

# Segmented Labor.

Evidence from the Quarterly Census of Employment and Wages

Microdata.

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## **Abstract**

This analysis seeks to provide empirical evidence that supports the existence of a segmented labor market—there exists a subset of the population confined to an unstable and low paying labor market experience. Linked employee-employer data is used to document labor market flows, allowing identification of labor market structures independent of preconceived notions and without artificial truncations. The evidence demonstrates that labor market instability is not normally distributed; rather, instability is highly concentrated and exhibits a perfect monotonic relationship with relative earnings. The secondary market is found to occur primarily in retail, service, and caring subsectors.

## 1. Introduction

Human capital theory serves as the standard framework for understanding labor market outcomes of import, notably the structure of earnings and wages. From this framework it follows that a stock of knowledge or other worker specific characteristics constitutes their human capital; human capital determines worker productivity and hence their earnings. However, back in the 1970's, an alternative framework for understanding labor market outcomes appeared and challenged the dominance of human capital theory—segmented labor market theory (SLM). SLM posits that there exist distinct labor market segments, distinguishable by the stability of employment and wage determination mechanisms; moreover, SLM asserts that barriers limit mobility between the primary and secondary markets.

Damning critiques by Wachter (1974) and Cain (1976) dismissed early SLM inquiries and the challenge to human capital theory faded. Around the same time, neoclassical models of involuntary unemployment began to garner greater attention (Yellen, 1984). Efficiency wage models coupled with new evidence which supported the existence of wage differentials, both across and within industries corroborated the conclusions of SLM theory while presenting a challenge to human capital theory. The malleable nature of human capital theory, however, allowed it to match the empirical reality through *post-hoc* rationalizations (Dickens and Lang, 1993, pp. 147-156). While distinct wage determination mechanisms between segments, whether the stock is industry or occupation, remains consistent with SLM, it reveals nothing about the other principal disparities theorized to exist between segments: the extent to which there exists instability and immobility.

This inquiry provides an affirmative response to the question that has continued to trouble

segmentation theorists: is there empirical evidence of a subset of the population confined to an unstable and low paying labor market experience. To answer the question, the analysis utilizes the Quarterly Census of Employment and Wages microdata (QCEW) to identify novel evidence supporting the existence of a SLM—a labor market divided according to stable, high paying jobs and unstable, low paying jobs. According to Reich (1984, pp. 63-66), the empirical SLM literature developed along two distinct patterns. The earlier studies focused on determining if segments existed with differing patterns of behavior and limited mobility. While the latter studies directed attention on determining characteristics of stocks that yields a dual structure with observable differences in labor market outcomes. The weakness of both waves of studies, which generated varied, ambiguous, and often biased results, resides in the *a priori* specification of stock characteristics. The longitudinal administrative dataset utilized in this analysis allows documentation of labor market flows that emerge from the creation and destruction of job matches between individual employees and firms. The labor market flows experienced by individual employees over time yields a job match history that provides insight into the dynamics and structure of the labor market independent of preconceived notions and without artificial truncations.

### *1.1 Contributions*

There exists a subset of the population confined to an unstable and low paying labor market experience. The evidence supporting this claim of immobility in the secondary market appears in the data as highly concentrated flows out of employment relations and a perfect monotonic relationship between relative stability and relative earnings. The assertion of immobility resides at the center of the SLM theory. However, most analyses of SLM have restricted their study to earning

differentials as the principal, albeit not sole, characteristic segregating various stocks (primarily occupation and industry) within the labor market.

This study escapes the difficulties of previous works by relying upon labor market flows (as opposed to stocks like industry and occupation) and reorients the focus on instability and immobility. Much of the earlier literature defined segments—sometimes even arbitrarily—and tested for a relation between stock characteristics and labor market structures. Whereas this analysis begins by documenting labor market flows that emerge from tracking individual labor market outcomes. The relative outcomes serve to define the labor market structure independent of any preconceived notions concerning that structure. The final contribution determines the stocks from which the flows emerge. The inclusion of NAICS codes in the QCEW allows the analysis to identify the industries that are most active in the secondary market.

The focus on labor market flows, specifically the outcomes that results from the dissolution of the employment relation, illustrates the segmentation of the labor market according to its primary characteristic—the employment relation, particularly for a disadvantaged minority, remains highly unstable. The existence of a dual labor market becomes apparent when considering the magnitude, composition, and cross-sectional distribution of labor market flows and the correlation of relative stability in labor market experiences with relative earnings. Wachter (1974, p. 652), in his critical survey, acknowledges that segmentation may transcend firm and industry. However, Wachter attempts to dismiss elements of the theory, specifically that institutional forces create barriers confining members of our economic society to the secondary market; they do so by stating that the distribution of both industries and workers by earnings approximates a normal distribution. The assertion intends to discredit the restricted mobility of labor market participants between primary and secondary markets—the observable segmentation is viewed in individual, not structural terms.

Dickens and Lang (1985; 1988) follow the convention of studying the segmentation of the labor market by looking at earnings. In so doing, they claim that persistent inter-industry wage differentials, which are exacerbated when including measures of working conditions, seriously undermines the narrative of compensating differentials. However, restricting the analysis to attempts at defining empirical measures, identifying segments in the labor market according to observable stock characteristics, and to wage dispersion, while insightful, obscures important underlying dynamics of a segmented labor market. In accordance with Lawson (1997, pp. 89-91), explanatory failure often results from inappropriate method; a primary contention of this analysis emphasizes that a failure of the SLM literature to establish definitive segments derives from its misguided focus on labor market stocks and an over-reliance on wage dispersion as a principal identifier.

## *1.2 Findings*

The employment relation is highly unstable. Measuring the magnitude of flows into and out of job matches elucidates the extent to which the labor market remains in a constant state of change. On average in any given quarter, approximately 1/3<sup>rd</sup> of existing job matches was either created or destroyed. Moreover, nearly 7/10<sup>th</sup> of these worker flows exceeds what is necessary to accommodate changes in firm level employment. The magnitude of labor market flows found in this analysis coincides with previous studies which used similar data.<sup>1</sup> The distribution of labor market flows across workers and industries contains implications for SLM theory. To determine

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<sup>1</sup> Burgess, Lane, & Stevens (2000, p. 481) found, for all sectors excluding manufacturing, a worker flow rate of 32.3% and that 70.3% of the worker flows arise from churn.

the distribution of the flows, the analysis uses individual job match histories to consider the concentration of worker flows emerging from the destruction of job matches.

Whether considering quarterly separation rates or total separations experienced by individual workers, the destruction of job matches remains highly concentrated and strongly correlated with earnings. The observed individuals with high quarterly separation rates are overwhelmingly separating from job matches which are ranked in the lowest tercile of earnings. Similarly, the individuals with the greatest number of total separations—the 14% of the population that accounted for 43% of all separations—are found to be separating primarily from low earning matches. The relative stability of one’s labor market experience has a perfect monotonic relation with relative earnings.<sup>2</sup> This novel finding is exactly what SLM theory posits and has remained empirically elusive due to shortcomings of previous studies.

With the labor market structure defined by the relative experience of its participants independent of preconceived notions of what constitutes the segments, it becomes possible to identify from which industries the secondary market participants flow out of. With secondary market participants identified in the data, the analysis links these workers to the firms that employed them by the unique firm identifier. Firms operating in the secondary market, defined here in terms of relative stability, belong overwhelmingly to the retail, service, and caring industries.<sup>3</sup>

The following section describes the measurement of variables used in this empirical study and

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<sup>2</sup> Anderson and Meyer (1994, p. 198) found that 21% of the individuals in their sample accounted for 55% of total turnover.

<sup>3</sup> The secondary market industries identified in this analysis coincides with the industries that Burgess et al. (1996), Davis et al. (2006, pp. 7-8) and Abowd and Vilhuber (2011, Table 4) found to have relatively high churning rates.

considers its relation to the literature on labor market flows. After describing the methodology, the focus turns to measuring the magnitude and composition of labor market flows in section three. In so doing, the analysis seeks to provide evidence of an unstable labor market. The fourth section considers the cross-section structure of the labor market and presents the distribution of labor market flows. The distribution of flows facilitates discussion on the degree of concentration and links to the thesis of this analysis—the labor market is segmented according to relative stability of employment relations and earnings. The penultimate section identifies the top four industries employing the workers with the most unstable labor market experiences. Section six contains conclusions.

## **2. On Methodology**

“The labor market”, according to Doeringer and Piore (1971, p. 165), “is divided into a primary and secondary market.” SLM theory asserts further that the institutional structure and processes creates a pattern in the labor market observable by a disadvantaged minority confined to a relatively unstable and low paying experience. The more radical explanation comes from those who explore the historic process of this institutional phenomena from a Marxist lens. Gordon et al. (1982, pp. 15-16) emphasize that labor segmentation serves as a means of controlling labor—the segmentation of labor divides workers. The less radical explanation emphasizes the role of feedbacks; Piore (1973) and Vietorisz and Harrison (1973) describe how positive feedbacks dominate certain processes, creating barriers that restrict mobility between primary and secondary labor markets. Reich et al. (1973, p. 359) and Piore (1975, p. 126) explicitly state that stability, not pay, serves as the primary characteristic differentiating primary and secondary work. However, most analyses of SLM have restricted their study to earning differentials as the

principal, albeit not sole, characteristic segregating various stocks (primarily occupation and industry) within the labor market.

Many scholars have attempted to construct empirical measures and identify categories of a segmented labor market. Carnoy (1977) provides a summary of earlier attempts and the critiques that followed. Beck et al. (1978) sought to identify segmentation by industry; these authors used survey data to conclude that there exist sectoral differentials in earnings which can only be explained by structural forces. Boston (1990) and Osterman (1975) considered segmentation at the occupational level. After subjectively classifying occupations into primary and secondary, Osterman studies how different characteristics affect earnings and states that policy must take into consideration the existence of a dual labor market. Rumberger and Carnoy (1980) and Bibb and Form (1977) consider segmentation and its effect on earnings at the intersection of industry and occupation. Wachter (1974), Cain (1976, pp. 1245-1247), Heckman and Hotz (1986, p. 522), and Taubman and Wachter (1986, pp. 1200-1202) have critiqued SLM theory (particularly its challenge to the explanatory power of human capital in understanding segmentation) and the validity of studies on the claim that the use of arbitrary definitions to delineate segments and artificial truncations of the data bias their results.

In seeking to circumvent the difficulties associated with a stock-based analysis, this inquiry draws on studies which focused on three labor market flows: worker, job, and churning flows. Worker flows emerge from the creation and destruction of employee-employer job matches—the sum of total accessions and separations.<sup>4</sup> Job flows materialize from the creation and destruction of jobs

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<sup>4</sup> References include Pissarides (1985, 2000); Mortensen and Pissarides (1994); Blanchard and Diamond (1989,1990).



at the level of the firm and appear as changes in firm level employment.<sup>5</sup> Churning flows comprise of worker flows in excess of job flows.<sup>6</sup> These labor market flows provide information about the employment relation that remains unattainable when focusing on stocks.

The magnitude and composition of the measured flows provides insight into the nature and instability of the employment relation: the extent to which the labor market remains in a state of constant change, consistently churning labor. Measuring worker flows provides important information on the instability of employment relations. Further evidence on the instability of the social relation between employee and employer materializes when decomposing worker flows into its underlying elements. The decomposition illuminates an excess of worker flows beyond what serves to accommodate job flows. The degree to which labor is churned serves as an insightful indicator of employment relation instability. After decomposing the flows, the analysis considers the concentration of flows amongst a subset of the labor force. Focusing on the destruction of job matches facilitates the concluding discussion on the existence of a segmented labor market—a labor market divided according to stable, high paying and unstable, low paying labor market experiences.

## *2.1 The Data*

The administrative dataset utilized in the analysis originates from the tax accounting records collected by the Missouri Unemployment Insurance (UI) system. The microdata set contains two files, each of which is an unbalanced panel with quarterly observations ranging from the first

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<sup>5</sup> Including Davis and Haltiwanger (1990, 1992) Davis, et al. (1998).

<sup>6</sup> See Anderson and Meyer (1994); Burgess et al. (2000).

quarter of 2005 to the third quarter of 2014. The wage file contains observations at the level of the individual and includes all UI covered employees who worked in the state of Missouri. The available information in the wage file includes total wages received by every employee from each firm where they are employed, a personal identification key, and the unique UI number of the firm that paid the wages. The employer file's observations occur at the level of the establishment. The information in the employer file includes the unique firm UI number, average monthly employment levels, and seven-digit NAICS codes.

## *2.2 The Measurement of Variables*

The unique firm identifier, present in both files, enables quarterly matching of each employee to every firm that employed them. Linking employees to firms enables tracking the creation and destruction of these relations over time, resulting in a job-match history for every individual employee. The job match histories paint a vivid picture of the dynamics occurring within the labor market. Following Burgess et al. (2000, P. 474), the labor market dynamics are described by three distinct flows occurring at firm  $f$  and time  $t$ : worker flows  $Wf_{ft}$ , job flows  $JF_{ft}$ , and churning flows  $CF_{ft}$ .

Worker flows arise from the creation and destruction of job matches and represent the movement of labor into and out of relationships with firms. The flow of workers represents total turnover—the sum of total accessions and total separations in each quarter. Job flows consist of changes in the firm level of employment; these flows are described by Davis et al. (1998) as gross job creation and destruction. The job flows are calculated as the sum of job creation and job destruction. Churning flows arise as the excess of worker flows above what's necessary to accommodate changes in firm employment levels. This flow represents dynamics arising from the heterogeneity

and uncertainty that plagues the labor market and employment relations. Heterogeneity and uncertainty may cause either party to reevaluate the job match. However, it is not possible to determine who initiated the separation—the separation may emerge as labor churning firms (employee quits, and the firm hires a replacement) or as firms churning labor (employer layoffs employee and hires a replacement).

The analysis defines job match creation as an accession to a firm which occurs when a job match is identified that did not exist in the previous quarter. These accessions comprise the creation of new jobs (an element of job flows) as well as the filling of previously existing jobs (an element of churning flows). While impossible to determine which of the two categories the newly identified job match belongs in at the level of the individual, it is possible to approximate it at the level of the firm. To decompose worker flows into those driven by job creation and destruction and those driven by churning requires calculating average quarterly employment from the average monthly employment variable in the employer file. For an expanding firm, average quarterly employment in the current quarter exceeds the previous level. Job creation constitutes the difference between the level of employment at quarter  $t$  and quarter  $t - 1$ . Like accessions, total separations can be further decomposed at the level of the firm. Job match destruction can result from job destruction (attributable to job flows) and from separations at continuing positions (attributable to churning flows). For a contracting firm, average quarterly employment in the current period decreases below the previous level. Job destruction (attributable to job flows) constitutes the difference in the level of employment at quarter  $t$  and  $t - 1$ . The remaining job match dissolutions at a given firm transpire as separations from continuing positions (attributable to churning flows).

The definitions of job creation and destruction utilized in this analysis parallels the conception of job creation and destruction presented in Davis and Haltiwanger (1990, 1992). Let  $N_{ft}$  be the

average quarterly level of employment at firm  $f$  in quarter  $t$ . When  $N_{ft} - N_{ft-1} > 0$ , firm  $f$  is engaging in job creation and when  $N_{ft} - N_{ft-1} < 0$ , firm  $f$  is engaging in job destruction.

Now it is possible to explicitly state the relationship between the three flows. The job flow at firm  $f$  in quarter  $t$  is calculated as the absolute value of the change in employment.

$$JF_{ft} = |N_{ft} - N_{ft-1}|$$

Recall that worker flows at firm  $f$  in time  $t$  constitutes the sum of all the accessions  $A_{ft}$  and separations  $S_{ft}$ :

$$WF_{ft} = A_{ft} + S_{ft}$$

Job flows represent the absolute value of change in quarterly employment at the level of the firm which is equivalent to the absolute value of the difference between accessions and separations.

$$JF_{ft} = |N_{ft} - N_{ft-1}| = |A_{ft} - S_{ft}|$$

Churning flows arise from the excess of worker flows beyond what is necessary to accommodate job flows. Thus, we have our final measure of worker flows:

$$WF_{ft} = JF_{ft} + CF_{ft}$$

### **3. On the Magnitude and Composition of Labor Market Flows**

In seeking to measure the magnitude of labor market flows and to illuminate the significant magnitude of worker flows unaccounted for by the creation and destruction of jobs, this analysis follows Burgess et al. (2000, pp. 480-485) in presenting four measures: worker flow rate, job flow rate, churning rate, and the ratio of churning flows to worker flows. The final measure, the ratio of

churning flows to total worker flows, sheds insight into the importance of churning flows. The range of the data utilized in this analysis spans the Great Recession, during which the dynamics undergo a clearly discernible change; as such, the graphs and actual measures (seen in Tables B1, B2, and B3) are presented in a manner which attempts to elucidate this evolving behavior.

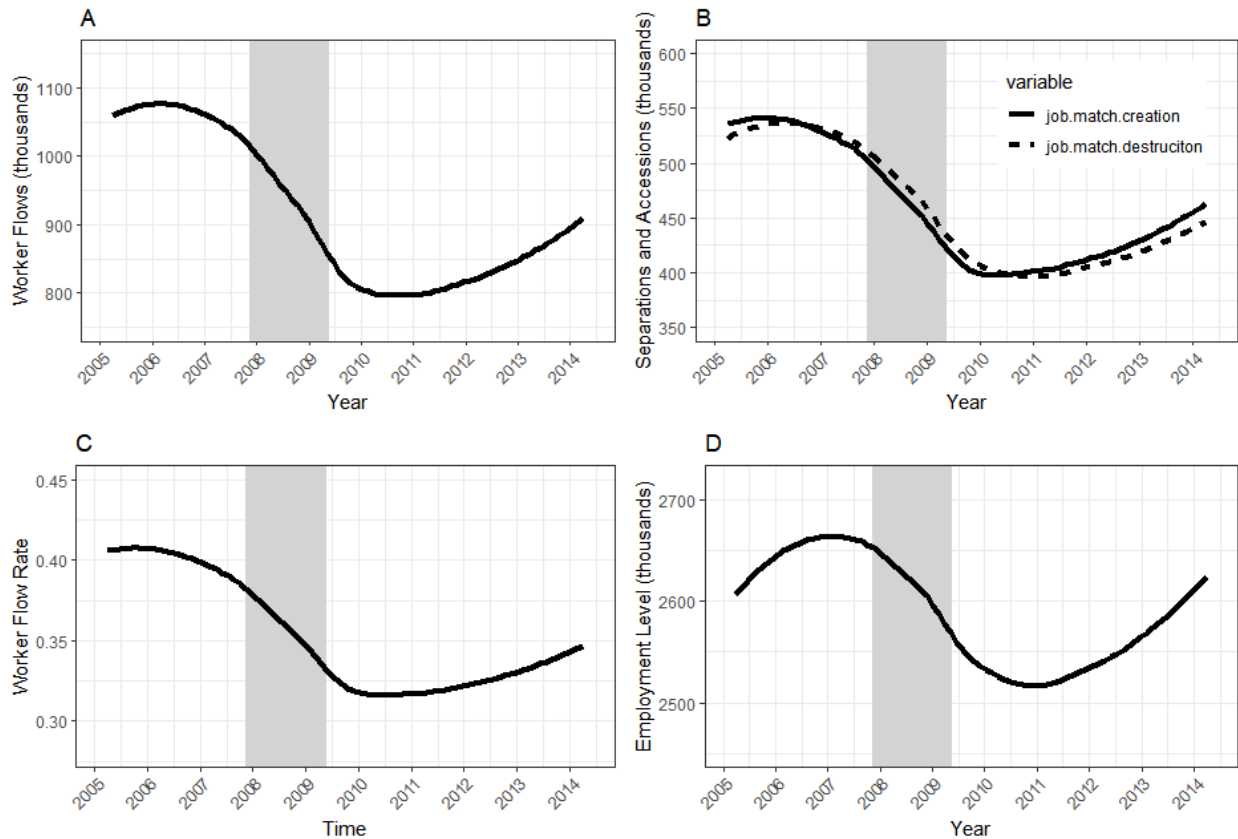
All the flow rates are calculated by dividing the measures by the stock of employment. Since the employment level also changes, the employment stock and all the measures of flows are also presented in absolute terms as well as decomposed into their parts. The employment level is presented alongside all rates in which it is used, and it behaves in a predictable manner across the range of data. The stock of employment increases until the onset of the Great Recession then declines by approximately 10% of its pre-Great Recession peak before beginning a very gradual recovery. However, unlike some of the flow measures presented in the analysis, the stock of employment recovers to its pre-Great Recession levels by the end of the data range.

Graphics for worker flows are presented in Figure 1 and demonstrate the total movement of individual workers into and out of relations with a specific firm. The creation and destruction of job matches takes a mean of 35.5% across the whole range. More than 1/3rd of existing job matches in each quarter, on average, were either created or destroyed. The mean of the worker flow rate declines across the observed range, from greater than 40% initially, down to below 33% after the recession; although, as visible in Figure 1 Panel C, the worker flow rate has been gradually recovering after bottoming out shortly after the Great Recession officially ended. The worker flow rate found using the Missouri QCEW is slightly higher than the 32.3% found by Burgess et al. in non-manufacturing (2000, p. 481) and significantly lower than the 49% found by Abowd and Vilhuber using national data (2011, Table 1). The discrepancy is easily explained by the different periods under consideration. There is a downward trend in the Abowd and Vilhuber (2011, Figure

2) data which approaches the 40% found in this analysis for the period preceding the Great Recession. Worker flows can be decomposed into job match creation and job match destruction. As seen in Figure 1B, both components of worker flows move in tandem across the observed range and decline precipitously during the Great Recession. The post-Great Recession minimum value of the worker flow bottomed at 55.32% of its pre-Great Recession maximum.

Figure 1

Worker Flows



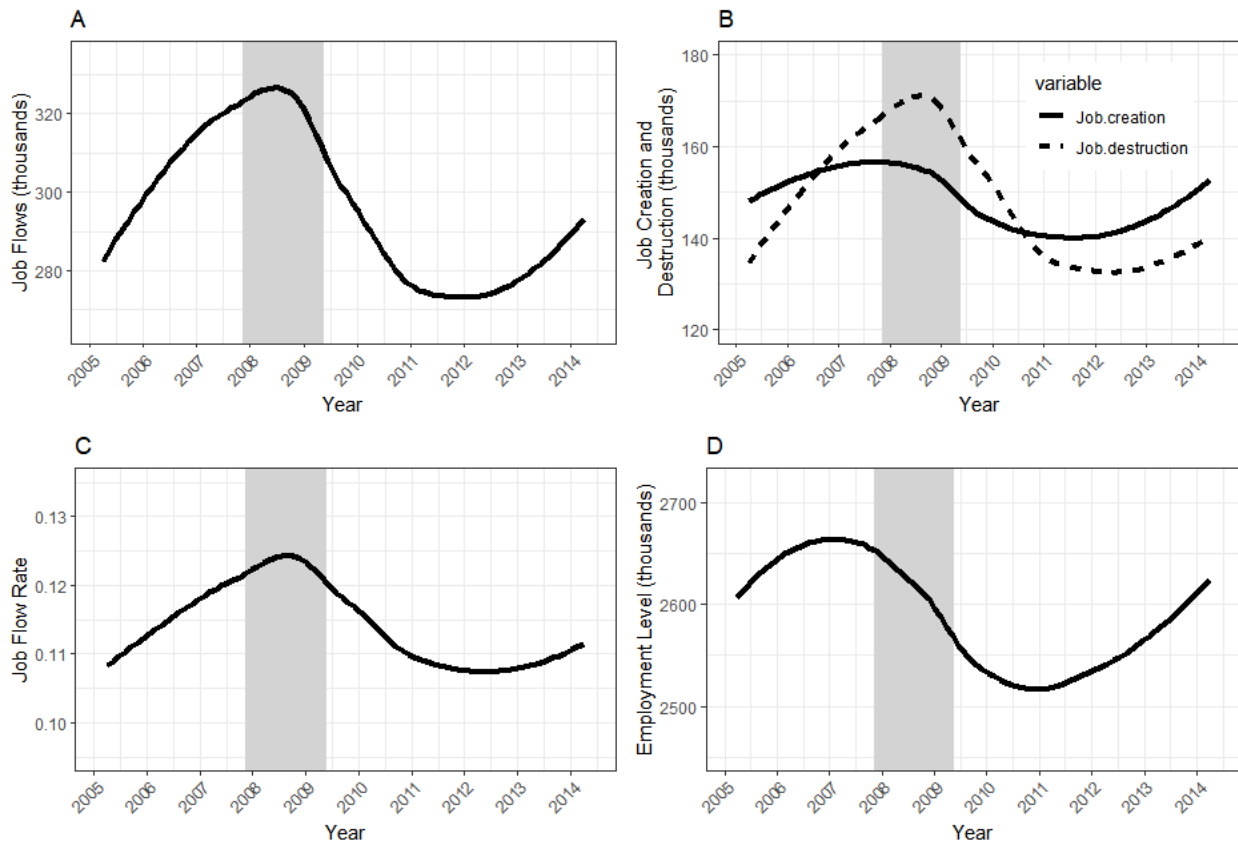
Note— The graphs have been smoothed using Loess method to clarify visualization of the trends. The Great Recession is denoted by the gray column.

Graphics for job flows are presented in Figure 2. The measure represents the share of the worker flows animated by the creation and destruction of jobs at the firm level and is much less volatile than the worker flow rate. The mean for the job flow rate across the entire range is 11.4%

which is very close to the national rate found by Abowd and Vilhuber (2011, Table 1). The job flow rate increased slightly during the Great Recession before receding back to near pre-Great Recession values. Like the worker flow rate, the job flow rate can be decomposed into two components: job creation and job destruction. Unlike the worker flow rate though, the two components are not as strongly correlated as seen in Figure 2 Panel B. Job creation continues to grow modestly into the Great Recession before a sudden, albeit relatively moderate decline; however, the second component of job flows, job destruction, spikes during the Great Recession and at almost the same time that job creation drops, so too does job destruction before eventually bottoming out and remaining relatively stagnant.

Figure 2

Job Flows



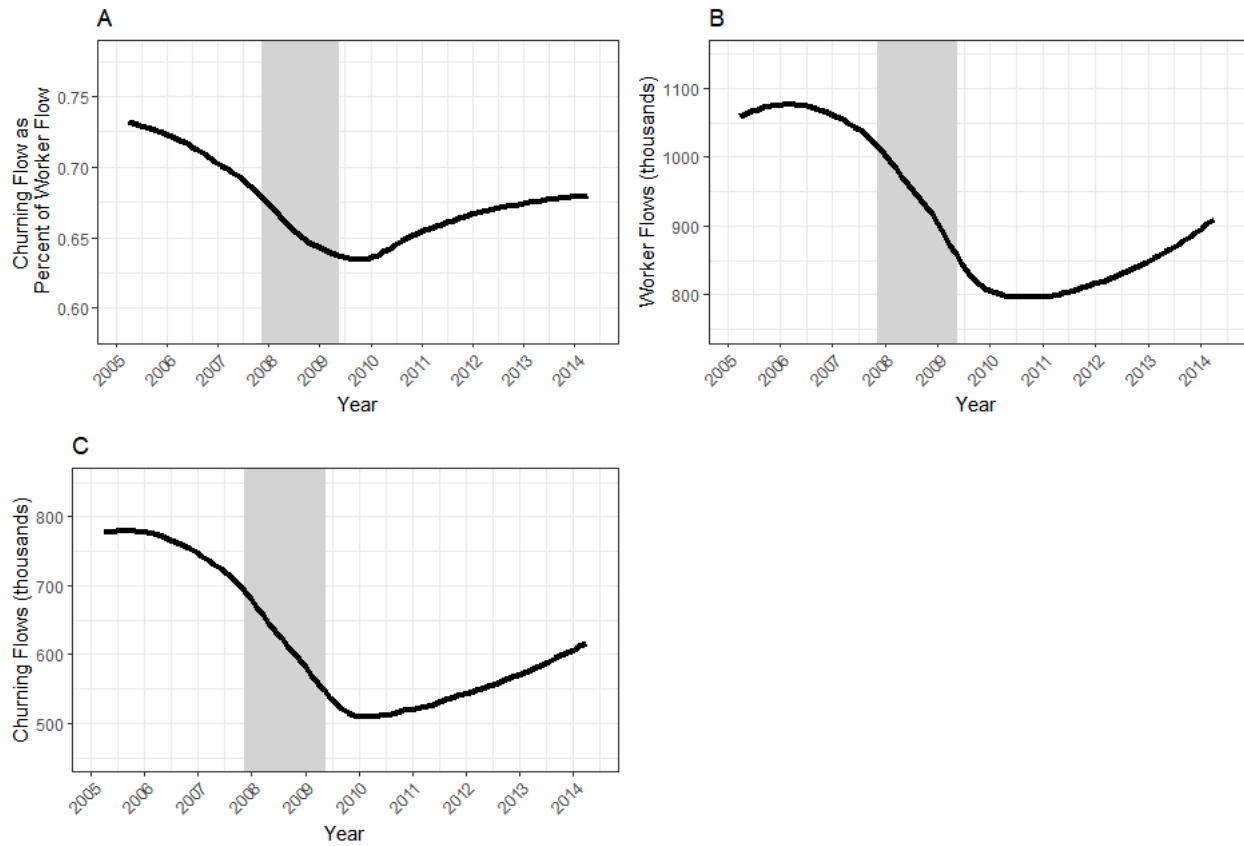
Note— The graphs have been smoothed using Loess method to clarify visualization of the trends. The Great Recession is denoted by the gray column.

The unique identifiers present in both files facilitates a decomposition of the worker flows two distinct categories: job flows and churning flows. The churning flow is presented in Figure 3. This measure constitutes the difference between total worker flows and the creation and destruction of jobs. Comparing the proportion of total worker flows that are unaccounted for by the creation and destruction of jobs yields some very interesting insights into labor market dynamics. The ratio of means of churning to worker flows is approximately 68% and is very similar to the results found by Burgess et al. (2000) and Abowd and Vilhuber (2011). Nearly 7/10<sup>th</sup> of the employment relations that are created and terminated quarterly remain unaccounted for by changes in desired firm level employment. Rather, a large majority of the flow of workers moving into and out of employment results from a re-evaluation of the job match by one or both parties.



Figure 3

### Churning Flows



Note— The graphs have been smoothed using Loess method to clarify visualization of the trends. The Great Recession is denoted by the gray column.

## 4. On the Distribution of Labor Market Flows

With the magnitude of labor market flows documented, the analysis now considers the distribution of labor market flows across workers. Specifically, this section considers whether separations are concentrated amongst a subset of the labor force. To study the distribution of job match destruction amongst workers, the analysis utilizes the job-match histories created from the individual wage records and considers the cross-sectional distribution of the documented flows. The first aspect considered is quarterly separation rates. While informative, it does not fully elucidate the division that exists. In seeking to further elucidate the phenomenon of labor market segmentation, the

analysis focuses on the number of separations experienced by every observed individual. Focusing on total separations experienced by individual's necessitates partitioning the employees according to separations and considering the percent of individuals in each bin as well as determining the shares of the total number of separations experienced by each partition. These measures shed a great deal of insight on the degree to which the labor market is segmented.

A segmented labor market, according to Doeringer and Piore (1971, p. 40) and Piore (1975, p. 126), has a secondary market distinguishable most importantly by instability of the employment relation. The segmented labor market theory posits that a subset of the labor force participates in a much more unstable labor market; evidence of this claim in the QCEW would assume the form of a disproportionate share of turnover being experienced by a subset of the observed employees. Cain (1976, p. 1231), in a critical survey of the literature on segmented labor market theories, states that simple descriptive statistics considering a cross section of labor market structure, where employment stability is measured on the horizontal axis and number of workers on the vertical, would provide the simplest test for the existence of a dual labor market; specifically, Cain states that "the segmentation hypothesis would presumably predict a distribution that was distinctly multi-peaked."

Following Cain, the analysis now turns to studying the number of separations and specifically the cross-sectional distribution of labor market flows. The first cross-sectional measure derives from the number of separations experienced on a quarterly basis. The number of separations per quarter is divided into series of intervals; the analysis then presents the number of persons falling into each bin. These results are shown in the histogram presented in Figure 4. Approximately 50% of the observed employees experience less than one separation every ten quarters, indicative of the most stable labor market experience. There is a steep drop off to the next partition and then a gradual

decline until the upward spike, creating a distinct second peak for the partition representing 0.4-0.5 separations per quarter—roughly two separations per year. The observed bimodality in the distribution of quarterly separation rates suggests a much less stable labor market experience for select labor market participants. This result, according to Cain (1976, p. 1231), confirms the existence of a dual labor market.

Figure 4

### Quarterly Separation Rates

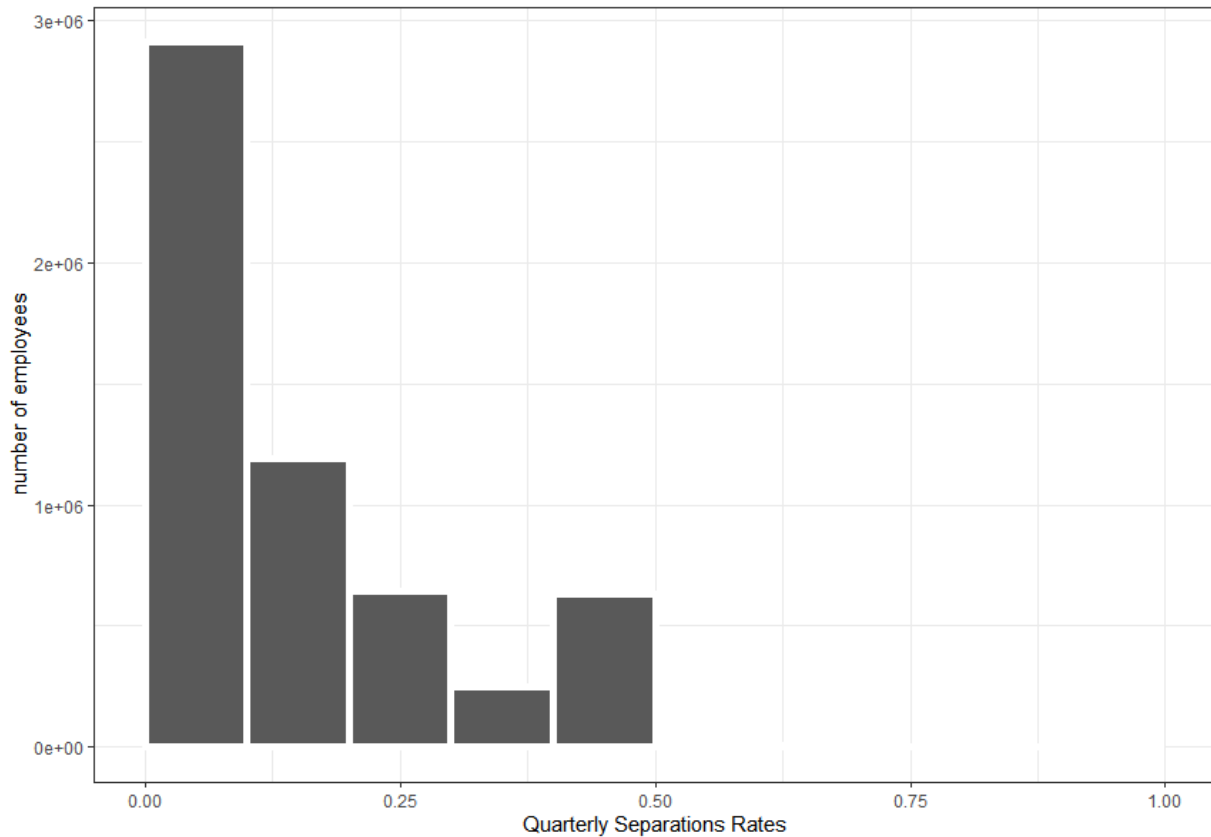
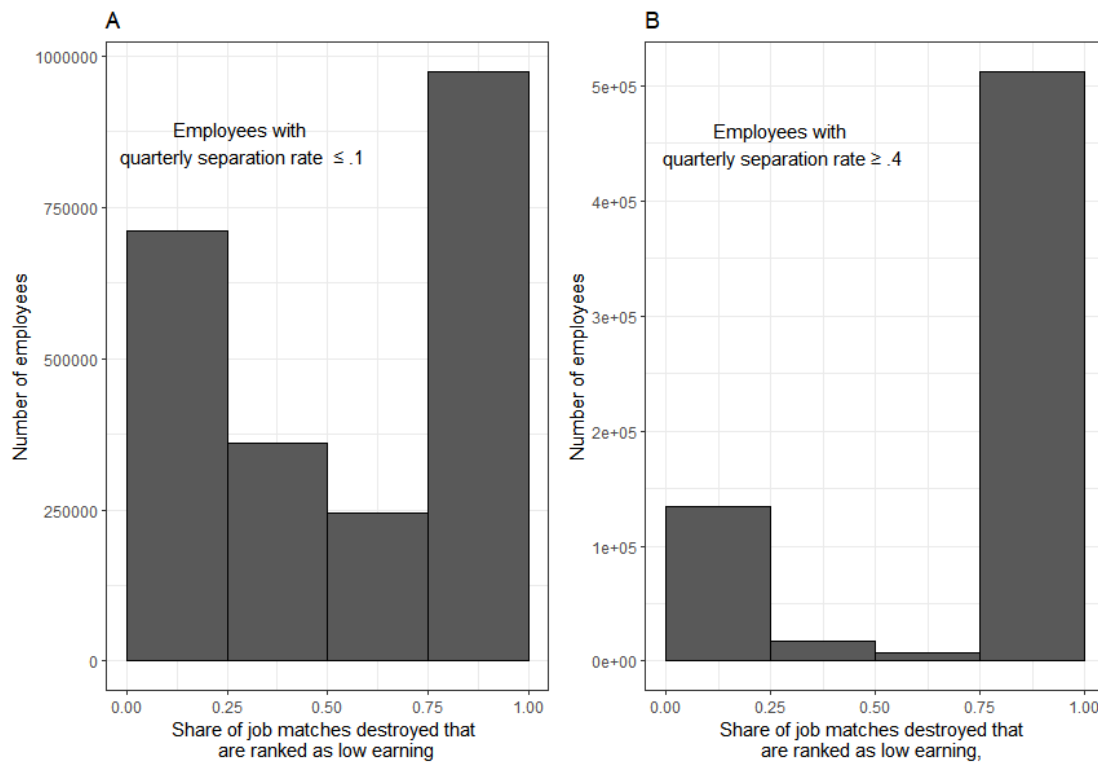


Figure 5 provides additional support for the existence of a dual labor market, which is distinguishable not just by instability but also by lower earnings. The histograms in Figure 5 demonstrates that those employees with a relatively unstable labor market experience—with quarterly separation rates greater than or equal to 0.4—have job matches dissolve which are

overwhelmingly (76%) ranked in the lowest earnings tercile. The distribution of separations by earnings experienced by the participants with the most unstable labor market experience relative to the participants with the most stable experience suggests a strong correlation between stability and earnings. While informative of the potential divide that exists in labor market experiences between stable and unstable and the correlation with low earnings, it fails to fully illustrate the extent to which some members of our economic society are relegated to a disadvantaged labor market experience. In seeking to better understand the extent which the segmented labor market confines some members of economic community to the secondary market, the analysis focuses on the total number of separations experienced by individual employees.

Figure 5

Share of Separations Ranked as Low Earning



Cain (1975, p. 20) poses a second question concerning the structure of the labor market and the

mobility of secondary market participants: are certain groups confined to the secondary labor market or do they choose that experience. Cain follows this question by stating that there is little evidence to support the claim of involuntary confinement. Taubman and Wachter (1986) survey the literature and reach the same conclusion as Cain. Their presentation agrees with that of Schiller (1977) who finds evidence that there is mobility for employed males; however, significantly less so for black males. It seems that this finding does not, as Schiller posits, contradict the SLM theory which asserts that the barriers confining members to the secondary market are not absolute and are, according to Vietowisz and Harrison (1973, p. 374), reinforced by group characteristics. Stratification coincides with segmentation in the labor market. The remaining studies reviewed by Taubman and Wachter (1986) essentially consider the relation between earnings in early and late stages for the entire sample across the range of data; generally, these studies find substantial mobility in earnings. However, substantial mobility when looking at the dynamics of an entire sample (a stock of workers) does not preclude the possibility of disadvantaged minority within the stock having a different experience; moreover, ignoring heterogeneous experiences prohibits these studies from providing insight into claims about differentiated labor market experiences. The identification of a segmented labor market with a subset of workers confined to a marginalized experience serves as the focus of the remaining analysis.

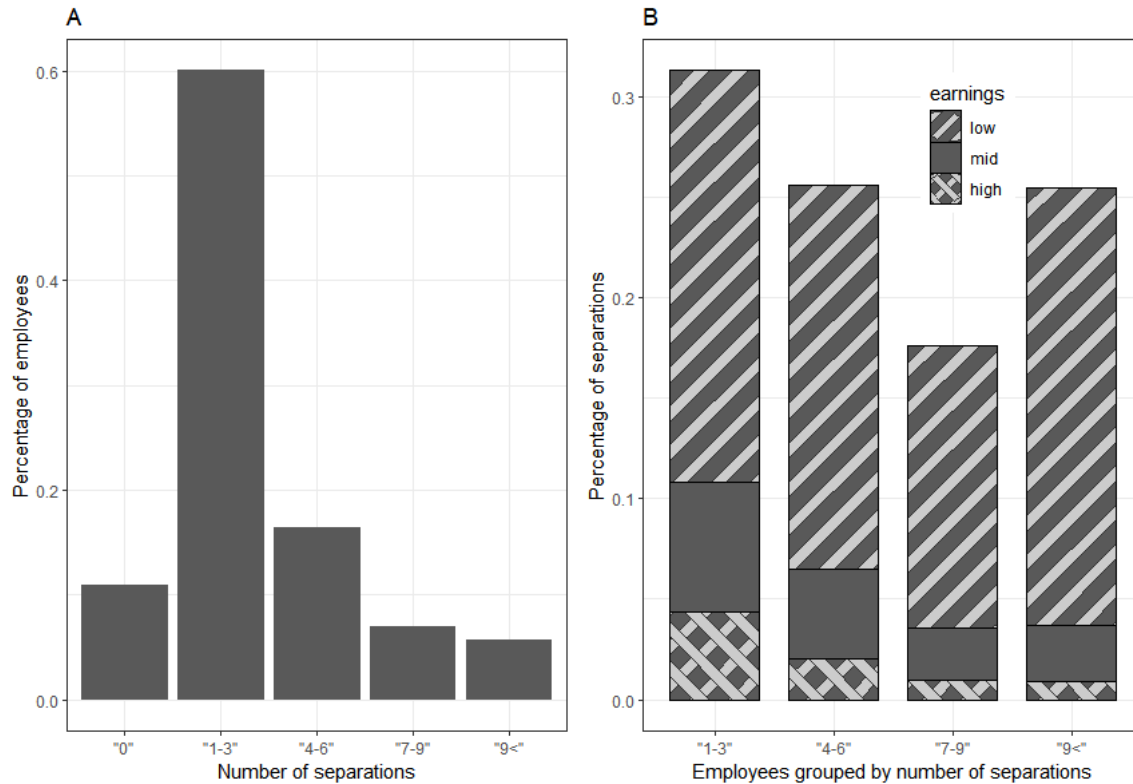
The analysis now studies the concentration of job-match destruction, determines what percent of turnover is accounted for by individuals clustered according to the relative stability of their labor market experience, and considers the correlation of instability with relative earnings. The analysis documents the number of separations over the entire observed range and creates a series of intervals according to the number of separations. The share of individuals that falls into each bin is presented on the vertical axis. As seen in Panel A of Figure 6, over 70% of the observed

employees experienced less than three separations over the nine years spanning 2005-2014. Of all employees who experienced at least one separation, 14 % experienced more than six separations and approximately half of these employees experienced more than nine separations across the range. Table 1 presents the percentage breakdown of employees who experienced at least one separation according to which bin they were relegated and the share of these job match destructions according to the assigned earnings indicator. There is a clearly discernible trend in the data: as you move from the relatively stable labor market experience to the most unstable, the likelihood that the job match destroyed was ranked in the lowest tercile of earnings increases dramatically. For the most stable bin, 65% of the separations were ranked as low earning; while for the most unstable bin, 85% of the separations were ranked in the lowest tercile.

After determining how many individuals fall into each partition, the analysis compares the total percent of the documented separations experienced by each group (presented visually Panel B of Figure 6). The 14% of individuals who experienced seven or more separations account for over 43% of all separations. The 6% of employees who experienced more than nine separations account for more than 25% of all separations. The concentration of these flows parallels those presented in Anderson and Meyer (1994, p. 198) who found that 55% of the turnover was experienced by 21% of their sample. Moreover, the employees who experienced a disproportionate share of the turnover, do so with earnings in the lowest tercile. Specifically, more than 83% of the separations experienced by employees with seven or more job-match destructions were in the bottom tercile of wages paid.

Figure 6

Separations Experienced by Employees



Tables 1-3 present the Spearman correlation between the stability of an individual's labor market experience and their relative quarterly earnings. There exists a perfect monotonic relation between instability and earnings. Comparing the total number of separations experienced by those employees who are classified as having a more unstable labor market experience and the correlation with quarterly earnings suggests that the segmentation of the labor market affects earnings. In accordance with Reich et al. (1973, pp. 359-360), not only does a subset of the labor force experience a disproportionate share of total turnover, but the secondary market to which our fellow community members are relegated also comes with relatively lower earnings.

Table 1

Spearman's Correlation between Separations and Low Earnings

Separations	Percent of separations in low wage	Rank Lowest to Highest		$d_i$	$d_i^2$
		Separations	Percent of separations in low wage		
1-3	65.4	1	1	0	0
4-6	74.5	2	2	0	0
7-9	80.1	3	3	0	0
>9	85.3	4	4	0	0

$$\text{Spearman's Correlation} = \rho = 1 - \frac{6\sum d_i^2}{n(n^2 - 1)} = 1$$

Table 2

Spearman's Correlation between Separations and Mid Earnings

Separations	Percent of separations in mid wage	Rank Lowest to Highest		$d_i$	$d_i^2$
		Separations	Percent of separations in mid wage		
1-3	20.70%	1	4	-3	9
4-6	17.40%	2	3	-1	1
7-9	14.50%	3	2	1	1
>9	11.00%	4	1	3	9



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$$\text{Spearman's Correlation} = \rho = 1 - \frac{6\sum d_i^2}{n(n^2 - 1)} = -1$$

Table 3

Spearman's Correlation between Separations and High Earnings

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Separations	Percent of separations in high wage	Rank		$d_i$	$d_i^2$
		Separations	Percent of separations in high wage		
1-3	13.90%	1	4	-3	9
4-6	8.00%	2	3	-1	1
7-9	0.60%	3	2	1	1
>9	0.40%	4	1	3	9

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$$\text{Spearman's Correlation} = \rho = 1 - \frac{6\sum d_i^2}{n(n^2 - 1)} = -1$$

## 5. On the Industries of the Secondary Market

After identifying the participants who are confined to the secondary market, the analysis takes advantage of the presence of the firm identifier in both files and the industry information in the employer file. Cross-referencing the firm identifier associated with employees of the secondary market—defined herein as those workers with 7 or more separations—with the NAICS codes in the employer file allows this inquiry to determine the industries that employ those with the most unstable labor market experience. Table 4 presents the top 4 industries of the secondary market by two-digit NAICS as well as the share of total separations experienced by workers in the secondary market.

Table 4

Industries of Secondary Market

Industry by 2 Digit NAICS	Share of total separations
Administrative and Support Services (56)	36%
Accommodation and Food Services Places (72)	12%
Retail (44-45)	10%
Health Care and Social Assistance (62)	8%
Total	64%

Administrative and support services dominate the secondary market. This industry is defined as those “establishments engaged in activities that support the day-to-day operations of other organizations... [and are] integral parts of the activities of establishments found in all sectors of the economy” (U.S. Bureau of Labor Statistics, 2020a). Occupations within this industry include janitors, laborers, landscaping, office clerks, and security guards. More generally, workers confined to the secondary market are in service, retail, and caring roles. The secondary industries identified in this analysis were arrived by starting with the workers who had the most unstable labor market experience back and tracing the flows back to the industries from which they originated. The results found herein remain consistent with Davis et al. (2006, pp. 7-8) and Abowd and Vilhuber (2011, Table 4); both studies used aggregate industry data and found that the secondary market industries have some of the highest churning rates.

## 6. Conclusion

This inquiry has sought to provide empirical evidence for the existence of a segmented labor market. In so doing, the analysis utilized the QCEW microdata from the state of Missouri ranging from the first quarter of 2005 through the third quarter of 2014. Creating job match histories from the longitudinal microdata elucidated the magnitude and concentration of labor market flows.

Evidence found in this analysis which supported the characteristics posited by SLM theory remains consistent with earlier findings from studies using similar datasets.

The unstable nature of the labor market was demonstrated by considering the magnitude and composition of labor market flows.). The worker flows are not evenly distributed across the population, but highly concentrated amongst a subset. Anderson and Meyer (1994, p. 198), discovered a similar concentration of worker flows in a minority of their sample.

Focusing on worker flows allows this analysis to identify workers with the most unstable labor market experience—the secondary market participants. Tracing the flows of the secondary market participants back to the industries where they were employed corroborates and extends the results of Burgess et al. (2000, p. 474). These authors used microdata to demonstrate that “churning is not the response to an unfortunate mismatch, scattered randomly across employers, but is highly persistent in particular employers suggesting that it is an equilibrium phenomenon, associated with a particular set of optimal personnel policies.” Not only are worker flows concentrated amongst a subset of firms but are also concentrated amongst a subset of workers and industries.

Compounding the concentration of job match destruction is the perfect monotonic relation between instability of labor market experiences and relative quarterly earnings—the more unstable one’s labor market experience is, the greater the likelihood that they earn relatively less than their primary market counterparts. The secondary market participants, identified in this analysis as having 7 or more separations, work in industries which Davis et al. (2006, pp. 7-8) and Abowd and Vilhuber (2011, Table 4) found to have relatively high churning rates. The identified industries responsible for the most unstable employment relations are service, retail, and caring.

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## Appendix A

### *A1. On Those Excluded from the Data.*

The Missouri QCEW microdata wage file contains 228,760,810 employee-firm job match quarter observations and the employer file contains 6,779,555 establishment quarter observations. The dataset includes all UI-covered workers and their employers in Missouri, which, according to the U.S. Bureau of Labor Statistics QCEW program, represents over 90% of civilian employment. According to the U.S. Bureau of Labor Statistics QCEW Handbook of Methods (2020b, 1-3), national data covers over 90% of jobs in the formal market with slight variation from state to state. The principal exclusions are the unincorporated self-employed, unpaid family members, certain domestic and farm workers, many elected officials at the local, state, and federal level, members of the armed forces, student workers at schools, and those working in the informal market. Nationally, in 2019, the QCEW covered slightly more than 148 million workers while excluding approximately 11 million formal market workers. The largest group of excluded formal market workers are the unincorporated self-employed, who constitute about 80% of the excluded. Significant work is performed outside the formal market as well; according to Anat Bracha and Mary Burke (2016), about 37% of non-retired adults in the U.S. engage in some form of informal work<sup>7</sup>.

### *A2. On Different Levels of Observation in the Two Data Files*

According to the U.S. Census Bureau (n.d., para. 1), establishment refers to “a business or industrial unit at *a single location* that distributes goods or performs services. It is not necessarily

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<sup>7</sup> The informal work as defined in this study covers activities ranging from dog walking and babysitting to renting and selling property and goods and responding to surveys.

identical with a company or enterprise, which may consist of one or more establishments. When two or more activities are carried on at a single location under a single ownership, all activities generally are grouped together as a single establishment. The entire establishment is classified on the basis of its major activity, and all data are included in that classification.” A firm is “a business organization or entity consisting of one domestic establishment (location) or more under common ownership or control. All establishments of subsidiary firms are included as part of the owning or controlling firm.”

While the employer data has observations at the level of the establishment, reporting requirements in Missouri, like most states, do not allow linking of the employer dataset to the wage dataset without aggregating to the level of the firm. Specifically, while the employer file includes observations at the level of the establishment, the wage data set only includes the UI number of the firm without any direct manner to link employees to establishments. This shortcoming requires imputation to make use of industry information. The existence of multi-unit establishments operating in different industries, but under a single firm identifier creates problems in determining the industry for which job-match dissolutions occur. Abowd *et al* (2009) addresses this problem by developing a dynamic multi-stage probability model. To impute establishment characteristics to the job-match histories of individuals working for a multi-establishment firm, the authors use distance between place-of-residence and place-of-employment and the distribution of the employment across the establishment. Geographic information for the establishments is included in the employer file; however, there is no information on the place-of-residence for the employee available in the Missouri QCEW microdata. To circumnavigate the missing data problem with available information, the simplifying assumption is made that separations at multi-establishment firms are distributed



according to the share of total firm employment at the establishment.

### *A3. On Other Manipulations of the Data*

Calculating job match creation and destruction rates requires dropping the first and last quarter of the data. The first quarter must be dropped since it cannot be known whether the observed job matches existed before or were created that quarter. Likewise, the last quarter must be dropped since it cannot be known whether the observed job matches continue or are destroyed. Before identifying and documenting the individual job matches that are created and destroyed, all existing job matches are assigned an indicator based on total quarterly earnings relative to all existing job matches: a variable is added indicating which tercile that job match belongs to. However, it is important to note that these quarterly earning indicators do not provide any information on hourly earnings, only the ranking of total quarterly earnings relative to all existing job matches. With job matches placed into low, mid, and high quarterly earning partitions, the analysis documents the creation and destruction of individual employee-employer job matches. After documenting the creation and destruction job matches, it becomes possible to determine the extent to which labor reallocates and the degree to which these reallocation flows are concentrated.

From the second quarter of 2005 through the second quarter of 2014, the wage file contains 228,760,810 employee-employer job-match quarter observations. To remove bias resulting from transcription errors and to focus the study on employees that are more attached to the labor market in Missouri, the data is filtered to remove any employees who were only present for a single quarter. This filtering is similar, but less restrictive than the approach of Burgess, Lane, and Stevens (2000) who filtered the data to remove job-match observations of less than three

quarters. After filtering the data to require at least two observations, employee-employer job match quarter observations drop to 228,640,416, a relatively modest reduction. In total, 17,362,432 job match dissolutions and 5,025,883 employees were identified in the data; moreover, approximately 89% of all observed employees experienced at least one separation.

## **Appendix B**

### Table B1

#### Mean Rates of Labor Market Flows

Note—Period 1 is from the data preceding the Great Recession, Period 2 is from the data during the Great Recession, and Period 3 is from the data after the Great Recession.

### Table B2

#### Maximum and Minimum Values of Labor Market Flows and Employment Level

Note—Period 1 is from the data preceding the Great Recession, Period 2 is from the data during the Great Recession, and Period 3 is from the data after the Great Recession.

### Table B3

#### Maximum and Minimum Values of the Flow Components

Note—Period 1 is from the data preceding the Great Recession, Period 2 is from the data during the Great Recession, and Period 3 is from the data after the Great Recession.