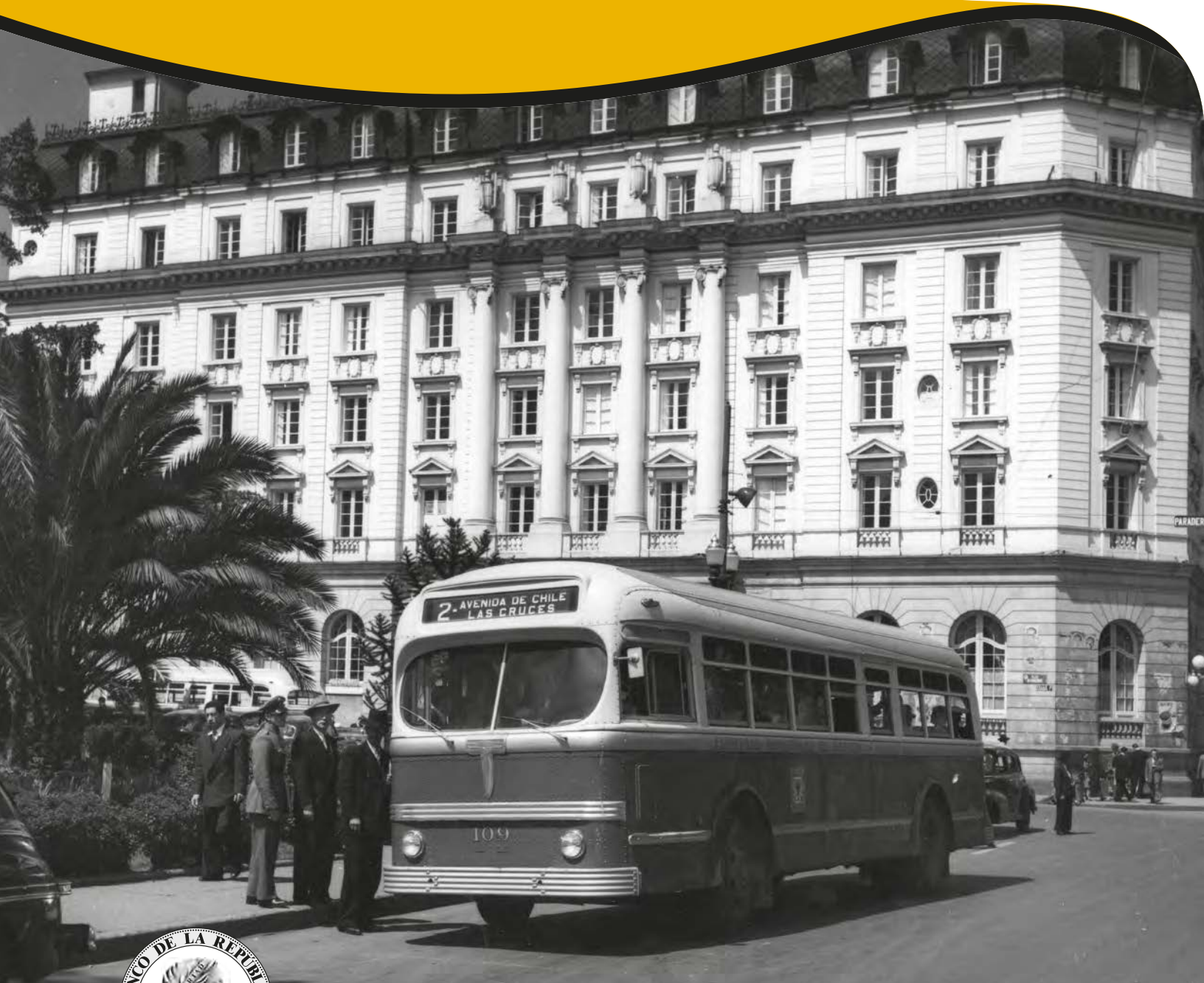


Interactions between Formal and Informal Labor Dynamics: Revealing Job Flows from Household Surveys

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Abstract

In its characterizations of job creation and job destruction rates, the literature on labor dynamics has largely ignored informal labor markets. The interrelationships between job creation and destruction among informal and formal labor markets are therefore still generally unknown, despite recent developments in the study of labor market dynamics. These interrelationships are important, however, because much of what researchers identify as formal job creation in developing countries involves substitution of informal jobs for formal ones. In this paper, we use an original methodology to derive hires as well as job creation, separation, and destruction flows from standard household surveys. The great advantage of this technique is that it allows measurements of these labor dynamic measures for the informal labor market. We find that informal labor markets are less fluid than formal ones, mainly because informal job-to-job transitions seem to have a low incidence. In addition, we characterize the relationship between informal job destruction and formal job creation. We find that almost 50% of job creation in the formal sector is caused by job destruction in the informal sector, and identify this formalization process as countercyclical. Our findings portray the informal labor market as an inferior segment; in good economic times, it loses importance as a source of formal jobs and as a recipient of jobs from the formal sector.

JEL Classification Codes: J60, J63, J23, J11

Keywords: Labor market fluidity; formality, labor demand, job creation.

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La interacción entre la dinámica del mercado laboral formal e informal: generando flujos de trabajo desde encuestas de hogares.

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Resumen

En los estudios sobre creación y destrucción de trabajo, la literatura sobre dinámica laboral ha ignorado al segmento informal del mercado. En general no se sabe mucho sobre la interdependencia de la creación y destrucción de trabajo entre estos segmentos. Las relaciones entre estas variables son importantes, ya que mucho de lo que a menudo se identifica como creación de trabajo formal, en realidad implica una sustitución de trabajos informales por formales. En este artículo, se utiliza una metodología original para derivar los flujos de contrataciones, separaciones, creación y destrucción de trabajo a partir de encuestas de hogares. La ventaja de la metodología es que también permite medir estos flujos para el segmento informal. Este estudio encuentra que el mercado laboral informal es menos fluido que el formal, principalmente porque las reasignaciones de trabajadores y la rotación laboral tienen baja incidencia en el segmento informal. Adicionalmente, en este artículo se caracteriza la relación entre la destrucción de trabajo informal y la creación de trabajo formal. Se halla que al menos el 50% de la creación de trabajo formal es causada por destrucción de trabajo informal; adicionalmente, este proceso de formalización resulta ser contra-cíclico. Nuestros resultados permiten inferir que el mercado laboral informal es un segmento inferior, ya que en los periodos de expansión económica pierde relevancia en dos sentidos: en primer lugar, como fuente para la creación de trabajos formales y, en segundo lugar, como receptor de trabajos desde el segmento formal.

JEL Classification Codes: J60, J63, J23, J11

Keywords: Fluidez del Mercado laboral; formalidad, demanda laboral, creación de trabajo.

Introduction

One of the most salient characteristics of labor markets in developing countries is the sizeable share of informality. Informal markets are characterized by low productivity levels, low human capital accumulation, and low job quality (La Porta & Shleifer, 2008, 2014). A simple description of quality job in terms of the percentages of wage-salaried workers² and self-employed workers reveals that Colombia's informal labor markets are large, both within the country and when compared regionally. The share of employees as a percentage of all occupied workers was 48.9% in 2017; in the same year, this ratio was 63.2% in the Latin American region (Fig. 1).

Characterizing the interrelationship between the high-quality and low-quality segments of the labor market and the dynamics in each sector is crucial for the understanding of labor markets in developing economies, where informality is rampant. Yet there has been little research on employment dynamics in developing economies from the standpoint of the flow approach to labor markets, which is central to modern labor macroeconomics. For instance, not one study has characterized the dynamics of informal labor markets in terms of modern measures of job flows. This gap in the literature remains because the literature on labor market flows has focused on data from developed economies and almost exclusively on the formal sector (Davis & Haltiwanger, 1992, 2014; Davis, Haltiwanger, & Schuh, 1996). In regard specifically to job flows, job creation (JC) and job destruction (JD), studies use administrative records of formal firms or surveys of formal firms in specific economic sectors.³

The literature on the interrelationship between formal and informal markets in developing countries has focused on the supply side of the market and has drawn on transitions between employment states. These studies characterized the probability of worker transit from different occupational positions; often, transitions from informality to formality and vice

²Wage and salaried workers (employees) are those workers who hold the type of jobs defined as "paid employment jobs," where the incumbents hold explicit (written or oral) or implicit employment contracts that give them a basic remuneration that is not directly dependent upon the revenue of the unit for which they work.

³As examples of studies using administrative records, the reader may refer to Ayandike, Bonner, and Hart (2011), Burgess et al. (2000), Corseuil and Ichimura (2006), Flórez et al. (2017), Haltiwanger (2012), and Morales and Medina (2016, 2019). As examples of studies using longitudinal surveys of firms in specific sectors, the reader may refer to Broesma and Gautier (1997), Davis, Faberman, and Haltiwanger (2006), Davis and Haltiwanger (1990), and Davis et al. (1996).

versa are studied as well. A Markov process has been widely used for modeling these transition probabilities (Bosch, Goni, & Maloney, 2007; Bosch & Esteban-Pretel, 2012; Bosch & Maloney, 2006; Prada, 2012). The more frequent focus on the worker's side in studies on developing countries is explained, at least in part, by data restrictions in these countries.

In recent years, the study of worker and job flows has gained importance in labor economics. This is because labor market flows allow characterizing supply (hires and separations) and demand (job creation and destruction) in a way that is directly linked to current job dynamics in the national and local labor markets (Flórez et al., 2017). These flows represent the mechanism of how workers and firms interact at micro levels and contribute to the traditional labor market stocks (occupied and unemployed workers). The tradition of the study of labor market transitions, or gross flows, ignores the demand side of the market. The study of labor market dynamics from the standpoint of worker and job flows constitutes a more comprehensive vision of the labor market. In the latter, the movement of workers across different segments of the market is considered simultaneously with the creation and destruction of jobs by firms in those segments.

The behaviors of formal and informal markets, and the interrelationship among them, hide very interesting regularities which have not previously been studied using modern measures of job creation and destruction flows. In the Colombian case, as illustrated in Figure 2, in an increasing phase of the economic cycle, informal and formal labor demands, measured using occupation rates, seem to behave similarly. From 2011 to 2014, as can be seen from the decreasing trend of the unemployment rate, Colombia had a remarkable economic performance with an annual GDP growth rate of almost 5%. After 2014, the Colombian economy started a process of economic slowdown and the unemployment rate started to increase. In that period, the informal labor demand started to decrease, while formal demand remained at a relatively high level. Therefore, it is only in the decreasing phase of the economic cycle where a process of formalization of informal jobs seems to take place.

In this paper, we use an original methodology to derive all labor market flows from standard household surveys. The great advantage of this technique is that it allows to identify these labor dynamics indicators for the informal labor market as well. We found that informal labor

markets are less fluid than formal ones, mainly because informal job-to-job transitions seem to have a low incidence. We use the estimated creation and destruction flows to characterize the relationship between informal job destruction and formal job creation. We found that almost 50% of job creation in the formal sector is caused by job destruction in the informal sector, and we identified that this formalization process is countercyclical. Our findings portray the informal market as an inferior segment. In good economic times, it loses importance as a source of formal jobs and as a recipient of jobs from the formal sector.

In section 1 of this paper, we review what is known about labor dynamics in developing countries from previous literature. In section 2, we present our original methodology for the computation of job creation and job destruction, using aggregated information on employment and hires in the labor market. In section 3, we characterize formal and informal labor market dynamics using the job flows computed in section 2 as input. In section 4, we estimate a simultaneous equation system using job flows of informal and formal markets as dependent variables and use the system to characterize the relationship between informal job destruction and formal job creation in the Colombian labor market. Last, we offer some conclusions and policy implications.

Figure 1

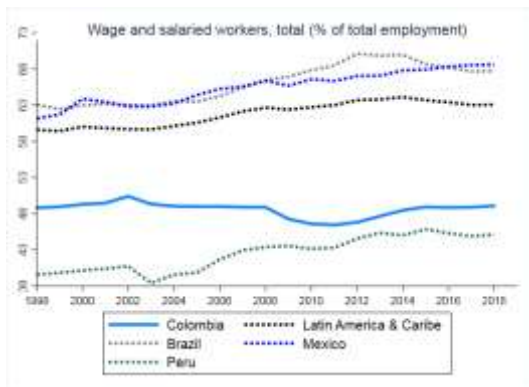
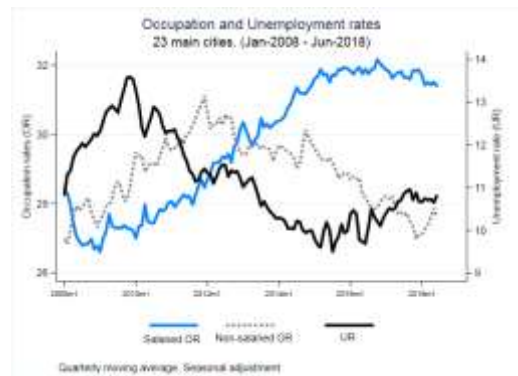


Figure 2



1. What We Know About Informal Labor Market Flows

The literature on labor market flows, especially when it is focused on the demand side (i.e., job creation and destruction) depends heavily on establishment-level payroll data. This information can only be obtained from linked data of employer-employee panels. Most of

the studies on worker/job flows use plant-level data to compute their measures; in many cases, information comes from samples of the manufacturing formal sector of the economy (Davis et al., 1996). In some cases, studies use administrative records of formal firms in all sectors (Burgess, Lane and Stevens, 2000; Morales & Medina, 2019). All of what is known about worker and job flows has been derived from studies of the formal sectors of labor markets; however, this approach ignores that in developing economies, informality can represent half or more of the labor market.

Informal firms in developing countries are not regulated, do not pay taxes, and are not in the official records of authorities. Therefore, it is impossible to obtain information on informal firms' payrolls, which is a real constraint for the study of labor dynamics in the informal segment of an economy. Probably because of this lack of information, research on labor market dynamics in developing economies has focused on the supply side, which can be well characterized using household surveys. In any country, an official household survey designed with the purpose of measuring unemployment allows differentiation between formal and informal occupied workers; therefore, literature that uses data from developing countries can include gross flows of transitions between different occupation positions, including transitions from formality to informality and vice versa.

The literature on workers' movements between informal and formal market segments is rooted in Funkhouser (1997) and Maloney (1999). These seminal papers on the topic are based on the computation of transition matrices. Funkhouser (1997) uses household surveys from El Salvador to identify mobility patterns and aims to detect the characteristics that impede transitions between segments. One of the most important findings of this first paper is that, due to considerable transition flows between segments, there is no evidence to conclude that labor markets are segmented. Accordingly, Maloney (1999) finds that for the Mexican labor market, not only are there sizeable transition flows between formal and informal segments, but also that these flows move in both directions. Therefore, this later research emerges as a depiction of a labor market in which there are complementarities between informal and formal segments. The evidence provided by both Funkhouser (1997) and Maloney (1999) opens a discussion on whether or not a labor market is segmented, as

well as whether its formal and informal components are rigid and static from the supply standpoint.

An important share of the research on transitions and labor markets flows focuses on the relationship of such measures with the economic cycle. Some examples of papers that explore the cyclicalities of gross workers' flows include Blanchard, Diamond and Murphy (1990), Davis and Haltiwanger (1992), Hall (2005), and Shimer (2005), all of which consider transitions of workers in and out of unemployment throughout the economic cycle. Adaptations of these studies to developing countries include informality as an additional state. For instance, Bosch and Maloney (2008) conclude that employment in Mexico and Brazil is procyclical, mainly due to the high correlation of the formal employment with the economic cycle; by contrast, they find that informal employment grows during economic recessions. An important finding in Bosch and Maloney (2008) is that the transition flow from the informal to formal worker is highly procyclical; however, unexpected as it may seem, the flow of formal to self-employed informal workers is also procyclical. This result does not hold, however, in the case of transition flow of formal workers to salaried informal workers.

From the evidence cited by Bosch et al. (2007) and Bosch and Maloney (2008), we argue that there is an important component of job-to-job search in labor markets in developing economies. Workers search for a job in either the formal or informal sector, which contradicts the picture of an extremely segmented labor market. In other words, there is some share of informality that can be considered sub-employment or hidden unemployment, and there is a share of informality that can be attractive for any worker, even from the formal sector. Additional studies of labor dynamics have explored the flows of worker movements and their relationship with the economic cycle. Bosch and Esteban-Pretel (2012), who compute hire and separation rates in Brazil, analyze the dynamics of such measures in the context of labor reforms there. In this paper, the authors refer to these flows as creation and destruction, but their measures are more closely related to standard hiring and separation in the literature of macroeconomic labor (see Davis et al., 1996).

Hoek (2007) computes transition flows among formal and informal sectors in Brazil. This paper concludes that in recession periods, an increase in costs associated with layoffs in the

formal sector reduces formal hiring, whereas in the informal sector, adjustments take place in the form of increments in separations. Peña and Mondragon (2008) analyze transition flows in Colombia between self-employed workers and entrepreneurs, the latter identified as workers who report being business owners. Their conclusion that mobility between these subsectors is limited provides evidence of an important level of segmentation. The few other studies that have considered Colombian transitions include informality as an additional state; usually, authors prefer to analyze these transitions along the economic cycle or in the context of particular labor market policies (López & Lasso, 2015; Prada, 2012).

The present study contributes to the literature on labor market dynamics in several ways. On the one hand, this is the first study to provide measures of job creation and job destruction rates for informal markets in the standard fashion of modern macroeconomics labor defined by the seminal work of Davis, Haltiwanger, and Schuh (1996). We also compute standard measures of hiring and separation rates, which have scarcely been studied for informal labor markets (Bosch & Esteban-Pretel, 2012). For formal markets in developing economies, few studies have analyzed labor dynamics using these worker-and-job flows; exceptions include Flórez et al. (2017) and Morales and Medina (2016, 2019). These studies use complex administrative data which is usually restricted from the general public and which considers only the universe of formal firms.

The procedure we implemented, and describe herein, requires only HH surveys, which are virtually universal for all economies in the world; moreover, they are frequently an open source of information and cover the entire labor market, not only its formal share. Our original methodology, which constitutes a plausible alternative to compute worker/job flows and labor market fluidity measures in general, opens new possibilities in the study of labor market dynamics through the use of more accessible sources of information (e.g., household surveys).

On the other hand, the present work characterizes the relationship between job creation and job destruction among informal and formal markets. This allows computation of the rate at which informal jobs become formal jobs (job formalization), a process that has not been studied from the market's demand-side perspective. We thereby present an alternative to studies that characterize transitions between formal and informal sectors, which are entirely

based on the supply side of the market. Therefore, our analysis constitutes a perspective previously unexplored in the literature.

A Comment on the Definition of Informality

In the literature on labor dynamics, it is difficult to find a consensus on the definition of the concept of formality. This is because in some cases, the definition must be adapted according to data restrictions; in other cases, the theoretical aspects of a study might require or already include a specific definition. The most standard definition of informality is the one promulgated by the OIT, which defines informal workers as non-professionals working in firms with five or fewer employees. Another commonly used definition of informality is the institutional one, which considers as formal those employers and employees who pay the official contributions and taxes to the social security system in each country. This definition is often used in studies of labor dynamics that use administrative data, which as expected can only cover formal firms that pay taxes, including payroll taxes.

Herein we use a simpler definition. We consider informal workers to be all self-employed individuals, and formal workers to be salaried ones. The population of salaried workers is similar to that of formal workers under the OIT definition; nevertheless, salaried workers are more similar to the total formal employment from Colombian administrative records⁴ than any other definition as shown in Figure 3. This similarity is very important for the purpose of this paper because we will use the administrative data to validate the performance of our methodology for the estimation of Job Flows. This is the main reason for using our definition for formality. As will be illustrated in subsequent figures, we compute formal hires from the Colombian official household survey, the GEIH (its acronym in Spanish); this is possible because responders are asked to provide their tenure in their current main job. Aggregated hires and net employment growth are the inputs required for the computation of job market flows in the methodology we propose in the next section.

As illustrated in Figure 4, the PILA and the formal GEIH hiring rates are very similar. Although these flow rates are computed from data sources that are very different in nature, they share seasonality and converge at the same level (close to 9.5% on average during the

⁴ i.e., the Integrated Record of Contributions to Social Security or PILA

period of analysis). This similarity of the hiring rates from administrative records and HH surveys validates the use of the later ones in the study of labor dynamics. Household surveys have the great advantage of being, in many countries, an open source of microdata information; in addition, they cover the whole labor market in a particular country, which allows the possibility of analyzing informal labor market dynamics as well.

Figure 3. Salaried workers and formal workers in PILA.

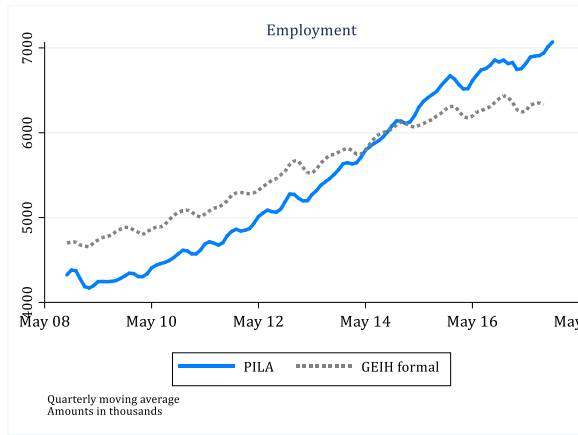
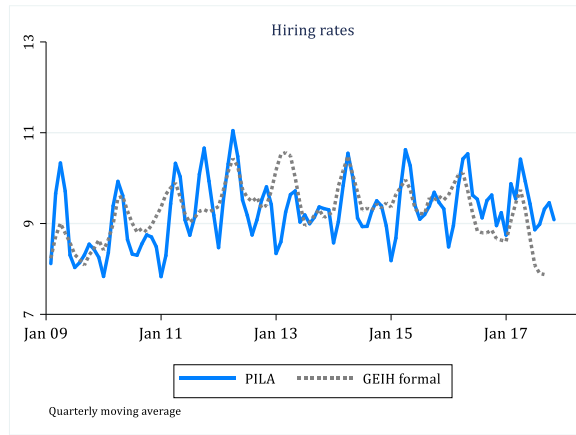


Figure 4. Formal hiring rates in PILA and GEIH (salaried workers).



2. Revealing worker and job flows from household surveys

Some Definitions

In the literature on labor market dynamics, worker and job flows constitute the basis of analysis. Worker flows in a specific labor market are composed by hires H_t and separations S_t of workers, which are the aggregation of all individual hires and separations from all establishments in that specific labor market. Where the subscript j denotes the establishment, we represent these flows as:

$$H_t = \sum_j h_{j,t}; \quad S_t = \sum_j s_{j,t}$$

If employment size of an establishment is denoted by e_{jt} , the magnitude of the establishment job creation (c_{jt}) and destruction (d_{jt}) can be represented as $c_{jt} = 1_{\{\Delta e_{jt} > 0\}} \Delta e_{jt}$ and $d_{jt} =$

$-1_{\{\Delta e_{jt} < 0\}} \Delta e_{jt}$, respectively. In other words, creation and destruction are defined as special cases of the employment net growth. The standard measures of job creation and job destruction in a given labor market are aggregations of these employment changes. Defining as Δ_t^+ (Δ_t^-) the set of all establishments that in period t experienced positive (negative) growth, the creation and destruction flows can be represented as:

$$C_t = \sum_j 1_{\{\Delta e_{jt} > 0\}} \Delta e_{jt} \equiv \sum_{j \in \Delta_t^+} \Delta e_{jt} = \frac{\sum_{j \in \Delta_t^+} \Delta e_{jt}}{\sum_j \Delta e_{jt}} \sum_j \Delta e_{jt} = \pi_t^C \sum_j \Delta e_{jt} \quad (1)$$

$$D_t = \sum_j -1_{\{\Delta e_{jt} < 0\}} \Delta e_{jt} \equiv \sum_{j \in \Delta_t^-} \Delta e_{jt} = \frac{\sum_{j \in \Delta_t^-} \Delta e_{jt}}{\sum_j \Delta e_{jt}} \sum_j \Delta e_{jt} = \pi_t^D \sum_j \Delta e_{jt} \quad (2)$$

As the reader may notice, π_t^C is the ratio of creation to aggregated employment growth in a labor market in a given period. For ease of comprehension in the presentation of the derivations below, it is useful to express total employment growth in a labor market as:

$$\Delta E_t = \sum_j e_{jt} - \sum_j e_{jt-1} = \sum_j \Delta e_{jt}$$

Finally, it is useful to remind the reader that worker and job flows are connected throughout the following identity:

$$\Delta E_t = H_t - S_t = C_t - D_t \quad (3)$$

A Methodology for Measuring Job Creation and Destruction

Let us define as θ_t^C (θ_t^D) the proportion of all hires (separations) in a labor market, which are creation (destruction) of jobs, as in the regular definition found in the labor market dynamics literature. Because θ_t^C represents all pairs of worker-job matches that imply positive net growth in the establishment size, we will call θ_t^C the creation ratio; analogously, θ_t^D stands for the destruction ratio. Therefore, using the definition of θ_t^C and equation (1), we can represent this creation ratio as:

$$\theta_t^C \equiv \frac{H_t}{C_t} = \frac{H_t}{\pi_t^C \cdot \Delta E_t} \quad (4)$$

Equation (4) is a mathematical identity upon which our procedure is based. By performing a simple algebraic transformation and solving for H_t , we get the following expression:

$$\ln(H_t) = \ln(\theta_t^C) + \ln(\pi_t^C \cdot \Delta E_t)$$

In the previous equation, using standard HH surveys, we can observe H_t and ΔE_t , and θ_t^C and π_t^C , would be estimable parameters. This is a nonlinear in parameters model, which can be estimated using maximum likelihood methods; nevertheless, longitudinal variations in θ_t^C and π_t^C cannot be identified simultaneously. Therefore, we will allow longitudinal and by labor market variation in parameter θ_t^C , but not in parameter π_t^C . Denoting labor markets with the subscript a and monthly periods with the subscript, the equation that we estimate can be represented as:

$$\ln(H_{a,t}) = \ln(\theta_{a,t}^C) + \ln\left(\pi^{C+} \cdot 1_{\{\Delta E_{a,t} > 0\}} \Delta E_{a,t} + \pi^{C-} 1_{\{\Delta E_{a,t} < 0\}} |\Delta E_{a,t}|\right) + u_{a,t}$$

$$\text{with, } \theta_{a,t}^C = \sum_a \sum_t \alpha_a \cdot 1_{\{a=a'\}} + \beta_t \cdot 1_{\{t=t'\}} \quad (5)$$

In this paper, we estimate a series of coefficients $\hat{\theta}_{a,t}^C = \hat{\alpha}_a + \hat{\beta}_t$ for each labor market, and use for this purpose information on total hires (H_t) and employment change (ΔE_t). These two variables can be easily computed from standard HH surveys; in the Colombian case, the total hires in a labor market can be captured from the individuals who report they have had their current job for less than one month. From the estimation of $\hat{\theta}_{a,t}^C$ and using the identity (3), job creation and job destruction can be easily computed as:

$$\hat{C}_{a,t} = \frac{H_{a,t}}{\hat{\theta}_{a,t}^C} \quad \hat{D}_{a,t} = \hat{C}_{a,t} - \Delta E_{a,t} \quad (6)$$

The same exact procedure can be repeated starting from $\theta_t^D = H_t/S_t$, in which case we would end up with an equation completely analogous to (5), but with the log of total separations ($\ln(S_{a,t})$) as the dependent variable.

Studying the Colombian case provides a unique opportunity to show the consistency of our methodology. The Ministry of Health and Social Protection in Colombia collects a rich set of administrative records from payments to the social security system, the Integrated Record

of Contributions to Social Security (Spanish acronym PILA).⁵ The PILA is a unique source of longitudinal information that allows the construction of an employer-employee linked panel for the formal economy in Colombia. Using this panel, we generated worker (hires and separations) and job flows (job creation/destruction) by observing, on a monthly basis, the payroll of all formal establishments. The construction of all these flows follows Flórez et al. (2017) and Morales and Medina (2016, 2019) for the period between September 2008 and December 2017.

Figure 5. Job creation bootstrap.

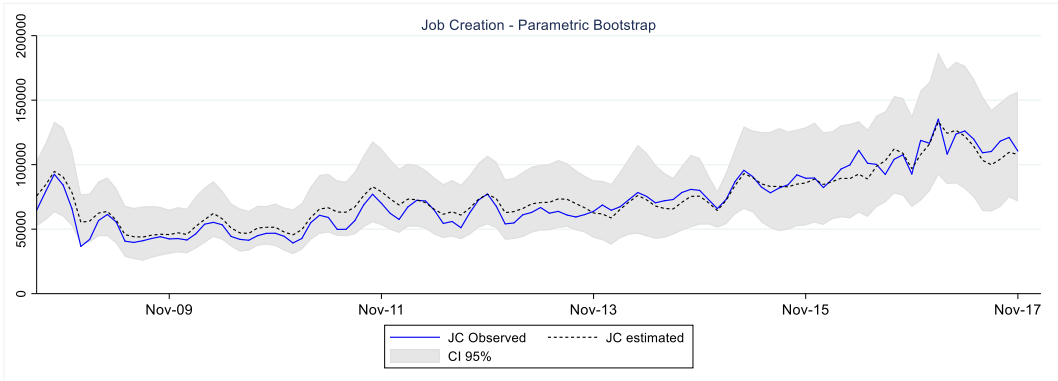
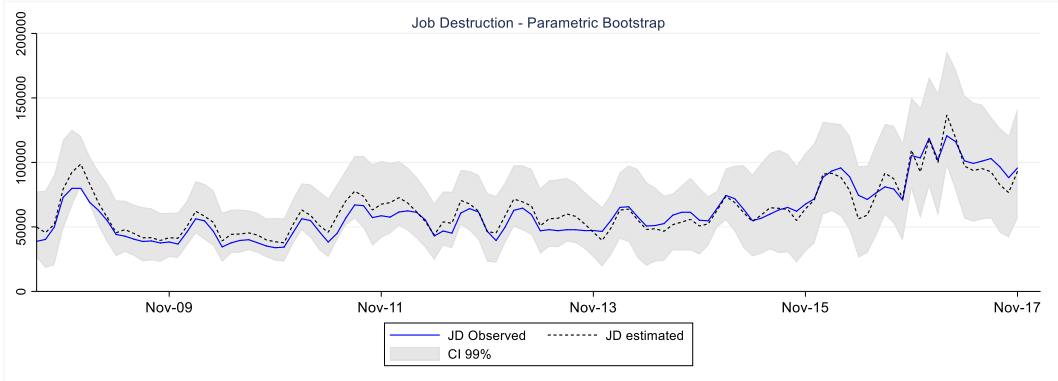


Figure 6. Job destruction bootstrap.



Notes: For the estimations of job creation and job destruction, we implemented the procedure described in this section, we complete the procedure estimating equation (5). The bootstrap was parametrically performed with 250 replications. In order to avoid instability in the computation of flows, for this validation exercise we used flows from firms of a size greater than 20 employees which remained in the sample during the entire study period.

As the reader might notice, the performance of the methodology in predicting the observed job flows is remarkable: the observed flows are always inside the 99% confidence interval

⁵ For more details on PILA and its suitability for the computation of labor market flows, the reader may refer to Morales and Medina (2016, 2019).

of the prediction and, in general, the predicted flows do a good job of capturing the level and stationarity of the real ones. However, this validation exercise is only possible using the labor market flows that correspond to the formal labor market; in the case of the informal share of the market, the information simply does not exist. In our estimations of job flow predictions, using the HH surveys, we separately computed these flows for the formal and informal labor markets. Even though we can only validate the performance of our methodology for the formal share of the market, we argue that there is no reason to assume that the methodology would be invalidated if applied to the informal labor market.

3. Data

As described in Section 2, we used PILA to validate our proposed methodology because we could compare observed job flows with our predictions; nevertheless, our main source of information was the standard Colombian HH survey. One of the contributions of this paper is that it shows HH surveys can be a good source of information for labor dynamics research. The Colombian HH survey (Spanish acronym GEIH), collected on a monthly basis, is representative of the country's 23 largest metropolitan areas. In general, the GEIH is a standard survey used for computing national statistics on unemployment and wages. One of its questions asks how long employees have had their current position; this is a fundamental question because it allows the computation of total hires in a labor market (metropolitan area) on a monthly basis (as all employees who report job tenure of one month or less).

Characterization of Informal and Formal Labor Market Flows in Colombia

In this section, using the methodologies presented in previous sections, we briefly describe the most standard flows used in the literature on labor market dynamics. For the purpose of comparison, we compute these flows separately for formal and informal markets; this computation is one of the main contributions of this paper to the literature. Figures 7 to 13 show the standard job and worker flows during a period of 10 years for which the GEIH was available. In all cases, these flows are presented as a share of employment, expressed as a moving average of second order as is standard in the literature.

Hiring rates for the formal sector were 9.7% of all formal employment, whereas the separation rate was 9.4%; this result is in line with the growth in formal employment that occurred during the study period. This increase in formal employment has been documented

in the literature partly as a result of recent labor market reforms (Fernandez and Villar, 2017; Morales and Medina, 2017). Formal job creation and destruction were, respectively, 5.55% and 4.77% of total formal employment. The labor market flow rates for the formal sector are very similar to what has been reported in previous studies using Colombian administrative records from PILA (Morales and Medina, 2016, 2019; Flórez et al., 2017). As commented before, the PILA covers the universe of all formal firms; therefore, the similarity of our formal labor market flow rates with others reported using different data sources validates the methodology suggested in the paper, to a certain extent.

From the comparison of worker and job flow rates, two regularities emerge. On the one hand, job creation (JC) and job destruction (JD) rates are surprisingly similar in the labor and informal labor markets; on the other hand, hiring and separation rates are sizeable higher in the formal market. Therefore, the average expansion (shrinking) and creation (destruction) of informal and formal firms are relatively similar, but the movement of workers is higher in the formal sector. In other words, a higher proportion of workers in the formal sector are entering and leaving jobs, including job-to-job movements, than in the informal sector. This proportional difference implies that the formal share of the market is more dynamic and more fluid, with more worker transitions that are not necessarily reflected in the creation or destruction of jobs.

Figure 7. Job creation rate.

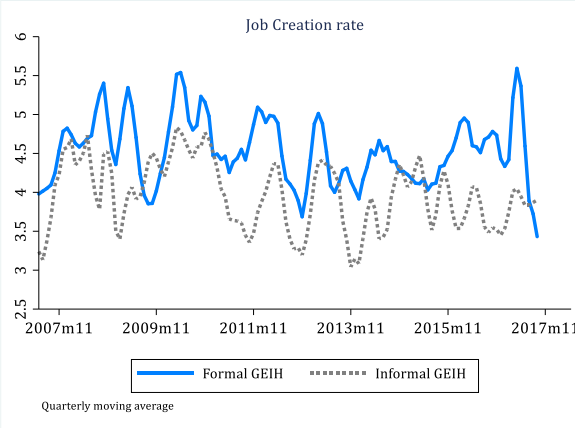


Figure 8. Job destruction rate.

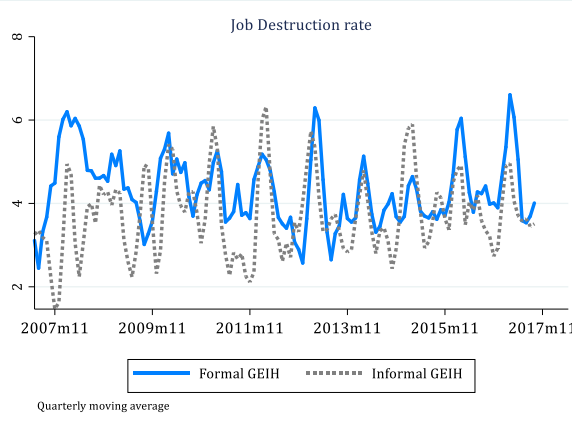


Figure 9. Hiring rate.

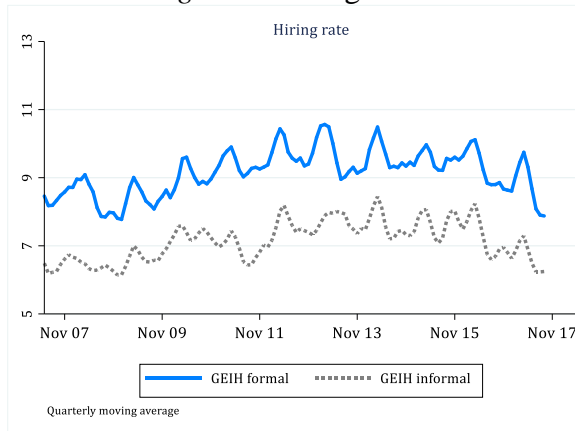
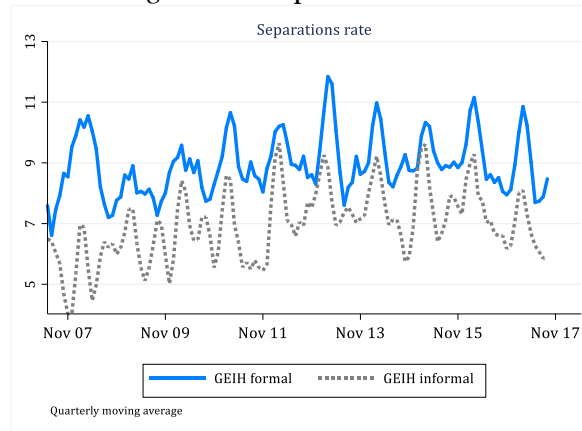


Figure 10. Separation rate.



The concept of labor market fluidity is well defined in Davis and Haltiwanger (2014). In a broad sense, it characterizes the ability of a labor market to mobilize workers and jobs across firms and economic sectors. More fluid markets are more dynamic, a dynamism that has been shown to have substantive consequences regarding better market performance (e.g., lower unemployment rates). Evidence in favor of this hypothesis has been shown for developed countries in Davis and Haltiwanger (2014), and Molloy, Trezzi, Smith, & Wozniak (2016) and for developing economies in Morales and Medina (2016, 2019).

The most standard measures of labor market fluidity include the following. The worker reallocation rate (WR) describes the movements of workers throughout firms and economic sectors; it is computed as the sum of monthly rates of hires and separation. The job reallocation rate (JR) describes the movements of jobs from shrinking to expanding firms; it is measured by aggregating monthly job creation and destruction rates. Finally, the churning rate (CR) is the excess of worker flows over and above the amount required to accommodate job flows (Davis & Haltiwanger, 2014). Because churning is a measure of worker transitions in and out of firms, which are not creation or destruction of jobs, it can be considered as a measure of labor replacement. The churning rate is computed as the difference between WR and JR.

The magnitude of JR in the formal and informal markets is similar; nevertheless, the WR and especially the CR are substantially higher in the formal market. The magnitude of job creation is similar in both segments of the labor market, which is not surprising given that both markets represent half of the market each. Nevertheless, the formal market is substantially

more dynamic, as can be seen from the sizeably higher magnitudes of both the worker reallocation rate and the churning rate. In the formal market, there are more worker transitions that are not necessarily reflected in creation or destruction of jobs; as a result, the formal churning rate is considerably higher than the informal churning rate. In comparison with the informal share of the market, in the formal market there is a higher proportion of workers entering and leaving formal jobs; given that JR is similar in both segments, formal job-to-job movements very likely explain this excess of worker reallocations in the formal share.

The causes and consequences of labor market dynamism is a topic that has been studied recently in the literature (Davis & Haltiwanger, 2014; Molloy et al, 2016; Morales & Medina, 2016, 2019). Previous literature has assessed the desirable consequences of more fluid labor markets; for instance, in terms of higher levels of employment (Davis & Haltiwanger, 2014; Morales & Medina, 2016, 2019; Shimer, 2001). To the best of our knowledge, the literature contains no previous documentation of our finding that formal markets are more fluid and dynamic than informal ones.⁶ This is an interesting result because, given the lack of regulation of informal markets, what to expect in terms of the dynamism of this share of the market is not obvious.

From our finding, it seems that when workers gain experience in the formal sector they move between formal positions, thereby contributing to the worker reallocation and churning in this sector. In contrast, it is more difficult to escape informality; moreover, informal job-to-job transitions seem to have a low incidence. One would expect the latter to be the case, because many self-employed workers do not really change from informal jobs; instead, they remain self-employed while waiting for a job offer in the formal sector or, alternatively, they remain self-employed if they consider informality to be their best option.

These claims are supported by some well-known facts in the Colombian labor market. On the one hand, the main search channels to get a formal job are by recommendations and social networking;⁷ in 2018, 40% searched for their jobs through friends, family, or colleagues.

⁶ We believe this is the case because informal labor market fluidity has not previously been studied.

⁷ Evidence of the strong effect of informal search channels within the Colombian labor market is presented in Uribe, Viáfara, and Oviedo, 2007.

Therefore, the experience and social capital accumulated in the formal market are valuable assets for obtaining a formal job. Formal positions are often taken by workers with experience in the formal market. In addition, as documented in Morales and Medina (2016, 2019), very small formal firms (2 to 5 employees) are numerous, but their relative contribution to total churning flows is only 3.6%. Informal firms are expected to be similar to small formal firms; in fact, size is the basis of some definitions of informality. Under this premise, therefore, WR and CR should be small in informal markets.

Figure 11. Job reallocation rate.

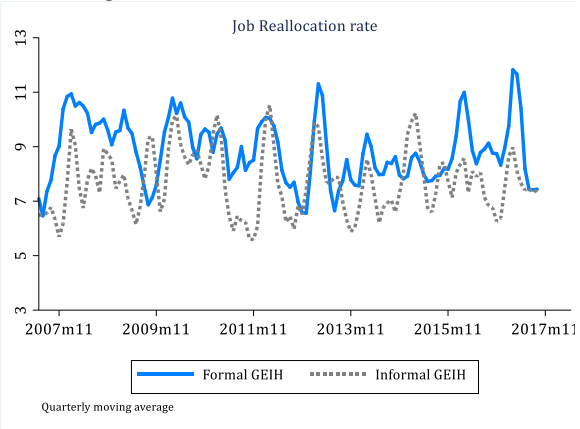


Figure 12. Worker reallocation rate.

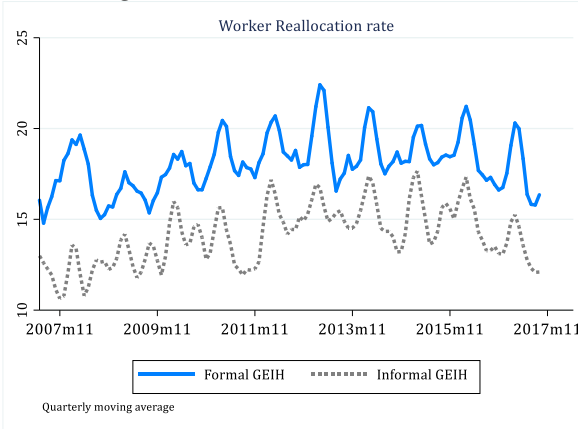
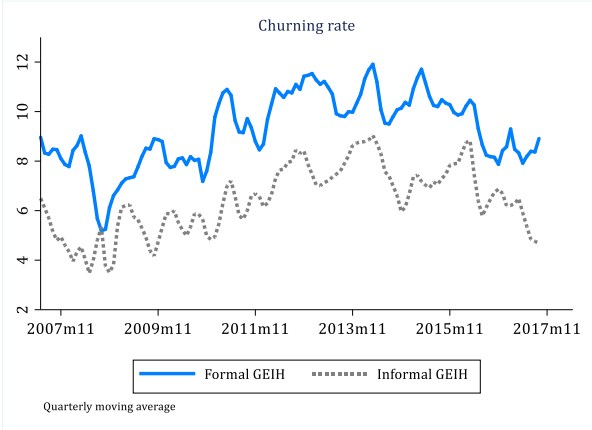


Figure 13. Churning rate.



4. Quantifying Formalization of Informal Jobs

In this section, we tackle the main purpose of this research, which is to characterize the relationship of job reallocation between formal and informal segments of the labor market.

More precisely, we are interested in the interrelationships between job creation and destruction between informal and formal labor markets; such a characterization is still largely unknown, mainly because of the impossibility of observing informal labor market dynamics. Using simple econometric models, we identify to what extent the creation of a job in the formal sector implies the destruction of a job in the informal sector. This question is important because in developing countries, much of what researchers identify as formal job creation is at least partial substitution of informal jobs for formal ones. Some of this process can be observed from the aggregated series of formal and informal labor demand, measured by their respective occupation rates. As illustrated in Figure 2, after some years of good performance of the labor market as a whole, formal labor demand continues to grow while informal labor demand starts to decrease in what seems to be a process of formalization of informal jobs.

In our econometric approach, we use the estimation of a simultaneous equation system in which as dependent variables we model JC and JD rates for each one of the formal and informal segments of the market. In this simultaneous equation system, we allow a dynamic specification for each individual equation, where the lag of each dependent variable is included as an additional independent variable. In this sense, our empirical model resembles similar approaches used by Lee and Parasnis (2014) and Omri, Nguyen, and Rault (2014).

$$\begin{aligned}
[1]: C_{a,t}^f &= \alpha_{cf}^{cf} * C_{a,t-1}^f + \alpha_{cf}^{df} * D_{a,t}^f + \alpha_{cf}^{ci} * C_{a,t}^i + \alpha_{cf}^{di} * D_{a,t}^i + \beta^{cf} X_{a,t} + u_{a,t}^{cf} & (7) \\
[2]: D_{a,t}^f &= \alpha_{df}^{df} * D_{a,t-1}^f + \alpha_{df}^{cf} * C_{a,t}^f + \alpha_{df}^{ci} * C_{a,t}^i + \alpha_{df}^{di} * D_{a,t}^i + \beta^{df} X_{a,t} + u_{a,t}^{df} \\
[3]: C_{a,t}^i &= \alpha_{ci}^{ci} * C_{a,t-1}^i + \alpha_{ci}^{cf} * C_{a,t}^f + \alpha_{ci}^{df} * D_{a,t}^f + \alpha_{ci}^{di} * D_{a,t}^i + \beta^{df} X_{a,t} + u_{a,t}^{df} \\
[4]: D_{a,t}^i &= \alpha_{di}^{di} * D_{a,t-1}^i + \alpha_{di}^{cf} * C_{a,t}^f + \alpha_{di}^{df} * D_{a,t}^f + \alpha_{di}^{ci} * C_{a,t}^i + \beta^{cf} X_{a,t} + u_{a,t}^{cf}
\end{aligned}$$

In equation 7, $C_{a,t}^k, D_{a,t}^k$, with $k \in \{f \equiv formal, i \equiv informal\}$, stands for job creation and job destruction rates; $X_{a,t}$ is a vector of control variables, including a labor market's fixed effects and a polynomial time trend. Finally, note that coefficient α_y^x , stands for the marginal effect of flow rate x on flow rate y . In our preferred specification, we impose symmetry restrictions on the parameters as a way of preserving some minimum consistency in the

relationships across coefficients. Consider for instance the coefficient $\alpha_{cf}^{di} = \frac{\Delta C_{a,t}^f}{\Delta D_{a,t}^i}$, which represents the marginal change on formal JC given a change in informal JD; by imposing symmetry in the coefficients, we estimate α_{cf}^{di} and α_{di}^{cf} in such a way that the following relationship is preserved:

$$\alpha_{cf}^{di} = \frac{\Delta C_{a,t}^f}{\Delta D_{a,t}^i} = \left(\frac{\Delta D_{a,t}^i}{\Delta C_{a,t}^f} \right)^{-1} = (\alpha_{di}^{cf})^{-1}$$

In other words, α_{cf}^{di} and α_{di}^{cf} are estimated so that the marginal effect of formal JC on informal JD is the inverse of the marginal effect of informal JD on formal JC, as should be the case given the specification of system (7). We impose four additional restrictions in other cases, where symmetry of marginal effects is expected from the specification of the system.⁸ In alternative estimations, we do not impose these restrictions.

Equation system (7) is jointly estimated using a combination of the Arellano–Bond (1991) and Blundel–Bond (1998) suggested instruments. Therefore, we estimate the system jointly by the generalized method of moments, using as instruments lags of all independent variables and their first differences. This method controls for the endogeneity of the dependent lagged variable in each equation, and in general avoids bias from endogeneity of the covariables. We use only three lags in order to avoid over-identification problems, as suggested in the literature (see Lee and Parasnis, 2014; Bowsher, 2002; and Huang, 2009). Instead, we started from the fourth lag to assure exogeneity of instruments; as previously indicated, all flow rates correspond to moving averages of order three.

In the system represented in (7), JC and JD rates in a given segment of the labor market are functions of JC and JD rates in the other segment of the market. This specification allows identifying the relationship between job flows among formal and informal labor markets. Consider for instance the first equation in the system, [1]; the parameter α_{cf}^{di} , captures how the JC rate in the formal sector increases as a result of an increase of one percentage point in

⁸ The following additional restrictions are imposed:

$$\alpha_{cf}^{df} = (\alpha_{df}^{cf})^{-1}, \alpha_{ci}^{ci} = (\alpha_{ci}^{cf})^{-1}, \alpha_{ci}^{df} = (\alpha_{df}^{ci})^{-1}, \alpha_{df}^{di} = (\alpha_{di}^{df})^{-1}, \alpha_{ci}^{di} = (\alpha_{di}^{ci})^{-1}$$

the JD rate in the informal labor market; this relationship is what we refer to herein as “formalization.” An alternative expression of this formalization can be seen in the last equation of the system, [4]; the parameter α_{di}^{ci} captures how the JD rate in the informal sector increases as a result of an increase of one percentage point of the JC rate in the formal market. These parameters are of especial interest for our purposes because they can be interpreted as a measure of the formalization of jobs that previously existed as informal positions.

Table 1 shows three different estimation results, being first-difference GMM estimation in our preference specification (see panel [3]). (We comment below on how the three estimations compare to each other.) From our preferred specification of equation system 7, we estimate that the parameter α_{cf}^{di} is significant and equal to 0.53; accordingly, parameter α_{cf}^{di} is equal to 1.89 (inverse of α_{cf}^{di}). Therefore, an increase of 1 percentage point in the JD rate in the informal market causes a sizeable increase of 0.53 percentage points in the JC rate in the formal market. Equivalently, an increase of one percentage point in the formal JC causes an increase of 1.88 percentage points in the informal JD rate. Formal and informal creation and destruction of jobs are very interrelated; in this sense, informal and formal markets are codependent. Almost half of the creation of jobs in the formal sector is explained by the destruction of jobs in the informal sector; at the same time, destruction of informal jobs is heavily explained by the creation of formal positions. These interrelationships provide evidence that formal and informal markets do not work as independent and fully segmented elements of a whole. Instead, the expansion of one market is the result of the shrinking of the other.

The interrelationship between job flows among formal and informal sectors goes in both directions; in this paper, we refer to the effect of formal job creation on informal job destruction as “formalization.” From the estimation in equation system (7), we find that the relationship in the opposite direction (formal job destruction on informal job creation) is also important and significant. As shown in Table 1, the first-difference generalized methods of moments (GMM) estimated regression results (see panel [3]) reveal a sizeable effect, which we interpret as a process of “de-formalization” of formal jobs. In other words, labor markets reallocate some formal jobs in the informal sector. In the specific case of the Colombian labor market, we estimate the coefficient $\alpha_{df}^{ci} = 0.52$, which means that an increase of 1

percentage point in informal JC increases formal JD by 0.52 percentage points. The relationship of the formalization and de-formalization processes to the economic cycle, which we study in the next section, helps better our understanding of these phenomena.

The effects previously described are based on our preferred specification, the simultaneous estimation by first-difference GMM with Arellano–Bond and Blundell–Bond instruments. In general, these effects are similar to ones obtained with a more basic panel fixed-effects estimation of the system (see panel [1]), but the magnitudes of the effects are larger. In general, in comparison to the unrestricted GMM, the results are similar as well (see panel [2]). For instance, formalization is significant and positive, but the effect is smaller in magnitude (0.14), which means that an increase of 1 percentage point in informal JD increases informal JC by 0.14 percentage points (coefficient α_{cf}^{di} in equation [1]).

The main caveat of the unrestricted GMM specification is that cross-flow marginal effects might be inconsistent. For instance, an alternative estimation of the formalization effect is identified by the coefficient α_{di}^{cf} in equation [4] of the system. This coefficient captures the marginal effect of formal creation on informal destruction. The coefficient α_{di}^{cf} is estimated in the unrestricted GMM system as 0.72. Based on the premise that cross-flow marginal effects should be consistent (i.e. $\alpha_{cf}^{di} \cong (\alpha_{di}^{cf})^{-1}$), coefficient α_{cf}^{di} (0.14) is underestimated in the unrestricted GMM system because it should be around $1.38=1/0.72$.

In regard to the interpretation of additional covariates' effects, using our preferred specification, we identify a negative and significant effect of average wages on both formal and informal job creation. In addition, we identify a negative effect of the share of working-age population with college on formal job destruction; in contrast, the effect of this variable on informal job creation is positive and significant.

Table 1. Estimation results of a system of equation of job flows by segments.

	[1]: Fixed Effects		[2]: First Difference		[3]: First Difference GMM Estimation with Restrictions	
	Panel Estimation Coef.	Std. Err.	GMM Estimation Coef.	Std. Err.	Coef.	Std. Err.
[1]: Formal JC						
Formal JC (lag)	0.530***	-0.068	0.315***	(0.107)	0.360*	(0.203)
Formal JD	0.236***	(0.078)	0.150***	(0.057)	0.673***	(0.096)
Informal JC	-0.021	(0.069)	-0.321*	(0.169)	1.076***	(0.183)
Informal JD	0.084***	(0.028)	0.142***	(0.035)	0.532***	(0.068)
Wage	-0.005	(0.007)	-0.031	(0.032)	-0.203***	(0.066)
Growth Rate	0.000	(0.000)	-0.000	(0.002)	0.001	(0.003)
% WAP 18-25	0.081	(0.072)	-0.665	(0.630)	1.291	(1.214)
% WAP with some college	0.064	(0.042)	0.268	(0.292)	-0.314	(0.644)
Polynomial time trend	YES		YES		YES	
[2]: Formal JD						
Formal JD (lag)	0.137***	(0.028)	-0.106	(0.091)	-0.831***	(0.151)
Formal JC	0.899***	(0.053)	0.354	(0.347)	1.486***	(0.212)
Informal JC	0.357***	(0.033)	1.666***	(0.372)	1.887***	(0.228)
Informal JD	-0.382***	(0.045)	-0.486***	(0.080)	0.967***	(0.100)
Wage	-0.012	(0.009)	0.219***	(0.079)	-0.055	(0.141)
Growth Rate	-0.001**	(0.000)	0.001	(0.003)	0.009*	(0.005)
% WAP 18-25	-0.447**	(0.153)	-3.421**	(1.551)	-3.719	(2.567)
% WAP with some college	0.022	(0.066)	0.084	(0.651)	-3.723**	(1.477)
Polynomial time trend	YES		YES		YES	
[3]: Informal JC						
Informal JC (lag)	0.658***	(0.037)	0.263***	(0.099)	0.485	(0.349)
Formal JC	0.043**	(0.018)	0.045	(0.071)	0.929***	(0.158)
Formal JD	0.028**	(0.011)	0.070***	(0.021)	0.530***	(0.064)
Informal JD	0.070***	(0.017)	0.069***	(0.021)	0.353***	(0.044)
Wage	0.006*	(0.003)	-0.025	(0.018)	-0.098*	(0.059)
Growth Rate	-0.000	(0.000)	0.001*	(0.001)	0.003	(0.003)
% WAP 18-25	0.070*	(0.039)	0.626	(0.434)	4.231**	(1.729)
% WAP with some college	-0.014	(0.028)	-0.445*	(0.228)	-1.483**	(0.657)
Polynomial time trend	YES		YES		YES	
[4]: InFormal JD						
InFormal JD (lag)	0.221***	(0.024)	-0.237***	(0.074)	-0.716***	(0.144)
Formal JC	0.313***	(0.029)	0.722***	(0.214)	1.880***	(0.240)
Formal JD	-0.312***	(0.028)	-0.311***	(0.066)	1.034***	(0.107)
Informal JC	0.683***	(0.042)	2.109***	(0.285)	2.833***	(0.353)
Wage	0.015	(0.011)	0.139**	(0.068)	-0.171	(0.114)
Growth Rate	-0.001***	(0.000)	-0.002	(0.002)	0.001	(0.006)
% WAP 18-25	-0.369**	(0.165)	-1,686	(1.374)	39.79	(2.921)
% WAP with some college	0.041	(0.074)	1.026	(0.634)	0.074	(1.231)
Polynomial time trend	YES		YES		YES	

Notes: Standard errors in parenthesis. *Denotes significance at 1.0%. ** Denotes significance at 5.0%. *** Denotes significance at 1.0%. Panel [1] corresponds to fixed effects estimation of each equation of system (7) estimated individually. Panel [2] and [3] correspond to first difference GMM estimation using lags and lagged first differences of independent variables. We use lagged from order 4th to 6th. For each equation we exclude lags and first differences of the independent variable as instruments. Polynomial trend if of 3rd order. WAP stands for working age population. Growth rate correspond to the annual GDP real growth rate of the department where each labor market is located.

Formalization/Deformalization and Economic Cycle

We now turn to analysis of how the relationships of job flows among formal and informal markets changes throughout the economic cycle. This is an important subject because the procyclicality or anticyclicality of what we are calling formalization/deformalization might shed light on possible causes of these phenomena. In economic slowdowns or recessions, when overall job creation decreases, formalization may intensify and gain importance in the explanation of formal job creation. In periods of good economic performance, formal job creation can be more heavily explained by factors other than formalization; formalization might, in fact, decrease. A situation such as this contains the implicit notion that, to a certain extent, the informal labor market can expand even when overall results of the labor market are good and the formal market is expanding as well.

The notion of an informal market that is comprised of those who were rationed out of the formal labor market has been seriously debated in the literature. Studies of developing economies, such as Bosch and Maloney (2006, 2008) and Bosch and Esteban-Pretel (2012), have argued in opposition to this notion. These studies instead show a sizeable magnitude in gross flows (supply transitions) among informal and formal sectors—evidence that has been interpreted as contrary to the view that informal labor markets are an inferior segment of the market, or disguised unemployment (Bosch and Maloney, 2008). This argument has been used in the literature, especially when the transition probabilities from informal to formal positions are procyclical, which has been reported for Brazil and Mexico (Bosch and Maloney, 2008); in these cases, the opposite flows from informal to formal are highly procyclical as well.

In an additional econometric exercise, we estimate the equation system (7) including as additional variables the interaction of regional GDP growth with job flow rates (estimation results are presented in Appendix 1). We include the interactions of the informal and formal job destruction with GDP growth, as additional covariates in equations [1] and [3], which are the ones with formal and informal job creation as dependent variables, respectively. This specification allows identification of how the magnitudes of formalization and deformalization change given different realizations of GDP growth for a given labor market. These results are presented in Figure 14.

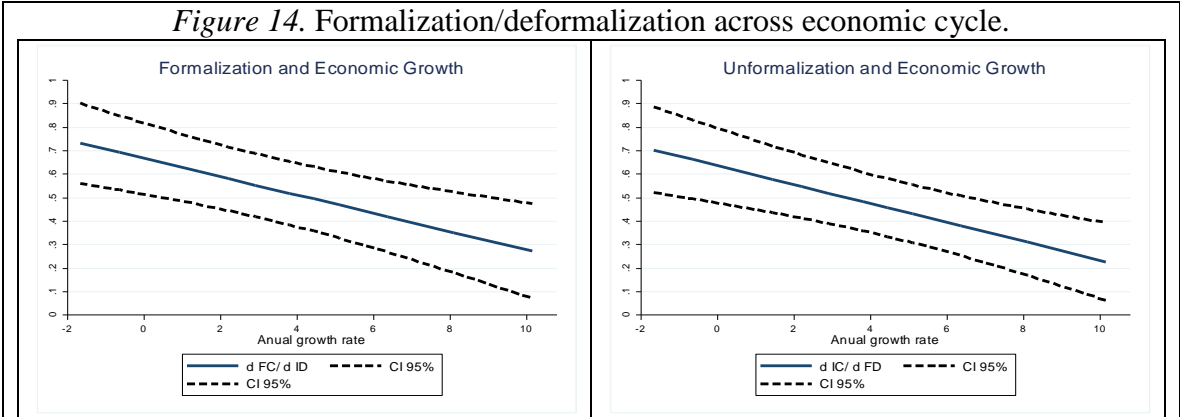
The effect of formalization is described in the left-hand side of the panel. Because the effect of informal JD on formal JC is a decreasing function of the GDP growth, in economic booms, the formalization is weaker than in recessions. We interpret these findings as evidence that the process of formalization of informal job positions is anticyclical. The effect of deformalization is described in the right-hand side of the panel. Because the effect of formal JD on informal JC is a decreasing function of the GDP growth, in economic booms, the deformalization is lower than in recessions. Again, the process of deformalization of formal jobs positions is anticyclical.

In summary, both formalization and deformalization are countercyclical processes. This conclusion is consistent with the view of a segmented labor market in which demand forces largely determine relationships between reallocation of jobs among informal and formal sectors. Nevertheless, our findings contradict a view of a segmented labor market in which there is very limited mobility of jobs and workers across sectors. Instead, we find that job flows reallocation, across segments of the market, increases during recessions. This finding is explained mainly by two factors: on the one hand, in recessions formal job creation is more dependent on formalization, and on the other hand, deformalization intensifies.

Our findings favor a vision of the informal labor market as a disadvantaged segment because reallocation from the formal to the informal segment increases during recessions. Nevertheless, paradoxically, formalization becomes a more important source for formal job creation during economic slowdowns, which implies that both segments of the markets would expand in economic booms.

Our findings can increase understanding of the empirical regularities depicted in Figure 2. Because formalization is countercyclical, in economic booms the importance of formalization is relatively low. Therefore, it is likely that the informal and formal labor markets can expand during growth phases of the economic cycle. Nevertheless, in economic slowdowns, formalization strongly increases as an explanatory factor in formal job creation. It is therefore likely that the destruction of jobs in the informal segment increases in importance during decreasing phases of the economic cycle, which would be a relevant factor in the explanation of reductions of informal labor demand during recessions. This hypothesis fits well with what we observe about the most recent decade in the Colombian market. In the

period after 2014, when the unemployment rate started rising again, the informal labor demand showed a negative trend while formal demand remained at a relatively high level. It seems that the decreasing part of the economic cycle is where this process of formalization gained momentum.



Notes:

These graphs are based on the estimation of first difference GMM estimation of the equation system (7) including the interaction of regional GDP growth with job flow rates as additional variables. The results of the estimation are presented in Appendix 1. We included the interactions of the informal and formal job destruction rates with GDP growth as additional covariates in equations [1] and [3], which are the ones with formal and informal job creation as dependent variables, respectively.

Conclusions

In this paper, we compute worker and job flow rates in the standard fashion of modern labor macroeconomics defined by the seminal work of Davis et al (1996). The computation of labor market flows introduces interesting demand-side considerations to our analysis. In the representation of labor markets portrayed by these measures, not only do workers move in and out of employment and between jobs, but employers also create and destroy jobs at large scales on a monthly basis. Therefore, both the creation and destruction of jobs represent demand-side micro-level events that shape the aggregated labor market demand; in addition, the total worker flows capture supply-side events as labor market entry, retirement, and job switching (Davis, Faberman, & Haltiwanger, 2006).

We compute all of these measures using regular household (HH) survey data. Worker flows can be computed directly from the surveys; for job flows, we use an original methodology to derive job creation and destruction flows from aggregated hiring and net employment growth at the labor market level. Using data from administrative records of the social security system

(PILA) and from Colombian household surveys (GEIH), we show that our predictions of job flows are consistent. The great advantage of this technique is that it allows measuring these labor dynamics for informal labor markets.

We contribute to the literature by discussing empirical regularities of the dynamics of informal and formal labor markets; this is a topic mostly ignored in the literature on labor fluidity because there is no data on informal job flows, as we conclude from our literature review. We find that the formal market is substantially more dynamic than its informal counterpart, and that the formal segment exhibits sizeable, higher magnitudes of both worker reallocation rates and churning rates. In comparison with the informal share of the market, the formal market contains a higher proportion of workers entering and leaving formal jobs; it is very likely that formal job-to-job movements explain this result. It seems that when workers gain experience in the formal sector they move between formal positions, which contributes to the worker reallocation and churning in this sector. In contrast, it is more difficult to get out from informality, and informal job-to-job transitions seem to have a low incidence.

With the job creation and destruction rates computed for all segments of the market, we can describe the interrelationships of these job flow rates among informal and formal labor markets. Such a characterization is still largely unknown, mainly because of the impossibility of directly observing informal labor market dynamics; in this sense, this paper contributes to the understanding of informal markets. From our econometric estimations, we find that formal and informal job creation and destruction are highly interrelated: half of the creation of jobs in the formal sector is explained by the destruction of jobs in the informal one. As it is standard in scientific literature, these results are contingent in the validity of our methodology assumptions.

Some forms of this codependence between formal and informal segments of the labor market can be interpreted as formalization of informal jobs or as the opposite (deformalization). For instance, in the case of formalization, a share of the formal job creation observed at aggregated levels is a partial substitution of informal jobs for formal ones. We find that an increase of 1 percentage point in informal job destruction causes an increase of 0.53 percentage points in the formal job creation rate.

Our findings are original since the relationship between formal and informal job flows has not previously been explored. Although similar evidence has been discussed in the literature on labor market dynamics, it uses workers' transitions. The supply-only perspective ignores demand-side considerations, such as the creation and destruction of jobs. Studies conducted by Bosch and Maloney (2006, 2008) and Bosch and Esteban-Pretel (2012) in developing economies show a sizeable magnitude in gross flows (supply transitions) among informal and formal sectors. This interrelationship between formal and informal employment has been interpreted in some cases as contrary to the conclusion that informal labor markets are an inferior segment of the market, or "disguised" unemployment (Bosch and Maloney, 2008). This conclusion has been driven mainly by the fact that job-to-job transitions, which include transitions across the formal and informal segments, including flows toward the informal sector, are procyclical.

In this paper, we provide evidence that the processes of formalization and deformalization are countercyclical. We argue that the countercyclicality of deformalization favors a vision of the informal labor market as a disadvantaged segment of the market. In other words, we find no evidence of sizeable reallocation of jobs toward the informal sector when labor demand is increasing. Formalization is therefore countercyclical in economic booms as well, when the importance of formalization is relatively low. These circumstances portray the informal segment as inferior: in good times, it loses importance as a source of formal jobs and as a recipient of jobs from the formal sector. Nevertheless, it is likely that in good times the informal and formal labor markets can expand in increasing phases of the economic cycle; this hypothesis favors the possibility that informality is "disguised" unemployment (Bosch and Maloney, 2008).

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Appendix 1

	First Difference GMM Estimation with Restrictions and Interactions	
	Coef.	Std. Err.
Formal JC		
Formal JC (lag)	0.179	(0.133)
Formal JD	0.706***	(0.086)
Informal JC	1.181***	(0.179)
Informal JD	0.665***	(0.077)
Wage	-0.189***	(0.069)
Growth Rate	0.002	(0.002)
% WAP 18-25	-0.227	(1.155)
% WAP with some college	0.041	(0.674)
Growth Rate * InFormal JD	-0.039***	(0.011)
Polynomial time trend	YES	
Formal JD		
Formal JD (lag)	-0.528***	(0.082)
Formal JC	1.416***	(0.172)
Informal JC	1.575***	(0.201)
Informal JD	0.963***	(0.088)
Wage	0.176	(0.115)
Growth Rate	0.006	(0.004)
% WAP 18-25	-1.691	(2.352)
% WAP with some college	-2.976**	(1.230)
Polynomial time trend	YES	
Informal JC		
Informal JC (lag)	0.088	(0.323)
Formal JC	0.847	(0.128)
Formal JD	0.635***	(0.081)
Informal JD	0.361***	(0.043)
Wage	-0.091**	(0.045)
Growth Rate	0.006***	(0.002)
% WAP 18-25	4.085***	(1.426)
% WAP with some college	-1.361**	(0.575)
Growth Rate * Formal JD	-0.040***	(0.011)
Polynomial time trend	YES	
InFormal JD		
InFormal JD (lag)	-0.734***	(0,099)
Formal JC	1.504	(0.174)
Formal JD	1.038	(0.095)
Informal JC	2.770	(0.330)
Wage	-0.198*	(0.118)
Growth Rate	0.001	(0.004)
% WAP 18-25	3.154	(2.939)
% WAP with some college	-0.572	(1.231)
Polynomial time trend	YES	

