

Wage Curve Evidence From Turkey's 2007-2009 Income and Living Conditions Survey

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ABSTRACT: The aim of this paper is to investigate the labour market conditions of Turkey via disaggregated wage curves following the argument that group specific regional unemployment rates might better describe wage curves than aggregate ones. Using 2007-2009 panel survey of Income and Living Conditions, I found that there is weak evidence in favour of the existence of a wage curve for Turkey. Different categories of unemployment rate give different results on the unemployment elasticity of pay. For male workers, wage curve relationship seems to exist only when male unemployment rates are used and for female workers, there is no evidence in favor of a wage curve. When the data are split into two age groups, and age specific unemployment rates are used, there appears a wage curve for women of age twenty-five to sixty-four and a positive unemployment elasticity of pay for the women of age fifteen to twenty-four. These results might be explained by İlkkaracan and Selim (2003)'s argument focusing on the labour force participation dynamics of women in Turkey.

JEL Classification: J30, J60.

Keywords: Wage curve, group-specific regional unemployment rates.

Evidencia sobre la curva de salarios en Turquía a partir de la encuesta de ingresos y condiciones de vida 2007-2009

RESUMEN: El objetivo de este trabajo es investigar las condiciones laborales de Turquía a través de curvas salariales desagregadas siguiendo el argumento de que las tasas regionales de desempleo por grupos podría describir mejor las curvas salariales que las agregadas. Usando datos del Panel de Ingresos y Condiciones de Vida 2007-2009, encuentro que no hay pruebas sólidas a favor de la existencia de una curva de salarios para Turquía. Diferentes categorías para la tasa de desempleo ofrecen distintos resultados en la elasticidad de los salarios al desempleo regional. Para los trabajadores masculinos, la relación salarial curva parece existir sólo cuando se utilizan tasas de desempleo específicas de este colectivo, mientras

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que para las trabajadoras no hay evidencia a favor de una curva de salarios. Cuando los datos se dividen en dos grupos de edad, y se usan las tasas de desempleo específicas por edad, aparece una curva de salarios para las mujeres de veinticinco a sesenta y cuatro años y una elasticidad positiva para las mujeres de edad de quince a veinticuatro. Estos resultados podrían explicarse por el argumento de İlkkaracan y Selim (2003) que se centra en la dinámica de la participación laboral de las mujeres en Turquía.

Clasificación JEL: J30, J60.

Palabras clave: Curva de salarios, tasas de paro por región y grupo.

1. Introduction

This study tests the wage curve hypothesis for Turkey using individual level data of 2007-2009 Income and Living Conditions Surveys. The wage curve is an empirical relationship that can be described by Mincerian wage equation (Mincer, 1974) augmented by region-specific unemployment rate. According to the wage curve hypothesis, workers that are employed in high unemployment regions have lower wages than the workers that are employed in low unemployment regions (Blanchflower and Oswald, 1994 and 2005). This negative relationship between regional unemployment rate and wage level is introduced by Blanchflower and Oswald as an empirical law, such that the unemployment elasticity of pay; that is, the estimated coefficient on regional unemployment rate in a wage curve equation is -0.10 . As suggested in the literature, bargaining and efficiency wage theories may explain the wage curve, where unemployment is considered as a disciplining device on labor force.

The Turkish economy has witnessed historic changes in the last two decades. Real wages have contracted since the early 1990s and entered a new phase of contraction after 1999 (Yeldan, 2004). The decline in the private sector real wage was almost 20% in 2001 and there was a very moderate increase afterwards: the average increase in real wages was 3.2% from 2001 to 2005 (Voyvoda and Yeldan, 2006). Over the post-2001 crisis period, unemployment has also become a major problem in the economy. Unemployment rate has increased from 7% in 2000 to 10.6% in 2005 and to 12% in 2010. These adverse conditions in the economy have not been shared equally. Different worker groups have been affected at different rates from the negative conditions in the labour market. For example, the youth unemployment rates have soared, especially in the second half of 2000s.

The aim of this paper is to investigate further the post 2000 conditions of the labour market of Turkey via disaggregated wage curves within the argument that group specific regional unemployment rates might better describe wage curves. Wage curve literature show that different labour market groups have different unemployment elasticities of pay. For Turkey, İlkkaracan and Selim (2003) and Baltagi, Başkaya and Hülügü (2012) provide evidence on the disaggregated wage curves (using official unemployment rates). While the first study has used data of 1994 Employment

and Wage Structure Survey and defined 7 regions, the second study has analysed the 2005-2008 period using Household Labour Force Surveys and defined 26 regions. The limitation of the first study is that it has used two alternative unemployment rate data which are both not much satisfactory. The first series is a proxy based on 1990 rates and although the second series is 1994 rates (which were the only available data provided by TURKSTAT at that time), it was not comparable with international standards¹. İlkaracan and Selim (2003) have found unemployment elasticity of pay for male workers as -0.10 , and higher elasticity for male workers in private sectors, but found no evidence for a female wage curve. They have also found lower elasticity of pay for the youngest worker groups and no wage curve evidence for highly educated workers. On the contrary, Baltagi, Başkaya and Hülügü (2012) have shown that there exists a wage curve for females; and the younger, less educated and less experienced female workers have the highest unemployment elasticities of wage among all workers. These results are in line with the international evidence showing vulnerable groups have more sensitive wages with respect to regional unemployment rates (see for example, Baltagi and Blien, 1998; Berg and Contreras, 2004; Sanroma and Ramos, 2005).

This study differs from these earlier studies of the Turkish literature in two respects. First, the study utilizes individual level data from Income and Living Conditions Surveys (ILCS) in which the *panel* survey method is applied. Although Turkish Statistical Institute (TURKSTAT) carries out this panel since 2006, only 2007-2009 period is covered. The crisis year 2008, and the preceding and the consequent years have been chosen to examine a relatively more homogeneous period.

Secondly, this study reports disaggregated wage curve estimates based on group specific (official) regional unemployment rates. The regional unemployment rates of different labor market groups have different dynamics and their relationship with wages might be different also (Aixala and Pelet, 2010; Boushey, 2002; Card, 1995; García-Mainar and Montuenga-Gómez, 2003, Sanroma and Ramos, 2005). Disaggregated analysis which regresses wage on overall regional unemployment rate may produce different elasticities of pay for different groups of the labor market, but this may not necessarily mean that different groups have different sensitivities to the same overall unemployment rate. Instead this result may arise because different groups have different elasticities with respect to overall unemployment rate (Card, 1995). İlkaracan, Levent and Polat (2012)'s recent paper for Turkey presents a very interesting analysis by disregarding the official definitions of unemployment rate. They conclude that unemployment elasticity of pay of different groups is sensitive to different categories of unemployment rate. The unemployment rates they calculate and use in their analysis take into consideration discouraged workers (ILO based measure), marginally attached workers (BLS based measure) and long-term unemployed. These different definitions of unemployment rate they use are also disaggregated by

¹ İlkaracan and Selim (2003) assumed that the same percent change in country wide unemployment rate from 1990 to 1994 applies to the regional unemployment rates of the same period, and upscaled the 1990 regional unemployment rates using this change rate. On the other hand, 1994 SIS data on regional unemployment rates do not meet the ILO standards and, in fact, is nowadays unpublished.

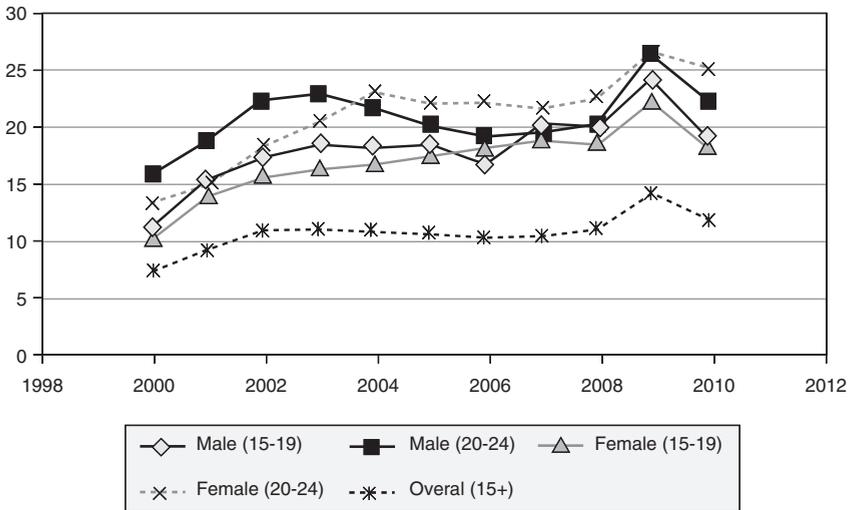
skill level. They have used the pooled cross section individual level data of Household Labour Force Surveys and analyzed the period 2005-2010.

In this study, the wage curve relationship has been investigated for male and female workers and for the aged between fifteen to twenty-four and twenty-five to sixty-four using group-specific (official) regional unemployment rates². The outline of the paper is as follows: In the next part, the trends in the unemployment rates in Turkey after 2000 is summarized. In the third part, the model and the data are introduced. In the fourth part, the findings are discussed and the last part provides concluding remarks.

2. Some Trends in Unemployment Rates in Turkey

Figure 1 shows male and female unemployment rates for fifty to nineteen and twenty to twenty-four age groups and compares them with the overall unemployment rates for the aged fifty and above. The purpose in presenting figure 1 is to demonstrate how the unemployment rates of different labor market groups may have different dynamics. For this reason, the groups that have the *highest* unemployment rates have been chosen to be displayed in Figure 1 while the unemployment rates of the other groups are not presented but are available from the author on request.

Figure 1. Some Trends in Unemployment Rates in Turkey, 2000-2010



Source: Household Labor Force Statistics, TURKSTAT.

² The information provided by ILCS makes possible the distinction between formal and informal workers. My analysis has also taken into consideration this information.

As it can be seen from figure 1, the gap between the youth unemployment rates and overall unemployment rates increases during the 2000s. For the period after 2004, females aged twenty to twenty-four years have the highest unemployment rates. In the twenty to twenty-four age group until 2004, the male unemployment rates exceed the female unemployment rates. After that year, the trend reverses: male unemployment rates enter into a declining trend and female unemployment rates consistently exceed male unemployment rates. Figure 1 proves that different labor market groups have very distinct trends and levels in their unemployment rates. Although figures with respect to regions are not presented here, diversifying trends and levels for different labor market groups can also be expected at regional level. This heterogeneity in the unemployment rates of different labor market groups suggests using disaggregated unemployment rates might produce more accurate results than in the case of using overall unemployment rates in wage curve estimates.

3. Model and Data

To test the wage curve hypothesis, the following model is estimated using ordinary least squares method. Both wage and unemployment rate in Eq. (1) are in log form. The model is estimated using unemployment rates of different labor market groups. Eq. (1) shows the wage curve equation

$$W_{irt} = \beta_0 + \beta_1 X_{irt} + \beta_2 U_{rt} + d_r + f_t + e_{irt} \quad (1)$$

where i , r , and t stands for individual, region and year respectively. W , is annual main job (after tax) income and it is the sum of wage (or salary) paid in cash and in-kind. The incomes reported in ILCS are in nominal terms, so they were deflated by yearly consumer price indices to reach real incomes. X stands for the control variables that may have influence on wage determination. The control variables include a gender dummy, 4 marital status categories, 7 education dummies, 9 occupational categories, 14 industry dummies, 10 age categories, logarithm of the number of months worked, logarithm of the weekly hours worked and the logarithm of the number of months worked full-time. U stands for group-specific regional unemployment rate. d and f stands for region and year dummies respectively and e is the error term³.

³ The female dummy takes the value of 1 for female workers and zero otherwise. *Age group* includes 10 categories: 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64. *Marital status* includes 4 categories: single, married, widowed, divorced. *Employment status* includes 5 categories: regular employee, casual employee, employer, self employed, unpaid family worker. *Educational status* includes 8 categories: illiterate, literate but without any diploma, primary school, primary education, junior school, high school, vocational school, higher education. *Industry classification* includes 14 categories: agriculture; mining; manufacturing; electricity, gas and water supply; construction; wholesale and retail trade; hotels and restaurants; transport, communication; financial intermediation; real estate; public administration and defense; education; health and social work; other social, community and personal services. *Occupational group* includes 9 categories: legislators, senior officials and managers; professionals; technicians; clerks; service workers; skilled agricultural and fishery workers; crafts and related trade workers; plant and machine operators; elementary occupations. *Regional unemployment rate* includes 12 categories: Istanbul

All the data except unemployment rates and yearly consumer price indices (CPI) come from Income and Living Conditions Surveys (ILCS). TURKSTAT applies this panel survey to the random sample of households, with the coverage of all settlements in Turkey. Although the survey gives information on all age groups and defines five employment status categories (see appendix for detail); only regular and casual employees aged between fifteen to twenty-four and are kept in the sample.

ILCS provides information on household's region with a region identifier classified in NUTS1 level, which makes 12 regions for Turkey. The source for the unemployment rate data is the Household Labour Force Statistics (HLFS) which covers all settlements in Turkey. HLFS provides regional data in NUTS1 (12) and NUTS2 level (26 regions) and by region/age, region/gender and region/age/gender. The region identifier provided in ILCS makes possible to combine the regional unemployment rate data with individual level data. The unemployment data used in this study is in NUTS1 level and disaggregated by region/age and region/gender.

The CPI used in this study are the 1994 based consumer price indices and they are on yearly basis. The source of CPI is TURKSTAT⁴.

Table 1 below presents descriptive statistics. As expected, average annual real income of women is less than the average annual real income of men. Average real income of the workers aged between fifteen to twenty-four is less than the average real income of workers aged between twenty-five to sixty-four. The mean unemploy-

Table 1. Descriptive statistics

	<i>Mean</i>	<i>Standard deviation</i>	<i>Minimum</i>	<i>Maximum</i>
<i>Average annual real income</i>				
Men	.7403615	.6253568	.0039388	10.73607
Women	.7162626	.6522132	.0042944	17.07277
Aged between 15-24	.6317428	.578082	.0071574	7.089919
Aged between 25-64	.759035	.6496261	.0039388	17.07277
<i>Unemployment rate</i>				
Men	11.38103	3.388482	5.5	18.4
Women	12.05095	4.379164	1.9	19.9
Aged between 15-24	22.13796	4.607534	11.3	30.2
Aged between 25-64	9.308191	3.085263	3.8	15.1

Source: Own elaboration from ILCS 2007-2009.

(TR1), West Marmara (TR2), Aegean (TR3), East Marmara (TR4), West Anatolia (TR5), Mediterranean (TR6), Central West Anatolia (TR7), West Black Sea (TR8), East Black Sea (TR9), North East Anatolia (TRA), Central East Anatolia (TRB), South East Anatolia (TRC).

⁴ TURKSTAT provides regional consumer price indices on yearly basis in the NUTS 2 level. Since price indices are not available at NUTS 1 level, nominal wages are deflated only by using yearly price indices.

ment rate across regions for men and women are 11.3% and 12.0% respectively. The lowest and highest unemployment rate is for women and fifteen to twenty-four age group, respectively.

The following section summarizes the findings of the wage curve estimations.

4. Findings

The results presented in table 2 are based on OLS estimations. Estimations are conducted for these groups: All workers, male workers, female workers, workers aged between fifteen to twenty-four and workers aged between twenty-five to sixty-four. Wage curves for these groups are first estimated by using overall regional unemployment rates and then by using group specific regional unemployment rates. The results are compared in the second and third columns in part (A) of table 2. ILCS gives information on the workers' status of social security system coverage. If a worker is in social security system he or she may be treated as formal worker, and if not, as informal worker (Ramos, Duque and Suriñach, 2010). The above groups further disaggregated as formal and informal, and the results presented in the fourth and fifth columns in part A of table 2.

All the entries except the ones in the second column in table 2 show estimation results that use group specific unemployment rates. The results of estimation for the aged between fifteen to twenty-four and twenty-five to sixty-four disaggregated by gender are displayed in the part (B) of table 2. In part (B) the age group unemployment rate (not the gender/age specific unemployment rate) is used in the estimations.

In table 2, only the estimated coefficient on unemployment rate is reported in order to save space but full results are available from the authors on request. All regressions include region and time dummies. For all workers, the unemployment elasticity of pay is found -0.074 and it is statistically significant at the 10% level. After the separation of all workers as informal and formal, the wage curve relationship disappears; although the estimated coefficients still carry negative sign, they become statistically insignificant.

For the female workers, the unemployment elasticity of pay is negative in all specifications (except for the informal female workers) but none of the estimated coefficients are statistically significant. For male workers, the wage curve relationship does not exist when overall unemployment rates are used. When male regional unemployment rates are used, the coefficient is estimated -0.097 and it is statistically significant at the 10% level.

Gender wage curve results presented here are in line with evidence provided by İlkkaracan and Selim (2003) for Turkey, Sanroma and Ramos (2005) for Spain and Janssens and Konings (1998) for Belgium. Janssens and Konings explain their result by the female labor market being more competitive than the male labour market. İlkkaracan and Selim explain their finding by the labor force participation dynamics of women: In tight labor markets, low- skill women withdraw from the work-force and the composition changes in favor of high- skill, high-pay women groups.

Table 2. Wage curve estimates based on 2007-2009 panel surveys of Income and Living Conditions

(A)

	<i>Overall U rate</i>	<i>Group specific U Rate</i>	<i>Formal workers</i>	<i>Informal workers</i>
All workers	-.074 (.042)*		-.060 (.044)	-.042 (.086)
N.O.	17940		13108	4832
<i>Gender</i>				
Female	-.049 (.061)	-.014 (.049)	-.035 (.050)	.139 (.101)
N.O.	7206	7206	5268	1938
Male	-.069 (.059)	-.097 (.058)*	-.056 (.060)	-.179 (.124)
N.O.	10734	10734	7840	2894
<i>Age</i>				
15-24	-.009 (.087)	.019 (.077)	.020 (.084)	.018 (.143)
N.O.	3986	3986	2741	1245
25-64	-.087 (.048)*	-.088 (.051)	-.076 (.053)	-.040 (.104)
N.O.	13954	13954	10367	3587

(B)

	<i>Age specific U rate</i>		
<i>Age by gender</i>			
15-24 (Female)	.186 (.104)*		
N.O.	1910		
15-24 (Male)	-.161 (.114)		
N.O.	2076		
25-64 (Female)	-.124 (.077)*		
N.O.	5296		
25-64 (Male)	-.024 (.069)		
N.O.	8658		

Robust standard errors in parantheses. * significant at the 10% level. N.O.: Number of observations

For the aged between twenty-five to sixty-four, a wage curve relationship seems to exist when the overall unemployment rates are used and it disappears when the group specific unemployment rates are used. When the age groups are disaggregated by gender, evidence in favor of a wage curve relationship appears only for the women of age twenty-five to sixty-four. The estimated coefficient is -0.124 and it is statistically significant at the 10% level. For the women of age fifteen to twenty-four, the estimated unemployment elasticity of pay has a positive sign and statistically significant coefficient (at the 10% level). These age group results presented here for female

workers (the positive unemployment elasticity of pay for the fifteen to twenty-four aged and the negative unemployment elasticity of pay for the aged twenty-five to sixty-four) might be explained by İlkkaracan and Selim's argument stating that in the case of Turkey, women having low skill background participate in the work-force until marriage or childbirth and they withdraw from work-force in the labor markets with high unemployment rates⁵.

5. Conclusion

For Turkey, there is weak evidence in favor of wage curve in the period 2007-2009 period. For male workers, wage curve relationship exists only when male unemployment rates are used and for female workers, there is no evidence in favor of a wage curve. However when the data are split into two age groups, and age specific unemployment rates are used, there appears a wage curve for women of age twenty-five to sixty-four. For the women of age fifteen to twenty-four, unemployment elasticity of pay is found positive. These results are in line with İlkkaracan and Selim (2003)'s argument focusing on the labor force participation dynamics of female workers. According to this argument, female workers with low-skill and low- pay participate in the work-force until marriage or childbirth and withdraws from work-force in tight labour markets so the composition of female work-force changes in favour of high-pay, high-skill female workers in the tight labour markets.

The disaggregation of male workers by age groups does not produce any sign for the existence of a wage curve relationship, and also the formal/informal disaggregation of data does not produce any results in favour of existence of a wage curve.

Different categories of unemployment rate give different results on the unemployment elasticity of pay; therefore, disaggregation of the unemployment rate is important in wage curve analysis.

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⁵ All the estimation results presented in table 2 are based on heteroscedasticity consistent standard error estimators. When cluster standard errors are used in the wage curve estimations, the estimated unemployment elasticity of pay in all regressions becomes statistically insignificant. The results are available from the authors upon request.

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Comments on «Wage Curve Evidence from Turkey's 2007-2009 Income and Living Conditions Survey», by Gonca Konyali

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This paper provides wage curve estimates based on regional data in Turkey during the period from 2004 to 2008. In their pioneering work, Blanchflower and Oswald (1990, 1994) used individual-level data to investigate the relationship between a worker's pay and the unemployment rate in the local labour market, a relationship they called «the wage curve»⁶. They concluded that wages are negatively correlated with the local unemployment rate, a finding that has been referred to as an empirical «law» of economics. Moreover, the majority of the wage curve elasticities in Blanchflower and Oswald's work are remarkably consistent across countries and estimated at approximately -0.1 ⁷.

There are three main methodological issues that researchers must face when estimating wage curve elasticities. First, it is crucial to control for the characteristics of individuals who work at different phases of the business cycle. There is evidence that composition biases due to changes in such characteristics obscure the true degree of real-wage procyclicality (Solon *et al.*, 1994) because the variability in working hours is higher for those workers who earn lower wages. To account for composition biases, some studies have included individual specific fixed effects in their estimations (see, for instance, Bratsberg and Turunen, 1996, for the US and Turunen and Sanz-de-Galdeano, 2006, for the Euro area). Previous findings also suggest that it is of paramount importance that the composition of the workforce is well captured by the observed characteristics used as control variables in wage curve regressions. Second, when wage curves are estimated using individual-level wage information, which is drawn from a population and grouped by year and region cells, the error term is likely to be correlated within groups (Moulton, 1990). As a result, the standard errors of the regional unemployment elasticities will be biased downwards. Blanchflower and Oswald (1994) avoid this issue by presenting estimates based on region-by-year «cell means», which is precisely what this paper does. As Card (1995) notes, the standard errors obtained when using this simple aggregation procedure are valid as long as there is no correlation in the unobserved determinants of wages across markets. Finally, various authors (Baltagi and Blien, 1998) have argued that one may underestimate the absolute values of unemployment elasticities when regional unemployment rates are not predetermined. If wages and unemployment rates are simultaneously determined, standard wage curve estimates will be biased and inconsistent. Baltagi

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⁶ See Card (1995) for an excellent review of Blanchflower and Oswald (1994) and an insightful discussion of the potential theoretical interpretations of the wage curve relationship.

⁷ See also Nijkamp and Poot (2002) for a meta-analysis and references.

et al. (2012), for example, in a recent study that also focuses on the Turkish context, address this problem by using a FE-2SLS estimator. While one may argue that simultaneity is less likely to be an issue when individual-level data are employed, this paper relies on regional-level data and its conclusions would therefore be more solid if they were qualitatively unchanged by using an FE-2SLS estimator.

Aside from methodological considerations, there is still room for interesting extensions in the wage curve literature, despite its extensiveness. In particular, contributions based on low- and middle-income economies where the informal sector plays an important role, such as this paper or Baltagi *et al.* (2012), are especially welcome.

Assessing whether the cyclical behaviour of wages differs between the formal and informal sectors is crucial to understand whether informality is a consequence of labour market segmentation (following the classical reasoning of Harris and Todaro, which has been formalised by Rauch, 1991) or if it instead responds to workers' choices given that the benefits associated with formal sector jobs (*e. g.*, health insurance) may not compensate for their costs (*e. g.*, payroll taxes). If informality reflects a segmented labour market, one would expect wages to exhibit less cyclical behaviour in the formal sector, in which nominal rigidities would prevent wages from adjusting to supply and demand fluctuations. Similar patterns of cyclical behaviour in the two sectors would instead contrast with the segmented view of the labour market. While there are various studies analysing the cyclical behaviour of wages in Europe and in the US, previous work on middle-income countries is scarce and generally fails to account for heterogeneous responses to the cycle across different segments of the labour market.

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