMDEs.

We extend prior empirical work and provide an explanation for previous findings (Boz, Durdu and Li (2015); Ball, Leigh and Loungani (2017); An, Bluedorn and Ciminelli (2022); Horvath and Yang (2022)) that labor markets in advanced economies tend to have a higher unemployment-to-output elasticity.

Our work relates to the recent literature that focuses on differences in labor markets between advanced economies and EMDEs. In terms of unemployment levels, Feng, Lagakos and Rauch (2023) show that when unemployment definitions are standardized across countries, higher unemployment rates emerge in advanced economies compared to EMDEs, challenging the conventional wisdom of no significant relationship between unemployment levels and income per capita (Caselli, 2005). Poschke (2023) finds that poorer countries experience higher unemployment relative to wage employment, and self-employment tends to rise with the unemployment-wage employment ratio. Donovan, Lu and Schoellman (2023) highlight that movements in labor markets, such as job-finding and employment exit rates, are more pronounced in developing economies. Our work adds to this literature by showing that the different composition of EMDE labor markets is consequential in accounting for differences in the cyclical properties of headline employment between EMDEs and advanced economies.

The business cycle literature incorporating a self-employment sector has generally focused on the role of shocks or sectoral composition in propagating economic disturbances. An incomplete pass-through of productivity shocks from the formal to the informal sector can generate a countercyclical response in informal employment, thereby dampening the overall employment response to the business cycle (Fernández and Meza, 2015). Shocks to the foreign interest rate may freeze hiring in the formal sector while leaving informal employment relatively insulated (Leyva and Urrutia, 2020). Another strand of this literature emphasizes the size of the informal sector, demonstrating that a larger informal sector facilitates worker transitions in and out of informal employment, thereby helping workers cope with adverse shocks (Finkelstein Shapiro, 2014; Horvath and Yang, 2022). In this paper, we contribute to the literature by empirically quantifying how differences in sectoral composition and the differential responses of wage and self-employment to aggregate shocks can explain the low headline employment-to-output elasticity observed in EMDEs. Additionally, we highlight that other moments—such as the skewness of growth rates and the violence of recessions—

are potentially important for capturing the full picture of economic fluctuations.

Our work also extends the literature that focuses on asymmetries in the adjustment of labor markets. The inception of this literature can be traced to Keynes' (1936) observation that "the substitution of a downward for an upward tendency often takes place suddenly and violently, whereas there is, as a rule, no such sharp turning point when an upward is substituted for a downward tendency." The literature (Neftci, 1984; Sichel, 1993; Silvapulle, Moosa and Silvapulle, 2004; McKay and Reis, 2008; Ilut, Kehrig and Schneider, 2018) has focused mainly on the United States, documenting the existence of an asymmetric pattern of employment over the cycle that can be described as easy-to-fall and hard-to-rise, which goes in line with Keynes' observation, but less so for GDP. We extend the analysis to other advanced economies and EMDEs, finding that the asymmetry holds well in the case of advanced economies but much less so in the case of EMDEs.

The remainder of this paper is organized as follows. Section 2 outlines our methodological approach to documenting labor market dynamics. Section 3 describes the data used in our analysis. Section 4 presents our baseline results on the cyclicality of headline employment, as well as wage and self-employment. Section 5 extends the analysis by examining the impact of different shocks, the response of demographic groups, and an alternative sample. Section 6 concludes.

2 Methodology

To quantify the severity of recessions on labor markets in both advanced economies and EMDEs, we first analyze whether contractions, on average, are steeper than expansions—a concept known as the steepness of the cycle. As outlined by Sichel (1993), this can be estimated by examining the skewness coefficient. A negative skewness coefficient indicates that the distribution of innovations in an economic time series experiences sharp, infrequent declines, in contrast to more moderate, frequent increases. A steepness test can be computed using the coefficient of skewness for the change in the variable of interest. To calculate the skewness coefficient, data on advanced economies and EMDEs are pooled together and the skewness coefficient is computed for the two country groups. We perform this exercise

considering the following regression model:

$$\frac{\left(\Delta Z'_{ct} - \overline{\Delta Z'}_{group}\right)^3}{\sigma\left(\Delta Z'\right)^3_{group}} = ST^{Z,AE} \times I_c^{AE} + ST^{Z,EMDE} \times I_c^{EMDE} + \epsilon_{ct}, \tag{1}$$

where Z is our variable of interest log GDP, the unemployment rate, or log employment, $group \in \{AE,\ EMDE\}$, $\overline{\Delta Z'}_{group}$ and $\sigma\left(\Delta Z'\right)_{group}$ are the average and standard deviation of pooling the data within each group. The OLS coefficients $ST^{Z,AE}$ and $ST^{Z,EMDE}$, equal to $\frac{1}{N_{AE}} \frac{\sum_{ct}\left(\Delta Z'_{ct} - \overline{\Delta Z'}_{AE}\right)^3}{\sigma(\Delta Z')^3_{AE}}$ and $\frac{1}{N_{EMDE}} \frac{\sum_{ct}\left(\Delta Z'_{ct} - \overline{\Delta Z'}_{EMDE}\right)^3}{\sigma(\Delta Z')^3_{EMDE}}$, represent the skewness coefficients for advanced economies and EMDEs with the advantage that this formulation allows us to perform a variety of statistical tests. To make sure our results are not driven by structural difference across countries, we demean the variable ΔZ_{ct} using the country specific mean, $\frac{\sum_t \Delta Z_{ct}}{T_c}$, which is denoted as $\Delta Z'_{ct}$.

A related metric to measure the depth of economic recessions is measuring its violence. The measure of violence we employ is a panel data statistic which closely follows the McKay and Reis (2008) approach. The violence of recessions in advanced economies and EMDEs is calculated as the average change in the growth of a series between expansions and contractions. To do so, we employ the same statistical approach as with the skewness coefficient, and we compute the following regression model:

$$\Delta Z_{ct} = g^{Z,AE} \times I_c^{AE} + \nu^{Z,AE} I_c^{AE} \times Recess_{ct} + g^{Z,EMDE} + \nu^{Z,EMDE} I_c^{EMDE} \times Recess_{ct} + \epsilon_{ct}, \tag{2}$$

where the coefficient $g^{Z,AE}$ measures the average growth rate of Z for advanced economies during business cycle expansions, $\nu^{Z,AE}$ measures the average effect of recessions on Z (with $g^{Z,EMDE}$ and $\nu^{Z,EMDE}$ having similar interpretations for EMDEs); $\nu^{Z,AE} - \nu^{Z,EMDE}$ measures the different effects of recessions between advanced economies and EMDEs. $Recess_{ct}$ is a dummy variable equal to 1 during recessions, which we define as peak-to-trough periods in the business cycle. We use recession dates from Kose, Sugawara and Terrones (2020), which are based on peaks and troughs in log GDP per capita identified using the algorithm from Harding and Pagan (2002).[2] To control for country-specific trends, Equation 2 is also

[2]As robustness, we apply the Harding-Pagan algorithm (Harding and Pagan, 2002) using log GDP delivering similar results.

estimated with country fixed effects.

To put the fluctuations in activity and employment together, we compute labor market-to-output elasticities in the same spirit as Okun (1962). Specifically, Okun's Law posits a stable relationship between the extent of cyclical fluctuations, measured by the real GDP growth rate (Δy_{ct}) and the change in unemployment. In this spirit, we consider this framework to perform several exercises on the change in unemployment and employment growth. We estimate the following regression:

$$\Delta Z_{ct} = \alpha_{Zc} + \beta_Z (L)^{Okun,\ AE} \Delta y_{ct}\ I_c^{AE} + \beta_Z (L)^{Okun,\ EMDE} \Delta y_{ct}\ I_c^{EMDE} + \epsilon_{ct}, \qquad (3)$$

where Z in this case, with some abuse of notation, is the unemployment rate or log employment, $\beta_Z (L)^{Okun,\ \cdot} = \sum_{s=1}^{3} \beta_{Zs}^{Okun,\ \cdot} L^{s-1}$ and L is the lag operator, and α_{Zc} are country fixed effects. In distributed lag models, the cumulative effect of a one percentage point increase in output growth for ΔZ_{ct} is computed based on the sum of the coefficients over a given horizon. That is, the cumulative responses of Z over S years to a one percentage point increase in output growth is computed as $\sum_{s=1}^{S} \beta_{Zs}^{Okun,\ \cdot}$, when S equal to three this is a measure of a medium-term elasticity.

In Okun's framework, we can measure the presence of differences in the adjustment of employment to recessions between advanced economies and EMDEs. To quantify the differential effects of recessions on labor markets, we augment Equation 2 by estimating elasticities conditioning on the phase of the cycle, either a recession or expansion period. We regress annual changes in the unemployment rate or log employment on GDP growth, and a dummy variable indicating the years a country is under a recessionary episode interacted with GDP growth. To analyze the differential effects in EMDEs, we include interaction terms for all the variables with the EMDE indicator. We consider the following regression model:

$$\begin{aligned}\Delta Z_{ct} = \alpha_{Zc} &+ \left(\beta_Z (L)_{expansions}^{Okun,\ AE} + \beta_Z (L)_{recessions}^{Okun,\ AE} \times Recess_{ct}\right) \Delta y_{ct}\ I_c^{AE} \\ &+ \left(\beta_Z (L)_{expansions}^{Okun,\ EMDE} + \beta_Z (L)_{recessions}^{Okun,\ EMDE} \times Recess_{ct}\right) \Delta y_{ct}\ I_c^{EMDE} + controls_{ct} + \epsilon_{ct},\end{aligned} \qquad (4)$$

where the coefficients $\beta_Z(L)^{Okun,.}_{expansions}$ and $\beta_Z(L)^{Okun,.}_{recessions}$ measure the Z-to-output elasticities during expansions and recessions, $controls_{ct}$ includes the interacted variables as standalone variables, and α_{Zc} are country fixed effects.

3 Data

Employment data is from OECD and ILO.[3] Employment includes all individuals engaged in the production of goods and services during a short reference period, in exchange for payment in the form of wages or profits. In general, employed people include those whose age is between 15 and 64 years and who have worked at least one hour in the previous week or who had a job but were absent from work during the reference week. In addition, two types of employment status are discussed: i) wage employment, which refers to individuals who exchange their working hours for a wage; ii) self-employment, which refers to employment of employers, workers who work for themselves, members of producers' co-operatives and unpaid family workers. Data on real GDP is from the World Development Indicators.

Since our analysis is mainly constrained to the variation of employment and activity over time within countries, aiming to establish distinct patterns over different business cycles' phases, our baseline sample includes all countries with employment, self-employment, and wage employment data for a relatively long time series, at least eight years. We adopt the eight-year threshold because, on average, a complete business cycle in EMDEs spans about seven years.[4] Our robustness section shows that our results hold well when including countries with an even longer time series of fifteen years. We regard a handful of observations with employment log differences exceeding .5 log points as outliers. In addition, some country-year observations with apparent errors in wage employment were also regarded as outliers. Finally, our baseline sample excludes the COVID-19 recessions, so it excludes the years 2020 and 2021 from the analysis, and in Section 5, we include these years to uncover the particularities of the episode.

The main sample includes 28 advanced economies and 30 EMDEs.[5] Average annual

[3]See Appendix Tables A.1 and A.2 for the sources used per country.

[4]The seven years threshold is derived from Table 1 in Calderón and Fuentes (2014).

[5]Annex Tables A.1 and A.2 present the countries included in the main sample and in robustness checks.

GDP and employment growth are both about 0.5 times larger in EMDEs compared to advanced economies.[6] However, self-employment growth is much larger (more than double) in EMDEs than advanced economies, which is, on average, 0.51 and 0.20, respectively. Wage employment growth is also larger in EMDEs compared to advanced economies—though wage employment tends to be a smaller share of the labor force in EMDEs. The average wage employment rate in the sample is 77.6 and 59.2 percent in advanced economies and EMDEs, respectively. Logically, it follows that the self-employment rate is larger in EMDEs.

4 The adjustment of employment over the cycle

Table 1 presents results on the asymmetry of GDP and employment fluctuations. When all countries are pooled together in the first row, a negative skewness in GDP indicates that contractions in GDP tend to be sharper than expansions. When the countries are split into groups, the skewness coefficient for GDP is not statistically different between advanced economies and EMDEs, presenting evidence of a similar asymmetric cycle. Interestingly, for advanced economies, the skewness is more marked in the employment series, including unemployment, than activity, while the opposite occurs for EMDEs.[7]

Table 2 presents results about expansions and recessions' violence in advanced economies and EMDEs. The first three columns present results excluding country fixed effects. The top panel shows that the average growth rate of expansions in EMDEs is roughly 1 percentage point higher than in advanced economies. This result is unsurprising as some convergence should occur in the first group relative to the second one, so output should grow faster in EMDEs. Regarding employment, differences in growth are much less marked—EMDE employment growth is, on average, 0.2 percentage points higher in EMDEs than in advanced economies. Zooming in on the differences between the adjustment of expansions relative to recessions—the cycle's violence—we find that recessions are more violent regarding GDP growth in EMDEs than in advanced economies, although these differences are only statis-

[6] See Annex Table A.3 for summary statistics.

[7] These conclusions generally hold for the cyclical components of GDP, employment, and the employment rate as well. We extracted the cyclical component of each variable using the Hodrick-Prescott filter and a smoothing parameter of 6.25.

tically significant when we include country fixed effects (fourth column). This is consistent with the idea of a more volatile GDP cycle in EMDEs. However, here we further refined this definition by showing that the cycle is not only more volatile but also more violent in terms of the adjustment between expansions and recessions. Interestingly, we find that the opposite result holds for employment: the adjustment of employment and unemployment is more nuanced in EMDEs than in advanced economies, which suggests a faster adjustment in advanced economy labor markets compared to EMDEs, especially during economic contractions. In general, these results do not differ much when fixed effects are included in the regression model (fifth and sixth columns). Next, we explore the employment elasticity in more detail.

For advanced economies and EMDEs, employment and unemployment-to-output elasticities are presented in Figure 3.[8] Regardless of the employment measure considered, the response of the variables is stronger in advanced economies, in both the short- and medium-term. For example, in the short-term a one percentage point increase in GDP growth is associated with a 0.2 percentage point increase in employment growth in EMDEs compared to a 0.4 percentage point increase in employment growth in advanced economies. Similarly, a one percentage point increase in GDP growth is associated with a 0.1 percentage point decrease in the unemployment rate in EMDEs compared to 0.3 in advanced economies. These elasticities can be considered as "unconditional" employment and unemployment responses to changes in GDP in the sense that the effects of a rise or a fall in GDP are assumed to be symmetric.

The range of empirical results presented here implies that employment responds more aggressively to GDP fluctuations in advanced economies than in EMDEs. Understanding what may be driving these distinct employment reactions is the focus of the remaining sections.

[8]See Appendix Table B.1 for the corresponding regression results.

4.1 The role of self- and wage employment

An advantage of the methodology we have laid out is that it allows us to decompose employment into the self- and wage employment sectors and analyze differences in the adjustment between them. Labor markets in advanced economies and EMDEs are characterized by the coexistence of these two distinctive sectors. Two possibilities arise here, one is that labor markets are intrinsically different across advanced economies and EMDEs as captured by different elasticities between self- and wage employment across country groups. A second alternative is that self- and wage employment do not display different cyclical properties, but to a large extent, the differences in labor market outcomes are driven by different labor market compositions.

To analyze these issues, let employment be the sum of self-employment and wage employment, $E_{ct} = E_{ct}^{Self} + E_{ct}^{Wage}$. Then, assuming constant self- and wage employment shares across countries and time, the fixed effect estimator from Equation 3 is

$$\beta_{Employment}\left(L\right)^{Okun,\ \cdot} = \overline{\frac{E_{ct}^{Self}}{E_{ct}}}\beta_{Self}\left(L\right)^{Okun,\ \cdot} + \overline{\frac{E_{ct}^{Wage}}{E_{ct}}}\beta_{Wage}\left(L\right)^{Okun,\ \cdot} \tag{5}$$

where $\overline{\frac{E_{ct}^{Self}}{E_{ct}}}$ and $\overline{\frac{E_{ct}^{Wage}}{E_{ct}}}$ are the average of pooling the data within each group. Of course, the share of self-employment varies over time, although it is generally stable, and so in the data, the right-hand side of the equation is an approximation.

When looking at the evolution of self- and wage employment around economic contractions, some differences emerge in their behavior. Figures 4a and 4b illustrate the evolution of total employment (solid blue line), self-employment (dashed red line), and wage employment (dashed purple line). Wage employment exhibits similar cyclical patterns in advanced economies and EMDEs, contracting sharply during recessions and recovering slowly in both groups, yet in EMDEs, at a seemingly faster rate than in advanced economies. In contrast, self-employment, while generally less cyclical in both groups, increases during recessions in EMDEs and remains above pre-recession levels even a year after the end of a recessionary episode, while in advanced economies remains below pre-recession levels for a protracted period.

The skewness coefficient sufficiently summarizes this evidence, indicating that wage employment follows a steeper cycle in advanced economies than in EMDEs, while self-

employment exhibits a more symmetric pattern across both groups of countries. Table 3 presents the skewness coefficients for all countries and for advanced economies and EMDEs separately. Wage employment in advanced economies displays an asymmetric adjustment over the business cycle and is of an order of magnitude greater than in EMDEs. However, while the skewness coefficient for advanced economies is lower than the point estimate for EMDEs, the large uncertainty around the EMDEs coefficient prevents us from rejecting the null hypothesis that they are statistically equal. No significant asymmetry is observed in the cyclical behavior of self-employment.

Despite the more asymmetric pattern of employment over the cycle, wage employment adjusts as dramatically to recessions in both advanced economies and EMDEs, whereas self-employment experiences stronger contractions in advanced economies. Table 4 presents these findings. During expansions, wage employment in EMDEs grows at 3 percent while self-employment remains nearly unchanged, whereas in advanced economies wage employment grows at 2 percent and self-employment remains stable. As a result, the share of wage employment increases at the expense of self-employment, with a larger shift in EMDEs than in advanced economies. In addition, the violence of recessions is higher for wage employment in advanced economies than in EMDEs, although the difference is only statistically significant when fixed effects are omitted (first versus third column). Meanwhile, self-employment in EMDEs expands during recessions, whereas in advanced economies it is procyclical—though significantly less than wage employment.

Combining the similar severity of contractions with the lower skewness in wage employment growth suggests that recessions have a more prolonged impact on wage employment in advanced economies than in EMDEs. In advanced economies, the likelihood of large negative shocks is higher and the likelihood of sizable positive corrections is lower compared to EMDEs, resulting in less pronounced wage employment recoveries. This is consistent with the stronger wage employment growth observed in EMDEs during expansions.

When placing together employment and output fluctuations, Okun's coefficients for wage and self-employment show that the elasticities for both types of employment tend to be lower in EMDEs than in advanced economies, yet they remain more similar than suggested

by headline employment figures. These elasticities are reported in Figure 5.[9] Starting with wage employment, economic activity affects employment similarly on impact in both country groups. While differences begin to emerge after two years, they remain relatively minor when measuring the response after three years. For self-employment, we find a lower elasticity in EMDEs, where it exhibits a contemporaneous inverse relationship with output growth but no significant relationship from the second year on. In advanced economies, self-employment appears to be contemporaneously unaffected by economic activity but develops a positive relationship with economic activity over time.

The approximation in Equation 5 allows us to perform a counterfactual exercise to calculate how much of the difference in the headline employment-to-output elasticity between advanced economies and EMDEs can be explained by the different composition of employment in the two groups. This is one of the crucial contributions of our work. We compute a counterfactual EMDE employment-to-output elasticity by applying Equation 5 with the average advanced economy employment shares and the sectoral elasticities estimated for EMDEs. Figure 6 reports the difference between the counterfactual and actual EMDE elasticities relative to the difference between the advanced economy and the actual EMDE elasticities. Our results show that differences in sectoral composition account for a substantial portion of the difference in the headline employment elasticity in the short term—about 70 percent—though its explanatory power decreases to roughly 40 percent in the medium-term. This evidence suggests that while employment composition explains much of the short-term adjustment differences between these groups of economies, other structural factors drive the medium-term dynamics.

4.2 Adjustment during recessions

The asymmetric pattern uncovered in the previous sections calls for different elasticities between recessions and expansions in these economies. In the case of advanced economies, an easy-to-fall and hard-to-rise employment pattern, greater than in the case of output, would suggest a larger elasticity during recessions than in expansions. In contrast, the patterns

[9] See Appendix Table B.2 for the corresponding regression results.

documented in EMDEs suggest, if anything, a lower elasticity. The results of the exercises presented below illustrate the role of business cycle phases in the adjustment of employment to GDP fluctuations.

Allowing expansion and contraction phases of the business cycle to affect employment and unemployment differently, we trace the difference in the elasticity between advanced economies and EMDEs to a greater sensitivity of labor markets in advanced economies during recessions. Figure 7 shows the results of estimating Equation 4. In panels (a) and (c), the employment- and unemployment-to-output elasticities for advanced economies and EMDEs overlap substantially during economic expansions. In panels (b) and (d), the short- and medium-term elasticities statistically differ between advanced economies and EMDEs during recessions. In the short term, employment- and unemployment-to-output elasticities in advanced economies are approximately 0.5 and -0.4, respectively—more than doubling the magnitudes observed in EMDEs, 0.2 and -0.1, respectively. Over the medium-term, elasticities rise further in advanced economies, whereas EMDE elasticities lack clear statistical patterns, as evidenced by wide confidence intervals that include zero. Importantly, EMDE elasticities remain consistent across expansions and recessions, reinforcing the conclusion that lower overall elasticities in EMDEs, relative to advanced economies, are driven predominantly by labor market behavior during downturns. Our findings indicate that during downturns, advanced economies adjust their labor markets faster than EMDEs; however, during upturns, they fail to reduce unemployment at the same pace as the increase in unemployment during recessions.

There is also some evidence that wage and self-employment behave somewhat differently in EMDEs during recessions. Figure 8 presents elasticity estimates for expansions and recessions for self- and wage employment. Self- and wage employment have similar elasticities during economic expansions, as their point estimates virtually overlap between the country groups. During recessions, there is evidence that wage employment is destroyed more quickly in advanced economies than in EMDEs, although after three years, there are no statistical differences between the groups. Self-employment, initially similar in its short-term response across groups, shows a greater divergence in the medium-term: it contracts significantly in advanced economies two years after the outset of a recessionary spell, whereas EMDEs show

no distinctive statistical shape. Although the differences in the wage and self-elasticities during recessions are part of the story behind the overall lower elasticity in EMDEs, differences in the sectoral composition of employment highlighted earlier are necessary to reconcile them with aggregate employment.

5 Additional exercises and robustness

Additional exercises provide support for the key finding that the difference between advanced economy and EMDE labor market adjustment occurs during recessions and that the sectoral composition of employment plays an important role in the headline employment response to GDP fluctuations. Exercises presented below include the response of labor market activity to different types of shocks (non-financial recessions, financial recessions, and COVID), the response of employment among different age groups and education levels to GDP fluctuations, and replication of results presented in section 4 for an alternative sample.

5.1 Response to different recessions

The nature of shocks may have differential effects on labor markets and examining their impact on employment can help uncover what types of shocks may be driving the difference between country groups and under what conditions self-employment makes a difference. For example, financial recessions have been found to have a larger impact on employment and unemployment in advanced economies (Boeri, Garibaldi and Moen (2013); IMF (2010)). Although our exercises are non-structural, we focus on financial, non-financial, and the COVID-19 recessions to extract lessons about how labor markets behave in each event. In EMDEs, the role of different recessions for employment remains a gap in the literature, including in their comparison to advanced economies.[10]

[10]The closest exercise to ours presented here is from Donovan et al. (2024)–they found that EMDEs are less affected by crises compared to advanced economies but that the difference is not statistically significant in most cases. Other work has focused specifically on EMDEs, finding that unemployment increased less during the global financial crisis compared to prior recessions (WorldBank (2015)) and that unemployment in emerging markets is found to increase leading up to a sovereign debt default but starts to recover once a

The violence of recessions in advanced economies and EMDEs is calculated as the average annual change of GDP growth or employment growth during each type of recession separately, based on the following specification:

$$\Delta Z_{ct} = \alpha_c^Z + g^{Z,AE} \times I_c^{AE} + \sum_{type} \nu^{Z,AE,type} I_c^{AE} \times Recess_{ct}^{type}$$
$$+ g^{Z,EMDE} \times I_c^{EMDE} + \sum_{type} \nu^{Z,EMDE,type} I_c^{EMDE} \times Recess_{ct}^{type} + \epsilon_{ct},$$

where all variables are defined as in Equation (2) and $Recess^{type}$ are three dummy variables indicating non-financial, financial, and the COVID recession. Non-financial recessions are simply recessions that do not coincide with a financial crisis, either during peak to trough or in the year before or after that window. Financial recessions coincide with a financial crisis during the recession or the year before or after. The COVID recessions are indexed as recessions that occurred during the 2020-2021 period. Financial crisis dates are from Laeven and Valencia (2020). The coefficients of interest are the ν's, which denote the violence of types of recessions, separately for advanced economies and EMDEs. The difference between the AE and EMDE coefficients yield the difference in the violence of recession types between the country groups. Table 5 shows the degree of violence during non-financial, financial, and COVID recessions regarding GDP and labor market variables.

For financial and non-financial recessions, labor markets in EMDEs exhibit milder fluctuations than in advanced economies; the sole exception is the COVID-19 recession. For non-financial and COVID recessions, GDP growth contracts more in EMDEs than in advanced economies; the exception is financial recessions, where GDP growth contracts similarly in both groups. Regarding employment and unemployment, financial and non-financial recessions are economically and statistically more violent in advanced economies than in EMDEs. In contrast, the COVID-19 recession was markedly more violent in EMDEs compared to both advanced economies and all previous recession types. A natural candidate to explain these differences in employment behavior across recession types is the evolution of wage and self-employment in advanced economies and EMDEs over the episodes.

default occurs (Yeyati and Panizza (2011)).

The response of wage employment during financial and non-financial recessions tends to be similar in advanced economies and EMDEs; at the same time, self-employment contracts more in advanced economies than in EMDEs. The results presented in Table 5 show that the adjustment of wage employment during recessions is statistically similar in advanced economies and EMDEs. However, self-employment expands in EMDEs during non-financial recessions, while it remains relatively stable in advanced economies; during financial recessions, self-employment remains unaffected in EMDEs, whereas it declines in advanced economies, although less severely than wage employment. This latter finding suggests that self-employment in advanced economies is more sensitive to financial conditions, likely reflecting greater capital intensity, while in EMDEs, self-employment is less capital-intensive and thus less vulnerable to financial shocks.

The COVID-19 recession provides a critical illustration of what can occur in EMDE labor markets during a downturn when self-employment behaves pro-cyclically. Columns (4) and (5) show that wage and self-employment were similarly affected during the pandemic recession and that their adjustment was significantly more violent in EMDEs than in advanced economies and relative to any previous recession. As a result, the different behavior of self-employment during the COVID-19 pandemic can explain the larger response of employment and unemployment during this episode.

Next, an augmented version of Equation 4 is estimated to quantify labor market responses to GDP fluctuations during the three types of recessions:

$$\begin{aligned}\Delta Z_{ct} = \alpha_{Zc} &+ \left(\beta_Z\left(L\right)^{Okun,\ AE}_{expansions} + \sum_{type}\beta_Z\left(L\right)^{Okun,\ AE}_{type} I_c^{AE} \times Recess_{ct}^{type}\right)\Delta y_{ct} \times I_c^{AE} \\ &+ \left(\beta_Z\left(L\right)^{Okun,\ EMDE}_{expansions} + \sum_{type}\beta_Z\left(L\right)^{Okun,\ EMDE}_{type} I_c^{EMDE} \times Recess_{ct}^{type}\right)\Delta y_{ct} \times I_c^{EMDE} \\ &+ controls_{ct} + \epsilon_{ct},\end{aligned} \tag{6}$$

where the coefficients of interest are $\beta_Z\left(L\right)^{Okun,\ \cdot}_{type}$ as they measure the Z-to-output elasticities during non-financial, financial, and COVID-19 recessions; $controls_{ct}$ includes the standalone recessions dummies interacted with the country group dummies. Note that identification

here comes from cross-country variation within each type of recession. Hence, if a large common component dominates recessions, the elasticities are unlikely to be estimated with good precision, and hence, the results must be interpreted with caution.

In general, the patterns highlighted in the baseline results hold when analyzing different types of recessions with two differences: i) larger statistical uncertainty and ii) the patterns during the COVID-19 recessions are different than what happens in earlier recessions. Figure 9 presents elasticity estimates across the various recessions, with a square representing the short term elasticities ($\beta_{1,type}^{Okun,\ \cdot}$) and with a circle the medium-term elasticities ($\sum_{s=1}^{3} \beta_{s,type}^{Okun,\ \cdot} L^{s-1}$) (dashed and solid lines represent 90-percent confidence intervals). Whether recessions are financial or non-financial, EMDEs have lower elasticities compared to advanced economies. Therefore, the result that a labor market composition characterized by a larger prevalence of self-employment is associated with a smaller response of employment and unemployment to downturns in economic activity holds well across different types of recessions. The sole exception is the COVID-19 pandemic recession, which exhibits a notably larger short-term employment-to-output elasticity for EMDEs.

The results of this section highlight the strong response of employment to GDP fluctuations in advanced economies, in contrast with the stronger response of GDP to recessions in EMDEs. Overall, these results suggest that recessions, regardless of their financial nature, are associated with a sharp contraction of employment in advanced economies, and the difference compared to EMDEs is statistically significant in both financial and non-financial recessions. This is in contrast to the stronger response (greater violence) of GDP in EMDEs during recessions than in advanced economies–except for financial recessions, which may be driven by the weaker GDP recovery in advanced economies in the wake of the global financial crisis around 2007-09 compared to the stronger recovery in EMDEs (Calderón and Fuentes (2014)). At the same time, the different response of unemployment and employment in EMDEs during the COVID-19 recession illustrates a valuable lesson for countries that may be overly reliant on self-employment to absorb shocks in the labor market.

5.2 Employment in demographic groups

The adjustment of employment in demographic groups to recessions is often more marked in advanced economies than in EMDEs. Employment contractions are largest for youth in both country groups. Further, the most apparent difference between advanced economies and EMDEs appears for youth and those with only a basic level of education. Overall, the results here provide support for the difference in advanced economy and EMDE cyclical adjustment driven by recessions.

Table 6 reports the violence of recessions for employment in demographic groups. Recessions have an outsized impact on employment among youth in both advanced economies and EMDEs, where recessions are associated with a contraction in youth employment by 7 and 2 percentage points, respectively. In both cases, the violence of recessions is statistically significant. The violence of recessions for other adults tends to be milder in both country groups. However, in all age groups, the violence of recessions is worse in advanced economies compared to EMDEs–though the difference is largest for youth employment. As self-employment helps to smooth employment in response to GDP fluctuations, self-employment may contribute to smaller employment losses during recessions in EMDEs regardless of age group.

In terms of education, the violence of recessions tends to be worst for workers with a basic education in advanced economies. In EMDEs, the contraction in employment for those with a basic education is less severe. This may reflect a connection between self-employment among workers with a basic education in EMDEs, which may not be the case in advanced economies. During recessions, workers with an intermediate education also experience statistically significant employment contraction in advanced economies.[11]

Figure 10 presents elasticities for demographic groups. These results are based on esti-

[11]The steepness in overall employment in advanced economies seems to be driven by the destruction of employment for workers with an intermediate level of education (see Appendix Table B.3). This could reflect that workers with less education are more exposed to shocks and experience weaker recoveries in advanced economies. In contrast, in EMDEs, workers in this group may be more likely to smooth cyclical movements in employment via self-employment. For example, Gindling and Newhouse (2014) report that self-employed workers without employees have about 2.5 less years of education than salaried workers in developing countries.

mating Equation 3 where the dependent variable is employment growth for a specific age group or education level. First, these results show that in both the short- and medium-term, youth (ages 15-24) and workers with a basic education tend to be the most sensitive to GDP fluctuations, regardless of country group. Second, the elasticities are typically larger for advanced economies within a certain age group or education level.[12]

Overall, the results presented here on the employment response to recessions provide additional evidence on the difference between advanced economy and EMDE labor market responses. In advanced economies, the response of employment (regardless of age or education level) to GDP fluctuations is generally larger than in EMDEs. Further, employment tends to fall more sharply during recessions across a range of demographic groups.

5.3 Alternative sample

Our results remain robust when we limit the analysis to countries with at least 15 years of data. We adopted the 15-year threshold as an alternative because, on average, this would allow each country to have two complete business cycles in EMDEs, which span about 7 years.[13] Appendix C presents the corresponding findings on asymmetry (Table C.1 and C.3), violence (Tables C.2 and C.4), elasticities (Figures C.2, C.3, and C.4), and composition (Figure C.1), which are qualitatively unchanged from our baseline estimates. The smaller sample size only deteriorates the statistical precision without altering the main conclusions.

6 Conclusion

Labor markets in advanced economies and EMDEs exhibit striking differences in how they respond to economic fluctuations. An economy's sectoral composition biased to a large self-employment sector can explain the difference in the unemployment- and employment-to-output elasticity between advanced economies and EMDEs. While the response of unem-

[12]The only exception to this pattern is the elasticity for workers with an advanced education in the medium-term. This result could suggest that highly-educated workers find it more challenging to secure employment after a recession in EMDEs.

[13]Refer to Appendix Tables A.1 and A.2 for the countries included in the 15-year sample.

ployment and employment to economic expansions are similar in advanced economies and EMDEs, it is during contractions that the two groups are different. Over the short-term, throughout historical recessions, for each percentage point decline in output growth, the unemployment rate rises by 0.4 percentage points in advanced economies and by only 0.1 percentage points in EMDEs. Employment growth during recessions exhibits similar differences: employment declines by 0.5 and 0.2 percentage points in advanced economies and EMDEs, respectively, for each percentage point decline in output growth.

The results suggest a bright side of the self-employment sector in EMDEs: higher self-employment, associated with low enforcement and higher informality, is associated with less cyclical adjustments of the labor market during economic downturns. This property generates lower unemployment increases in EMDEs than in advanced economies when reacting to adverse shocks. However, even seemingly cost-free meals always have disadvantages; the informal sector is associated with lower productivity, human capital accumulation, quality jobs, and access to social security. Thus, the increase in self-employment is by no means a panacea for labor markets during bad times.

Despite the decline in informality over the past few decades, self-employment remains a relatively large share of overall employment in EMDEs. Dismantling the informal sector is a priority for economies that seek to improve their tax base and optimize resource allocation. Shifting to a more services-based economy is also a goal for many economies. To successfully transition out of the agriculture and informal sectors, EMDEs should devise institutions to grant safety nets for workers to deal with negative aggregate outcomes.

Ongoing work includes further analysis of employment responses to different shocks—such as distinguishing between technological and non-technological shocks—and exploiting commodity prices to obtain structural estimates of the relevant elasticities.

References

An, Zidong, John Bluedorn, and Gabriele Ciminelli. 2022. "Okun's Law, development, and demographics: differences in the cyclical sensitivities of unemployment across economy and worker groups." *Applied Economics*, 54(36): 4227–4239.

Ball, Laurence, Daniel Leigh, and Prakash Loungani. 2017. "Okun's law: Fit at 50?" *Journal of Money, Credit and Banking*, 49(7): 1413–1441.

Blanchard, Olivier, and Justin Wolfers. 2000. "The role of shocks and institutions in the rise of European unemployment: the aggregate evidence." *The Economic Journal*, 110(462): 1–33.

Blanchflower, David G. 2000. "Self-employment in OECD countries." *Labour Economics*, 7(5): 471–505.

Boeri, Tito, Giulia Giupponi, Alan B. Krueger, and Stephen Machin. 2020. "Solo self-employment and alternative work arrangements: A cross-country perspective on the changing composition of jobs." *The Journal of Economic Perspectives*, 34(1): 170–195.

Boeri, Tito, Pietro Garibaldi, and Espen R Moen. 2013. "Financial shocks and labor: facts and theories." *IMF Economic Review*, 61(4): 631–663.

Boz, Emine, C Bora Durdu, and Nan Li. 2015. "Emerging market business cycles: The role of labor market frictions." *Journal of Money, Credit and Banking*, 47(1): 31–72.

Calderón, César, and J Rodrigo Fuentes. 2014. "Have business cycles changed over the last two decades? An empirical investigation." *Journal of Development Economics*, 109: 98–123.

Caselli, Francesco. 2005. "Chapter 9: Accounting for cross-country income differences." In . Vol. 1 of *Handbook of Economic Growth*, ed. Philippe Aghion and Steven N. Durlauf, 679–741. Elsevier.

Donovan, Kevin, Will Jianyu Lu, and Todd Schoellman. 2023. "Labor market dynamics and development." *The Quarterly Journal of Economics*, 138(4): 2287–2325.

Donovan, Kevin, Will Jianyu Lu, Joseph H Pedtke, and Todd Schoellman. 2024. "Labor market anatomy of a macroeconomic crisis." National Bureau of Economic Research Working Paper 33061.

Feng, Ying, David Lagakos, and James E Rauch. 2023. "Unemployment and development." *The Economic Journal*, 134(658): 614–647.

Fernández, Andrés, and Felipe Meza. 2015. "Informal employment and business cycles in emerging economies: The case of Mexico." *Review of Economic Dynamics*, 18(2): 381–405.

Finkelstein Shapiro, Alan. 2014. "Self-employment and business cycle persistence: Does the composition of employment matter for economic recoveries?" *Journal of Economic Dynamics and Control*, 46: 200–218.

Gindling, Thomas H, and David Newhouse. 2014. "Self-employment in the developing world." *World development*, 56: 313–331.

Harding, Don, and Adrian Pagan. 2002. "Dissecting the cycle: A methodological investigation." *Journal of monetary economics*, 49(2): 365–381.

Horvath, Jaroslav, and Guanyi Yang. 2022. "Unemployment dynamics and informality in small open economies." *European Economic Review*, 141: 103949.

Ilut, Cosmin, Matthias Kehrig, and Martin Schneider. 2018. "Slow to hire, quick to fire: Employment dynamics with asymmetric responses to news." *Journal of Political Economy*, 126(5): 2011–2071.

IMF. 2010. "World Economic Outlook April."

Kose, M Ayhan, Naotaka Sugawara, and Marco E Terrones. 2020. "Global recessions."

Laeven, Luc, and Fabian Valencia. 2020. "Systemic banking crises database II." *IMF Economic Review*, 68: 307–361.

Leyva, Gustavo, and Carlos Urrutia. 2020. "Informality, labor regulation, and the business cycle." *Journal of International Economics*, 126: 103340.

McKay, Alisdair, and Ricardo Reis. 2008. "The brevity and violence of contractions and expansions." *Journal of Monetary Economics*, 55(4): 738–751.

Neftci, Salih. 1984. "Are economic time series asymmetric over the business cycle?" *Journal of Political Economy*, 92(2): 307–28.

Nickell, Stephen, and Richard Layard. 1999. "Labor market institutions and economic performance." *Handbook of Labor Economics*, 3: 3029–3084.

Okun, Arthur M. 1962. *Potential GNP: its measurement and significance.* Cowles Foundation for Research in Economics at Yale University.

Poschke, Markus. 2023. "Wage employment, unemployment and self-employment across countries." Institute of Labor Economics (IZA) IZA Discussion Papers 16271.

Sichel, Daniel E. 1993. "Business cycle asymmetry: A deeper look." *Economic Inquiry*, 31(2): 224–236.

Silvapulle, Paramsothy, Imad A Moosa, and Mervyn J Silvapulle. 2004. "Asymmetry in Okun's law." *Canadian Journal of Economics/Revue canadienne d'économique*, 37(2): 353–374.

WorldBank. 2015. "Global Economic Prospects June."

Yeyati, Eduardo Levy, and Ugo Panizza. 2011. "The elusive costs of sovereign defaults." *Journal of Development Economics*, 94(1): 95–105.

Table 1: Steepness of GDP and employment in EMDEs and advanced economies

	GDP	Employment	Unemployment rate
All	-1.404**	-0.729	1.580**
	(0.585)	(1.870)	(0.803)
Advanced economies	-1.483*	-1.620**	2.536**
	(0.876)	(0.764)	(1.203)
EMDEs	-1.287*	-0.356	-0.0323
	(0.698)	(2.155)	(0.731)
Advanced economies-EMDEs	-0.195	-1.264	2.569*
	(1.119)	(2.286)	(1.407)

Notes: This table reports skewness coefficients for GDP, employment, and the unemployment rate. "All" simply reports the estimated constant coefficient from regressing the skewness measure on a constant for a sample of 58 countries, including 28 advanced economies and 30 EMDEs. The estimation period is 1992-2019. The results for advanced economies, EMDEs, and the difference are based on Equation 1. Robust standard errors are in parenthesis. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

Table 2: Recessions' violence in EMDEs and advanced economies

	(1) GDP growth	(2) Employment growth	(3) Change in unemployment	(4) GDP growth	(5) Employment growth	(6) Change in unemployment
Expansions						
EMDEs	4.337***	1.565***	-0.282***			
	(0.120)	(0.205)	(0.0623)			
Advanced economies	3.146***	1.367***	-0.376***			
	(0.0856)	(0.0665)	(0.0354)			
Recessions' violence						
EMDEs	-5.699***	-0.447	0.868***	-6.054***	-0.708	0.887***
	(0.442)	(0.403)	(0.207)	(0.507)	(0.501)	(0.234)
Advanced economies	-4.920***	-2.691***	1.737***	-4.675***	-2.647***	1.764***
	(0.294)	(0.271)	(0.172)	(0.329)	(0.269)	(0.182)
Differences in recessions' violence						
Advanced economies-EMDEs	0.779	-2.244***	0.869***	1.380**	-1.939***	0.877***
	(0.531)	(0.486)	(0.269)	(0.604)	(0.569)	(0.296)
Observations	1,085	1,085	1,007	1,085	1,085	1,007
Country fixed effects	No	No	No	Yes	Yes	Yes

Notes: The dependent variables is either real GDP growth, employment growth, or the change in the unemployment rate. The sample consists of 58 countries, including 28 advanced economies and 30 EMDEs. The estimation period is 1992-2019. Columns (4)-(6) include country fixed effects. Recessions dates are from Kose, Sugawara and Terrones (2020). Robust standard errors are in parenthesis. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

Table 3: Steepness of wage and self-employment in EMDEs and advanced economies

	Employment rate		Employment	
	Wage	Self	Wage	Self
All	1.727	-2.294	0.249	-0.876
	(8.787)	(5.968)	(0.912)	(1.247)
Advanced economies	-2.024**	0.551	-1.670**	0.610
	(0.980)	(0.728)	(0.734)	(0.698)
EMDEs	1.487	-1.551	0.798	-1.333
	(6.871)	(4.008)	(1.035)	(1.545)
Advanced economies-EMDEs	-3.511	2.102	-2.468*	1.942
	(6.941)	(4.074)	(1.269)	(1.696)

Notes: This table reports skewness coefficients for wage and self-employment and employment rates. "All" simply reports the estimated constant coefficient from regressing the skewness measure on a constant for a sample of 58 countries, including 28 advanced economies and 30 EMDEs. The estimation period is 1992-2019. The results for advanced economies, EMDEs, and the difference are based on Equation 1. Robust standard errors are in parenthesis. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

Table 4: Recessions' violence in wage and self-employment

	(1) Wage employment	(2) Self-employment	(3) Wage employment	(4) Self-employment
Expansions				
EMDEs	2.546***	0.320		
	(0.236)	(0.394)		
Advanced economies	1.621***	0.269		
	(0.0744)	(0.182)		
Recessions' violence				
EMDEs	-2.214***	1.739***	-2.530***	1.607*
	(0.411)	(0.656)	(0.452)	(0.865)
Advanced economies	-3.065***	-0.897**	-3.074***	-0.715**
	(0.305)	(0.392)	(0.312)	(0.359)
Differences in recessions' violence				
Advanced economies-EMDEs	-0.851*	-2.636***	-0.544	-2.322**
	(0.512)	(0.764)	(0.550)	(0.937)
Observations	1,085	1,085	1,085	1,085
Country fixed effects	No	No	Yes	Yes

Notes: The dependent variable is either wage or self-employment growth. The sample consists of 58 countries, including 28 advanced economies and 30 EMDEs. The estimation period is 1992-2019. Columns (3) and (4) include country fixed effects. Recessions dates are from Kose, Sugawara and Terrones (2020). Robust standard errors are in parenthesis. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

Table 5: Violence of recession, by recession type

	(1) GDP growth	(2) Employment growth	(3) Change in Unemployment	(4) Wage employment	(5) Self-employment
Non-financial recessions' violence					
EMDEs	-5.467***	0.0330	0.960***	-1.852***	1.905*
	(0.447)	(0.614)	(0.188)	(0.459)	(1.056)
Advanced economies	-3.962***	-2.059***	1.438***	-2.396***	-0.442
	(0.333)	(0.219)	(0.159)	(0.255)	(0.381)
Financial recessions' violence					
EMDEs	-6.839***	-1.844***	0.866*	-3.264***	0.640
	(0.894)	(0.582)	(0.456)	(0.692)	(1.002)
Advanced economies	-6.488***	-3.927***	2.544***	-4.527***	-1.412**
	(0.642)	(0.659)	(0.447)	(0.760)	(0.716)
COVID recession's violence					
EMDEs	-9.987***	-7.951***	2.321***	-8.832***	-6.542**
	(0.750)	(1.447)	(0.663)	(1.353)	(3.098)
Advanced economies	-7.416***	-2.866***	1.316***	-3.193***	-1.305**
	(0.628)	(0.387)	(0.255)	(0.414)	(0.622)
Difference in violence (Advanced economies-EMDEs)					
Non-financial recessions	1.505***	-2.092***	0.478*	-0.543	-2.347**
	(0.557)	(0.652)	(0.246)	(0.525)	(1.123)
Financial recessions	0.352	-2.083**	1.678***	-1.263	-2.052*
	(1.101)	(0.879)	(0.639)	(1.028)	(1.232)
COVID recession	2.571***	5.086***	-1.005	5.640***	5.237*
	(0.978)	(1.497)	(0.710)	(1.415)	(3.160)
Observations	1,178	1,178	1,100	1,178	1,178
Country FEs	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variables is GDP growth, employment growth, the change in the unemployment rate, wage, or self-employment growth. The sample consists of 58 countries, including 28 advanced economies and 30 EMDEs. The estimation period is 1992-2022. (Non-)financial recessions are recessions that do (not) coincide with a financial crisis. Recessions dates are from Kose, Sugawara and Terrones (2020). Financial crisis dates are from Laeven and Valencia (2020). Robust standard errors are in parenthesis. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

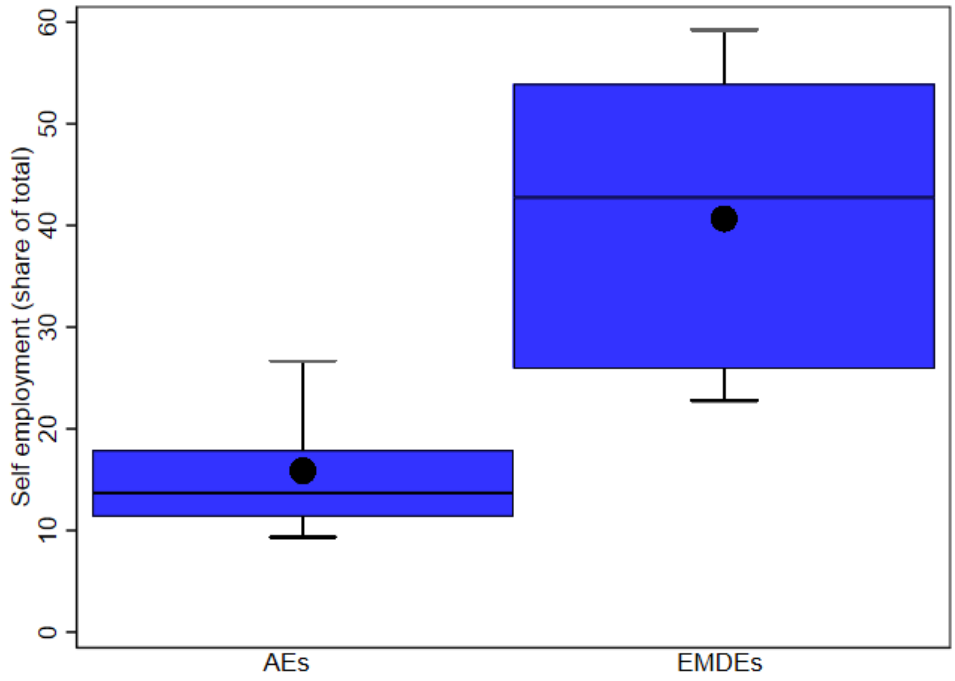
Table 6: Violence of recessions by demographic groups

	(1)	(2)	(3)	(4)	(5)	(6)
		Age group			Education group	
	15-24	25-54	55-64	Basic	Intermediate	Advanced
Recessions' violence						
EMDEs	-2.407*	-0.986*	0.440	-0.911	-1.200	-2.127*
	(1.416)	(0.581)	(0.609)	(0.898)	(0.831)	(1.157)
Advanced economies	-6.629***	-2.254***	-2.191***	-4.373***	-3.057***	-0.792
	(1.420)	(0.466)	(0.671)	(1.063)	(0.766)	(0.832)
Differences in recession's violence (Advanced economies-EMDEs)						
Difference	-4.222**	-1.268*	-2.631***	-3.462**	-1.857	1.335
	(2.006)	(0.745)	(0.906)	(1.392)	(1.130)	(1.425)
Observations	867	867	867	867	867	867
Country FEs	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variables is employment growth by age group or level of education. Employment of those with a basic, intermediate, or advanced education refer to workers with only primary or lower secondary education, upper secondary/non-tertiary education, or workers with at least some tertiary education, respectively (as defined by ILO). Age groups are based on ILO classifications. The sample consists of up to 53 countries, including 25 advanced economies and 28 EMDEs. The estimation period is 1992-2019. Recessions dates are from Kose, Sugawara and Terrones (2020). Country fixed effects are included. Robust standard errors are in parenthesis. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

Figures

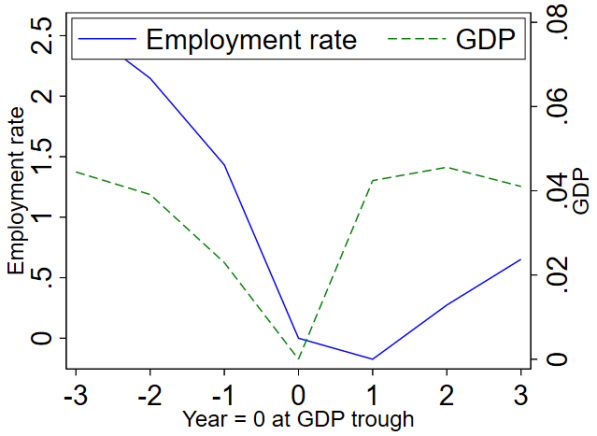
Figure 1: Prevalence of self-employment



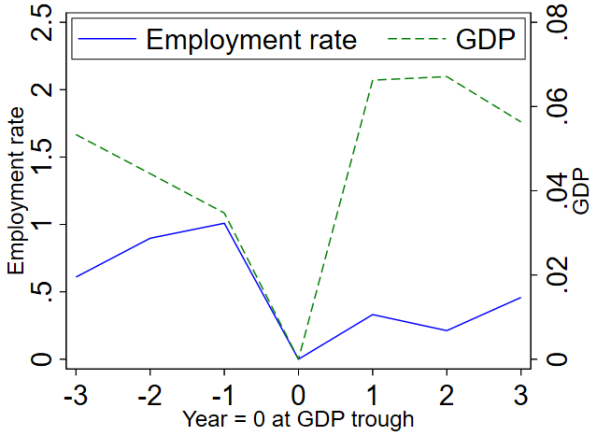
Notes: Circles denotes the average of the self-employment to total employment ratio (based on country averages between 1990-2019 for the baseline sample of 58 countries). The midline of the box denotes the median, the top and bottom lines of the box denote the upper and lower quartiles, respectively. Whiskers denote the upper and lower deciles.

Figure 2: Employment rate and GDP growth around GDP troughs

(a) Advanced economies



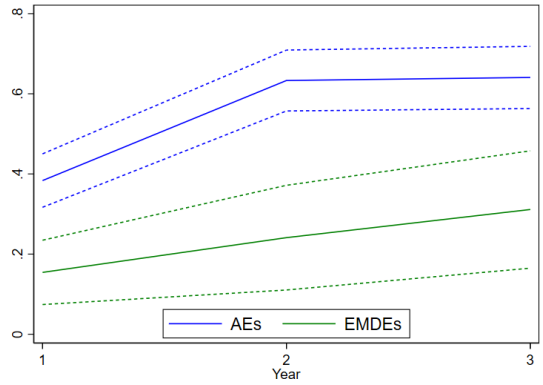
(b) EMDEs



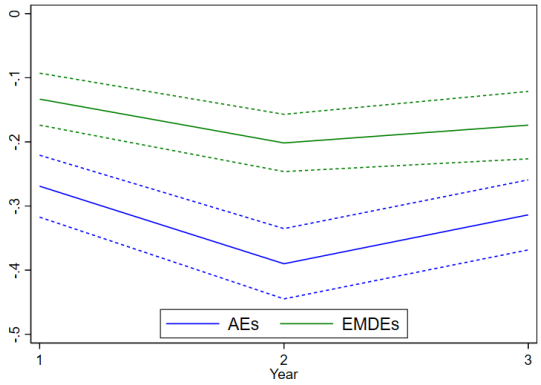
Notes: Difference in the employment rate and GDP growth relative to trough years. Identification of trough years is from Kose, Sugawara and Terrones (2020) based on turning points using the algorithm introduced by Harding and Pagan (2002). On the x-axis, -3 to -1 are the years leading up to a GDP trough and years 1 to 3 are the initial years of recovery after a recession ends. Based on the baseline regression sample including 28 advanced economies and 30 EMDEs, between 1992 and 2019.

Figure 3: Employment and unemployment-to-output elasticities

(a) Employment elasticities



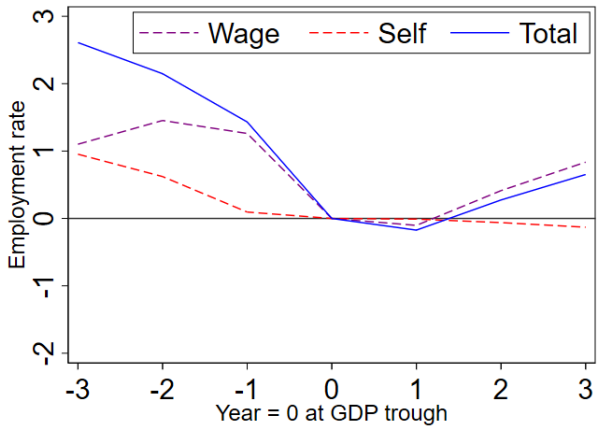
(b) Unemployment elasticities



Notes: Unemployment- and employment-to-output elasticities are denoted by the solid lines. 90-percent confidence intervals are denoted by the dashed lines. The sample includes 28 advanced economies and 30 EMDEs, between 1992-2019. See Appendix Table B.1 for corresponding estimation results.

Figure 4: Wage-, Self-, and Total Employment around GDP troughs

(a) Advanced economies



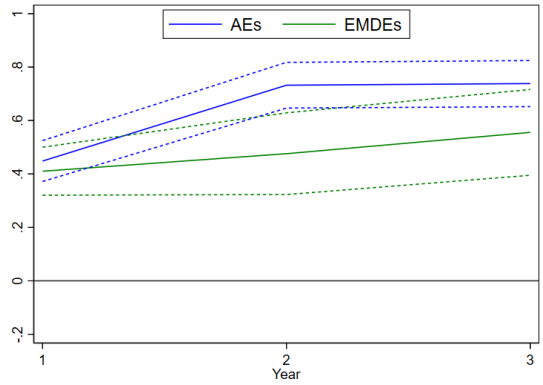
(b) EMDEs



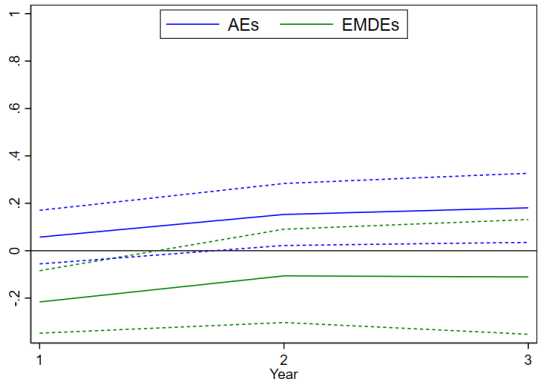
Notes: Difference in wage-, self-, and total employment rate relative to trough years. Identification of trough years is from Kose, Sugawara and Terrones (2020) based on turning points using the algorithm introduced by Harding and Pagan (2002). On the x-axis, -3 to -1 are the years leading up to a GDP trough and years 1 to 3 are the initial years of recovery after a recession ends. Based on the baseline regression sample including 28 advanced economies and 30 EMDEs, between 1992 and 2019.

Figure 5: Wage and self employment-to-output elasticities

(a) Wage employment elasticities

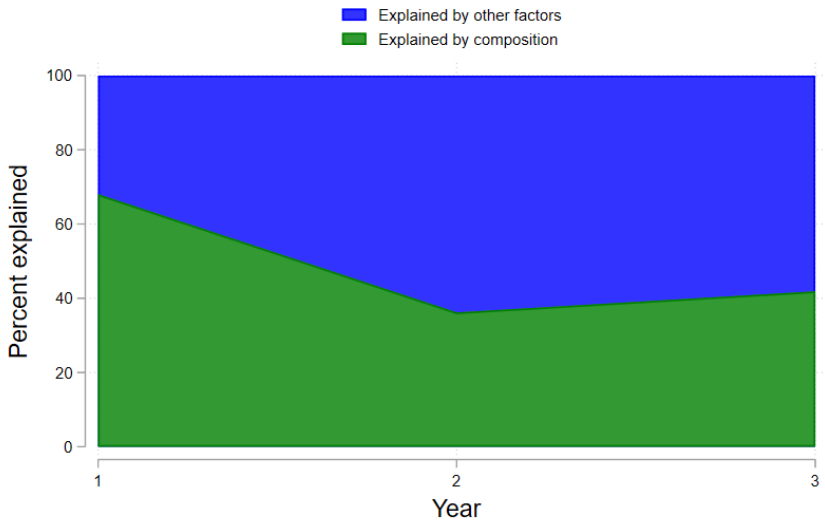


(b) Self employment elasticities



Notes: Wage- and self-employment-to-output elasticities are denoted by the solid lines. 90-percent confidence intervals are denoted by the dashed lines. The sample includes 28 advanced economies and 30 EMDEs, between 1992 and 2019. See Appendix Table B.2 for corresponding estimation results.

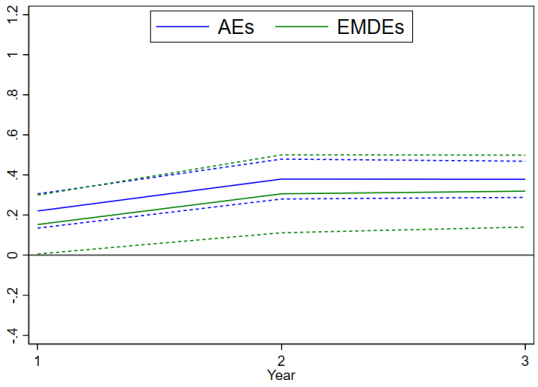
Figure 6: Explanation of the difference between AE and EMDE employment elasticities



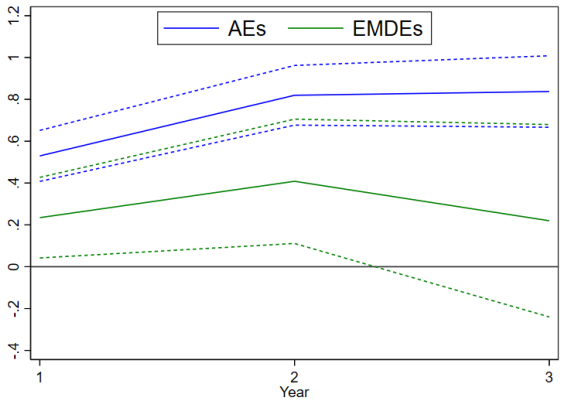
Notes: Share of the difference between AE and EMDE employment elasticities explained by sectoral composition of employment or other factors. The green shaded area shows the difference between the EMDE counterfactual employment elasticity and the actual EMDE employment elasticity in percent of the difference between the AE employment elasticity and the actual EMDE employment elasticity. The blue shaded area represents the difference between AE and EMDE employment elasticities that are not explained by differences in sectoral composition. To compute these shares, the elasticities in Figure 3a are used in combination with an elasticity derived from the EMDE elasticities in Figure 5 and the average of AE self and wage employment in total employment. See section 4.1 for details on this computation. The sample includes 28 advanced economies and 30 EMDEs, between 1992 and 2019.

Figure 7: Employment and unemployment-to-output elasticities during recessions or good times

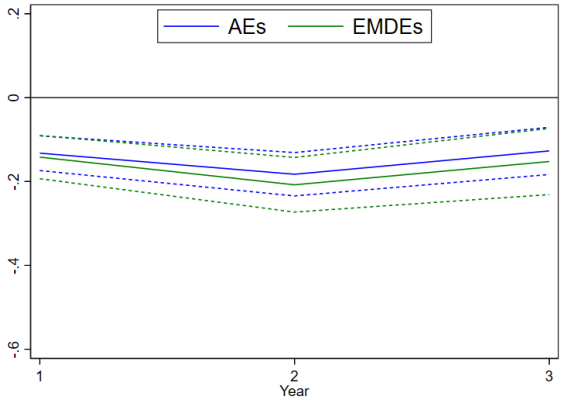
(a) Employment elasticities, good times



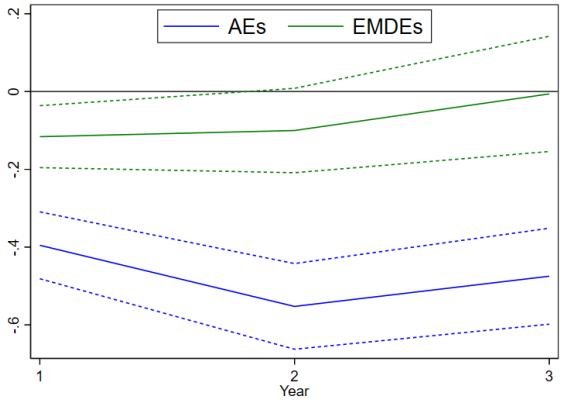
(b) Employment elasticities, recessions



(c) Unemployment elasticities, good times



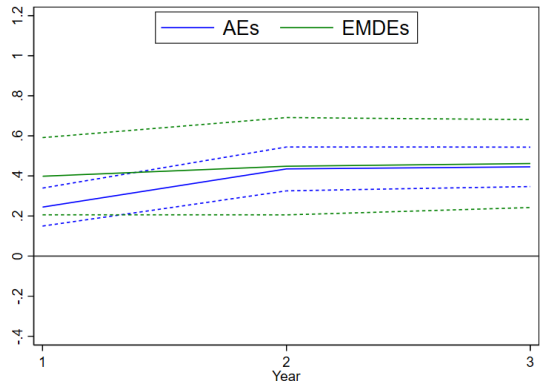
(d) Unemployment elasticities, recessions



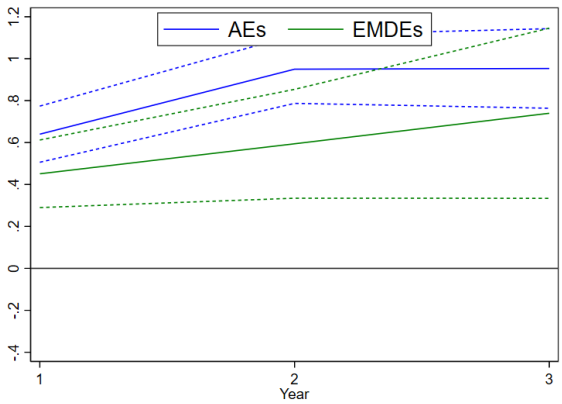
Notes: Unemployment- and employment-to-output elasticities during good times or recessions are denoted by the solid lines. 90-percent confidence intervals are denoted by the dashed lines. The sample includes 28 advanced economies and 30 EMDEs, between 1992 and 2019. Recession dates are from Kose, Sugawara and Terrones (2020).

Figure 8: Wage and self-employment-to-output elasticities during recessions or good times

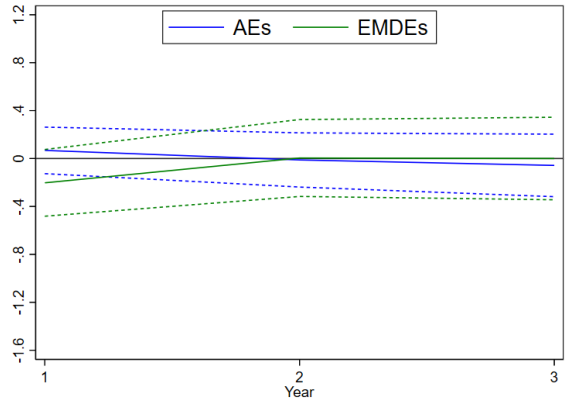
(a) Wage employment, good times



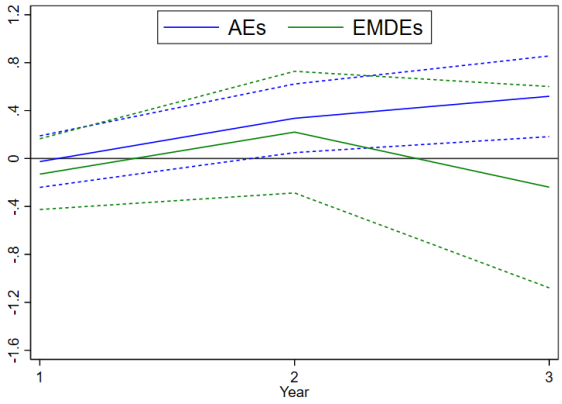
(b) Wage employment, recessions



(c) Self employment, good times



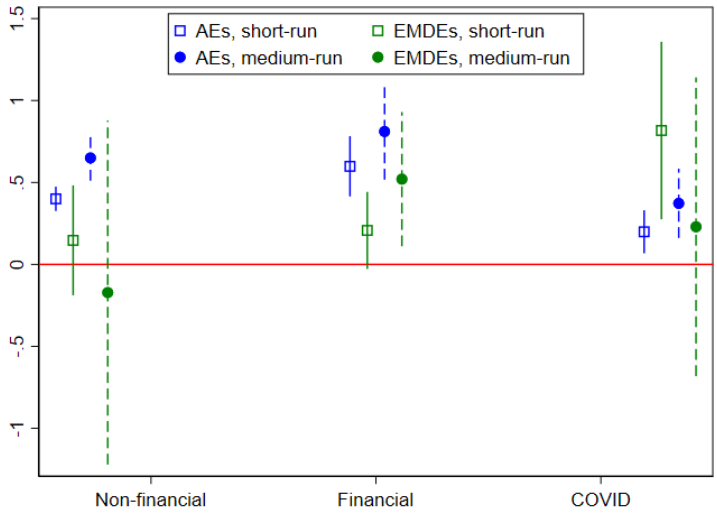
(d) Self employment, recessions



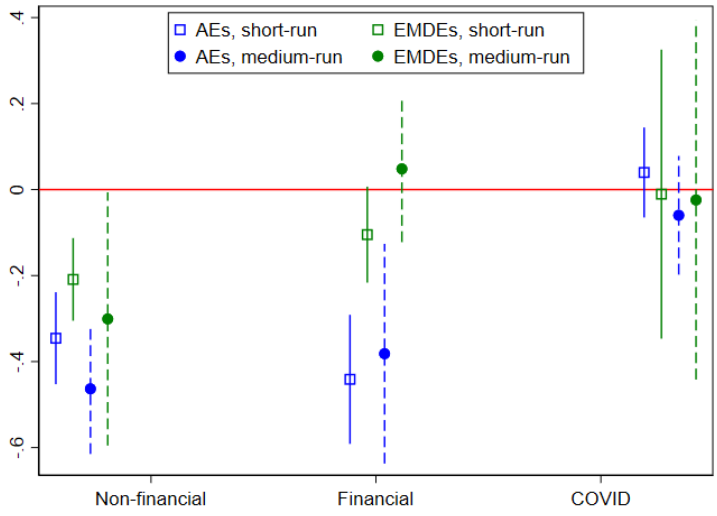
Notes: Wage and self-employment-to-output elasticities during good times or recessions are denoted by the solid lines. 90-percent confidence intervals are denoted by the dashed lines. The sample includes 28 advanced economies and 30 EMDEs, between 1992 and 2019. Recession dates are from Kose, Sugawara and Terrones (2020).

Figure 9: Employment and unemployment-to-output elasticities, by recession type

(a) Employment to output elasticities



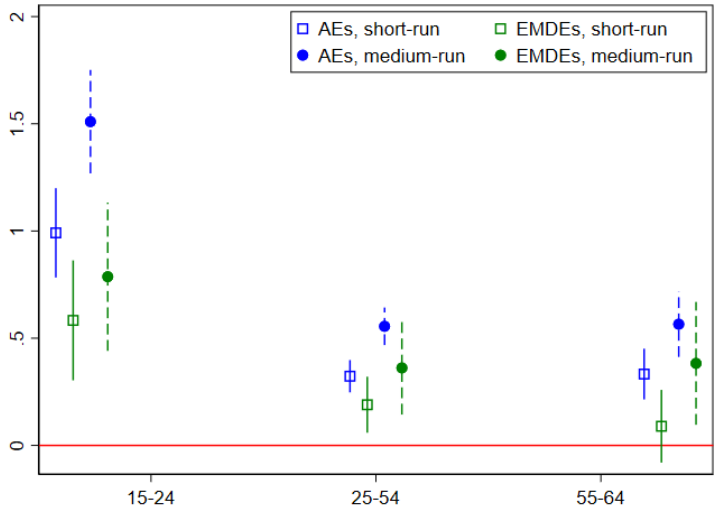
(b) Unemployment to output elasticities



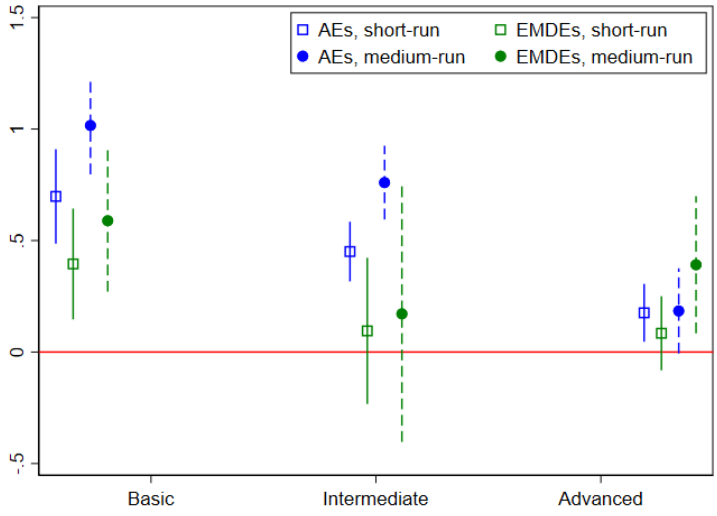
Notes: The short-run elasticities refer to the employment response to contemporaneous GDP fluctuations; the medium-run elasticities refer to the employment response to cumulative GDP changes over 3 years (or 2 years for COVID). 90-percent confidence intervals are denoted by the solid and dashed lines, for short- and medium-run elasticities, respectively. The sample includes 58 countries, including 28 advanced economies and 30 EMDEs.

Figure 10: Employment-to-output elasticities, by age group or education level

(a) Elasticities by age group



(b) Elasticities by education level



Notes: The short-run elasticities refer to the response to contemporaneous GDP fluctuations; the medium-run elasticities refer to the response to cumulative GDP changes over 3 years. 90-percent confidence intervals are denoted by the solid and dashed lines, for short- and medium-run elasticities, respectively. Employment of those with a basic, intermediate, or advanced education refer to workers with only primary or lower secondary education, upper secondary/non-tertiary education, or workers with at least some tertiary education, respectively (as defined by ILO). The sample consists of up to 53 countries, including 25 advanced economies and 28 EMDEs. The estimation period is 1992-2019.

A Sample and data details

Table A.1: Advanced economies in the sample

Country	First year	Last year	Sources
Australia*	1992	2019	OECD
Austria*	1999	2019	OECD
Belgium*	1992	2019	OECD
Canada*	2000	2019	OECD
Czech Republic*	1994	2019	ILO, OECD
Denmark*	1992	2019	OECD
Finland*	1992	2019	OECD
France*	2004	2019	OECD
Germany*	1992	2019	OECD
Greece*	1992	2019	ILO, OECD
Hong Kong SAR	2012	2019	ILO
Ireland*	1992	2019	OECD
Israel*	1998	2019	OECD
Italy*	1992	2019	OECD
Japan*	1992	2019	OECD
Korea*	1992	2019	OECD
Latvia*	1999	2019	ILO, OECD
Lithuania	2006	2019	OECD
Netherlands*	1992	2019	OECD
New Zealand*	1992	2019	OECD
Norway*	1992	2018	OECD
Portugal*	1992	2019	OECD
Slovak Republic*	2001	2019	ILO, OECD
Slovenia*	1998	2019	ILO, OECD
Spain*	1999	2019	OECD
Sweden*	1992	2019	ILO, OECD
Switzerland*	1993	2019	ILO, OECD
United States*	1992	2019	OECD

Notes: All countries listed here are included in the baseline sample and include at least 8 years of of employment, self-employment, and wage employment.* = robustness regression sample and at least 15 years of employment, self-employment, and wage employment.

Table A.2: EMDEs in the sample

Country	First year	Last year	Sources
Albania	2009	2019	ILO
Argentina	2006	2019	ILO
Bosnia and Herzegovina	2008	2019	ILO
Brazil*	1997	2019	ILO, OECD
Cambodia	1997	2017	ILO
Chile	2011	2019	OECD
Colombia*	2003	2019	ILO, OECD
Costa Rica	2003	2019	ILO, OECD
Dominican Republic*	2002	2019	ILO
Ecuador	2004	2019	ILO
El Salvador	2012	2019	ILO
Georgia	2011	2019	ILO
Honduras	2007	2017	ILO
Hungary*	1994	2019	ILO, OECD
Indonesia*	1997	2019	ILO, OECD
Islamic Republic of Iran	2006	2017	ILO
Mexico*	2004	2019	ILO, OECD
Moldova*	2001	2019	ILO
Mongolia	2010	2018	ILO
North Macedonia	2008	2019	ILO
Pakistan	2008	2019	ILO
Panama	2012	2019	ILO
Paraguay	2004	2017	ILO
Peru*	1999	2019	ILO
Poland*	1994	2019	OECD
Russia*	2000	2019	ILO, OECD
South Africa	2002	2019	ILO, OECD
Türkiye*	2001	2019	ILO, OECD
Uruguay*	2000	2018	ILO
Vietnam	2011	2019	ILO

Notes: All countries listed here are included in the baseline sample and include at least 8 years of employment, self-employment, and wage employment.* = robustness regression sample and at least 15 years of employment, self-employment, and wage employment.

Table A.3: Summary statistics

	Mean	SD	P25	P50	P75
Advanced economies					
GDP growth	2.323	2.802	1.100	2.337	3.706
Change in unemployment rate	-0.077	1.155	-0.637	-0.217	0.350
Employment growth	0.946	2.080	0.079	1.081	2.015
Self-employment growth	0.201	4.082	-1.648	0.143	2.035
Wage employment growth	1.132	2.351	0.094	1.354	2.311
Employment rate	92.441	4.002	90.964	93.264	95.210
Self-employment rate	14.829	6.945	10.132	13.158	16.555
Wage employment rate	77.610	8.416	73.468	79.607	83.151
EMDEs					
GDP growth	3.539	3.292	2.015	3.994	5.355
Change in unemployment rate	-0.115	1.270	-0.635	-0.119	0.337
Employment growth	1.388	3.203	0.224	1.386	2.613
Self-employment growth	0.512	4.733	-1.688	0.584	2.771
Wage employment growth	1.842	4.151	0.019	1.721	3.766
Employment rate	92.454	3.557	89.968	92.882	95.134
Self-employment rate	33.190	16.260	21.048	31.906	48.272
Wage employment rate	59.179	15.588	45.313	58.947	69.601

Notes: Summary statistics for main regression sample, including 28 advanced economies and 30 EMDEs between 1990 and 2019. Refer to Appendix Tables A.1 and A.2 for the country list.

B Additional results

Table B.1: Employment and unemployment-to-output elasticities

	(1) Unemployment	(2) Employment
$\beta_1^{AE,Okun}$	-0.269	0.383
	(0.029)	(0.041)
$\beta_1^{AE,Okun} + \beta_2^{AE,Okun}$	-0.390	0.633
	(0.033)	(0.046)
$\beta_1^{AE,Okun} + \beta_2^{AE,Okun} + \beta_3^{AE,Okun}$	-0.314	0.641
	(0.033)	(0.047)
$\beta_1^{EMDE,Okun}$	-0.133	0.154
	(0.025)	(0.049)
$\beta_1^{EMDE,Okun} + \beta_2^{EMDE,Okun}$	-0.202	0.241
	(0.027)	(0.080)
$\beta_1^{EMDE,Okun} + \beta_2^{EMDE,Okun} + \beta_3^{EMDE,Okun}$	-0.174	0.311
	(0.032)	(0.089)
Observations	1,016	1,094

Notes: The dependent variable is the change in the unemployment rate or employment growth. The estimation period is 1992-2019. Sample includes 28 advanced economies and 30 EMDEs. Country fixed effects are included. Robust standard errors are in parenthesis.

Table B.2: Wage and self-employment-to-output elasticities

	(1) Self-employment	(2) Wage employment
$\beta_1^{AE,Okun}$	0.057	0.448
	(0.069)	(0.047)
$\beta_1^{AE,Okun} + \beta_2^{AE,Okun}$	0.153	0.732
	(0.080)	(0.052)
$\beta_1^{AE,Okun} + \beta_2^{AE,Okun} + \beta_3^{AE,Okun}$	0.181	0.738
	(0.089)	(0.053)
$\beta_1^{EMDE,Okun}$	-0.216	0.410
	(0.080)	(0.055)
$\beta_1^{EMDE,Okun} + \beta_2^{EMDE,Okun}$	-0.106	0.476
	(0.120)	(0.093)
$\beta_1^{EMDE,Okun} + \beta_2^{EMDE,Okun} + \beta_3^{EMDE,Okun}$	-0.111	0.556
	(0.147)	(0.098)
Observations	1,094	1,094

Notes: The dependent variable is wage employment growth or self-employment growth. The estimation period is 1992-2019. Sample includes 28 advanced economies and 30 EMDEs. Country fixed effects are included. Robust standard errors are in parenthesis.

Table B.3: Steepness in employment by demographic groups

	Age group			Education group		
	15-24	25-54	55-64	Basic	Intermediate	Advanced
All	-0.146	-0.387	-0.106	0.424	-0.544	0.227
	(0.379)	(2.214)	(0.488)	(0.593)	(0.614)	(0.855)
Advanced economies	-0.137	-0.601	-0.00815	0.469	-0.992*	1.510
	(0.507)	(0.682)	(0.563)	(0.687)	(0.525)	(1.220)
EMDEs	-0.154	-0.270	-0.158	0.242	-0.244	-0.256
	(0.556)	(2.545)	(0.668)	(1.058)	(0.880)	(0.964)
Advanced economies-EMDEs	0.0171	-0.331	0.150	0.227	-0.748	1.766
	(0.752)	(2.635)	(0.874)	(1.262)	(1.024)	(1.555)

Notes: This table reports skewness coefficients for employment by age or education group. "All" simply reports the estimated constant coefficient from regressing the skewness measure on a constant. Employment of those with a basic, intermediate, or advanced education refer to workers with only primary or lower secondary education, upper secondary/non-tertiary education, or workers with at least some tertiary education, respectively (as defined by ILO). Age groups are based on ILO classifications. The sample consists of up to 53 countries, including 25 advanced economies and 28 EMDEs. The estimation period is 1992-2019. Recessions dates are from Kose, Sugawara and Terrones (2020). Robust standard errors are in parenthesis. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

C Results using an alternative sample, including countries with at least 15 years of complete data

Table C.1: Steepness of GDP and employment in EMDEs and advanced economies, with alternative sample

	GDP	Employment	Unemployment rate
All	-1.415**	1.186	1.639*
	(0.612)	(2.528)	(0.954)
Advanced economies	-1.139	-1.596**	2.397*
	(0.799)	(0.801)	(1.308)
EMDEs	-1.782**	2.955	0.0177
	(0.906)	(3.897)	(1.054)
Advanced economies-EMDEs	0.643	-4.551	2.379
	(1.208)	(3.979)	(1.680)

Notes: This table reports skewness coefficients for GDP, employment, and the employment rate. "All" simply reports the estimated constant coefficient from regressing the skewness measure on a constant. The sample consists of 38 countries, including 26 advanced economies and 12 EMDEs. The estimation period is 1992-2019. Recessions dates are from Kose, Sugawara and Terrones (2020). ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

Table C.2: Recessions' violence in EMDEs and advanced economies, with alternative sample

	(1) GDP growth	(2) Employment growth	(3) Change in unemployment	(4) GDP growth	(5) Employment growth	(6) Change in unemployment
Expansions						
EMDEs	4.393***	1.574***	-0.264***			
	(0.152)	(0.234)	(0.0781)			
Advanced economies	3.125***	1.395***	-0.370***			
	-0.087	-0.0673	-0.0344			
Recessions' violence						
EMDEs	-6.743***	-1.466***	1.130***	-6.850***	-1.786***	1.031***
	(0.711)	(0.430)	(0.352)	(0.770)	(0.524)	(0.368)
Advanced economies	-4.771***	-2.668***	1.679***	-4.515***	-2.599***	1.701***
	(0.270)	(0.269)	(0.163)	(0.296)	(0.267)	(0.168)
Differences in recessions' violence						
Advanced economies-EMDEs	1.971***	-1.201**	0.549	2.335***	-0.814	0.671*
	(0.760)	(0.507)	(0.388)	(0.825)	(0.588)	(0.405)
Observations	889	889	811	889	889	811
Country fixed effects	No	No	No	Yes	Yes	Yes

Notes: The dependent variables is either real GDP growth, employment growth, or the change in the unemployment rate. The sample consists of 38 countries, including 26 advanced economies and 12 EMDEs. The estimation period is 1992-2019. Columns (4)-(6) include country fixed effects. Recessions dates are from Kose, Sugawara and Terrones (2020). Robust standard errors are in parenthesis. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

Table C.3: Steepness of wage and self-employment in EMDEs and advanced economies, with alternative sample

	Employment rate		Employment	
	Wage	Self	Wage	Self
All	1.886	-3.192	0.220	1.048
	(9.816)	(9.811)	(1.346)	(0.856)
Advanced economies	-1.914*	0.865	-1.656**	0.978
	(1.038)	(0.794)	(0.761)	(0.773)
EMDEs	1.357	-1.898	1.167	1.146
	(6.502)	(5.772)	(1.776)	(1.921)
Advanced economies-EMDEs	-3.271	2.763	-2.823	-0.168
	(6.584)	(5.826)	(1.932)	(2.070)

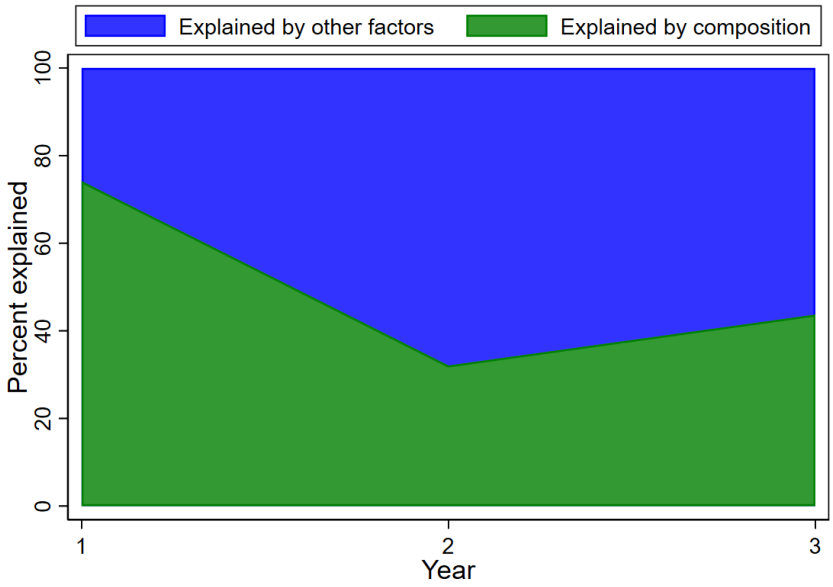
Notes: This table reports skewness coefficients for wage and self-employment and employment rates. "All" simply reports the estimated constant coefficient from regressing the skewness measure on a constant for a sample of 38 countries, including 26 advanced economies and 12 EMDEs. The estimation period is 1992-2019. The results for advanced economies, EMDEs, and the difference are based on Equation 1. Robust standard errors are in parenthesis. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

Table C.4: Recessions' violence in wage and self-employment, with alternative sample

	(1) Wage employment	(2) Self-employment	(3) Wage employment	(4) Self-employment
Expansions				
EMDEs	2.180***	0.434		
	(0.298)	(0.352)		
Advanced economies	1.642***	0.363**		
	(0.076)	-0.177		
Recessions' violence				
EMDEs	-2.674***	-2.674***	-3.059***	0.313
	(0.586)	(0.586)	(0.673)	(0.660)
Advanced economies	-3.033***	-3.033***	-3.022***	-0.725**
	(0.304)	(0.304)	(0.311)	(0.362)
Differences in recessions' violence				
Advanced economies-EMDEs	-0.359	-1.581**	0.0369	-1.038
	(0.660)	(0.692)	(0.741)	(0.753)
Observations	889	889	889	889
Country fixed effects	No	No	Yes	Yes

Notes: The dependent variable is either wage or self-employment growth. The sample consists of 38 countries, including 26 advanced economies and 12 EMDEs. The estimation period is 1992-2019. Columns (3) and (4) include country fixed effects. Recessions dates are from Kose, Sugawara and Terrones (2020). Robust standard errors are in parenthesis. ***, **, and * represent significance levels at 1%, 5%, and 10%, respectively.

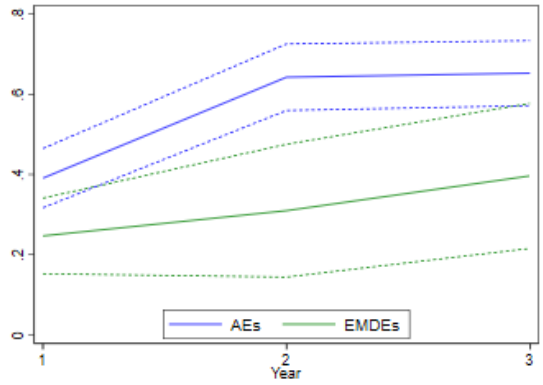
Figure C.1: Explanation of the difference between AE and EMDE employment elasticities, with alternative sample



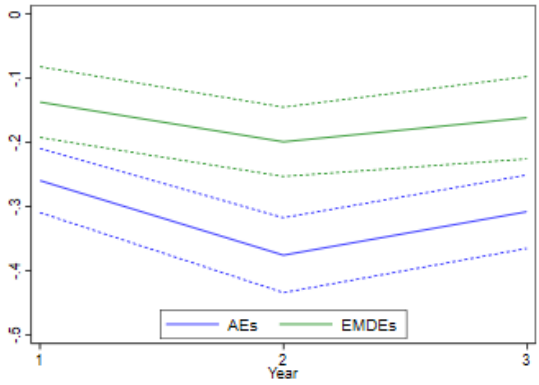
Notes: Share of the difference between AE and EMDE employment elasticities explained by sectoral composition of employment or other factors. The green shaded area shows the difference between the EMDE counterfactual employment elasticity and the actual EMDE employment elasticity in percent of the difference between the AE employment elasticity and the actual EMDE employment elasticity. The blue shaded area represents the difference between AE and EMDE employment elasticities that are not explained by differences in sectoral composition. To compute these shares, the elasticities from regressions using a sample of 38 countries (26 advanced economies and 12 EMDEs) are used in combination with an elasticity derived from the EMDE elasticities there and the average of AE self and wage employment in total employment. See section 4.1 for details on this computation. The sample includes 28 advanced economies and 30 EMDEs, between 1992 and 2019.

Figure C.2: Employment and unemployment-to-output elasticities, with alternative sample

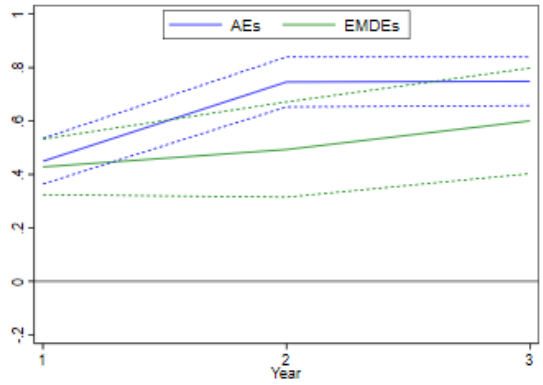
(a) Employment elasticities



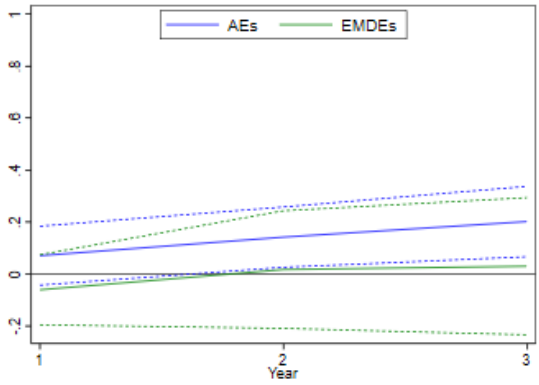
(b) Unemployment elasticities



(c) Wage employment elasticities



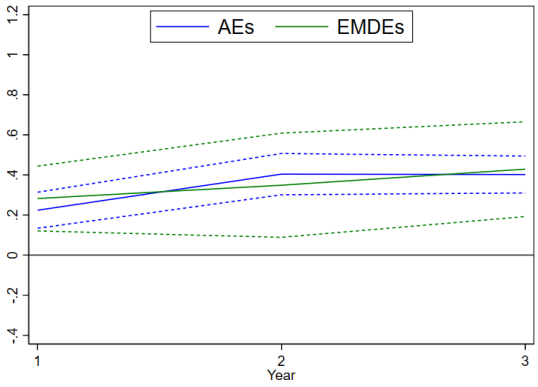
(d) Self-employment elasticities



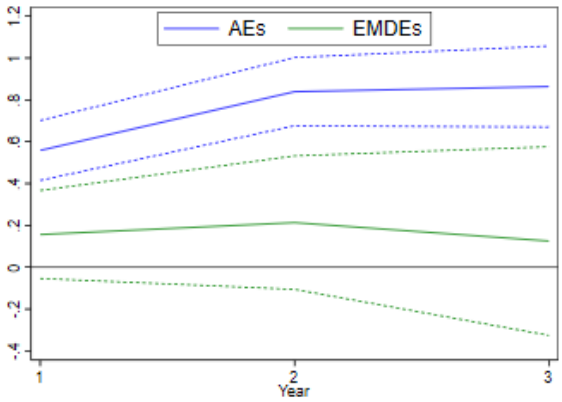
Notes: Unemployment-, total employment, wage employment and self-employment-to-output elasticities are denoted by the solid lines. 90-percent confidence intervals are denoted by the dashed lines. The sample includes 26 advanced economies and 12 EMDEs, between 1992-2019.

Figure C.3: Employment and unemployment-to-output elasticities during recessions or good times, with alternative sample

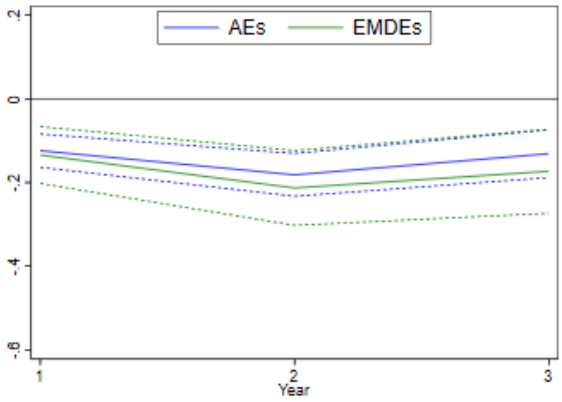
(a) Employment elasticities, good times



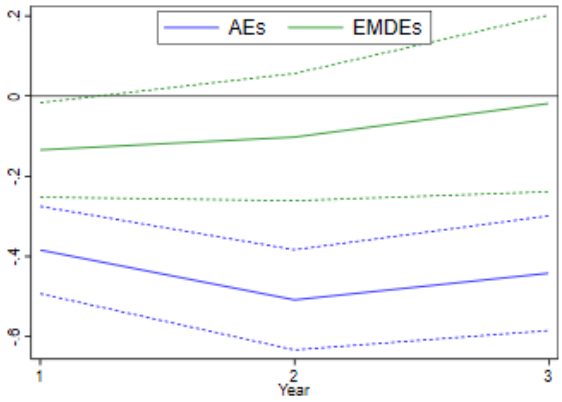
(b) Employment elasticities, recessions



(c) Unemployment elasticities, good times



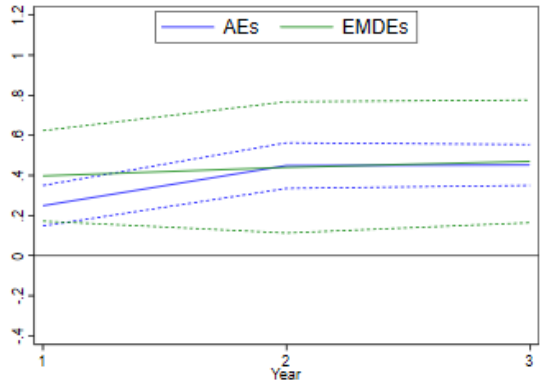
(d) Unemployment elasticities, recessions



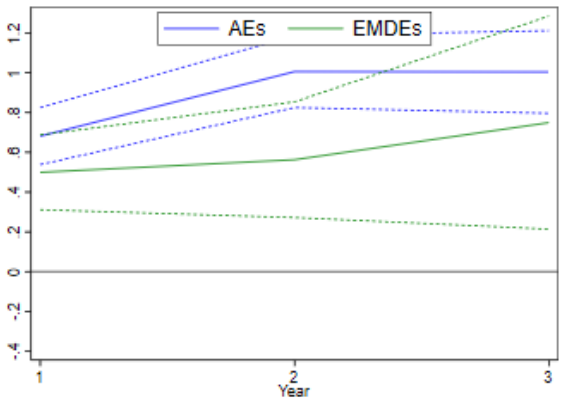
Notes: Unemployment- and employment-to-output elasticities during good times or recessions are denoted by the solid lines. 90-percent confidence intervals are denoted by the dashed lines. The sample includes 26 advanced economies and 12 EMDEs, between 1992-2019. Recession dates are from Kose, Sugawara and Terrones (2020).

Figure C.4: Wage and self-employment-to-output elasticities during recessions or good times, with alternative sample

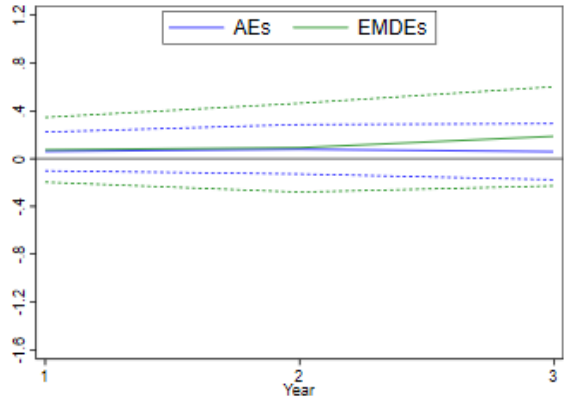
(a) Wage employment, good times



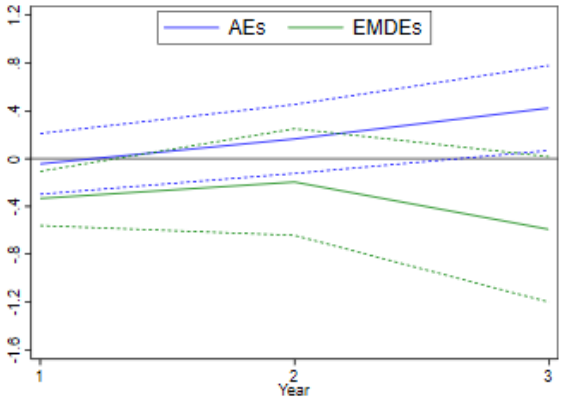
(b) Wage employment, recessions



(c) Self-employment, good times



(d) Self-employment, recessions



Notes: Wage and self-employment-to-output elasticities during good times or recessions are denoted by the solid lines. 90-percent confidence intervals are denoted by the dashed lines. The sample includes 26 advanced economies and 12 EMDEs, between 1992-2019. Recession dates are from Kose, Sugawara and Terrones (2020).