Job-to-Job (J2J) Flows 101

Local Employment Dynamics

Overview

Job-to-Job (J2J) Flows are U.S. Census Bureau statistics on hires and separations in the United States, with a focus on worker reallocation across employers. J2J statistics provide overall job-to-job transition rates as well as worker flows in and out of employment. They are available nationally, by state, and by Metropolitan Statistical Area (MSA). Statistics are available by firm characteristics (industry, age, and size) and by worker demographics (sex by age, sex by education, and race by ethnicity). Job-to-Job Flows are generated from the Longitudinal Employer Household Dynamics (LEHD) data at the Census Bureau, a linked employer-employee database merging job-level data collected by state unemployment insurance (UI) programs to business and household data.

This document provides a basic introduction to the construction and interpretation of J2J. For a more complete discussion of the methodology, see *Job-to-Job Flows: New Statistics on Worker Reallocation and Job Turnover.*[1]

How to Download the Data

Users can download public-use files of recent J2J release at any time. These files are available in both Excel and CSV formats and can be accessed via a selector tool at the Job-to-Job Flows webpage[2] or with a FTP program[3] at lehd.ces.census.gov/data/j2j/ . Detailed information about the structure and contents of the J2J data is provided in the LEHD Public-Use Data Schema.[4]

Data users can also access the J2J data in J2J Explorer and the LED Extraction Tool.[5] Note that these tools may not contain the latest release of J2J data and consequently may not contain all the measures and tabulations available in the public-use files.

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[1] Hyatt et al, *Job-to-Job Flows: New Statistics on Worker Reallocation and Job Turnover*, 2017 lehd.ces.census.gov/doc/jobtojob_documentation_long.pdf.

[2] The Job-to-Job Flows webpage is available at https://lehd.ces.census.gov/data/#j2j.

[3] Users seeking to do this must be able to access HTTP.

[4] The most recent data schema is available at lehd.ces.census.gov/data/schema/j2j_latest/lehd_public_use_schema.html.

[5] J2J Explorer and the LED Extraction Tool can be accessed via lehd.ces.census.gov/applications/.

Frequency and Data Availability

The Job-to-Job Flows statistics are quarterly, published on a quarterly schedule with a three quarter publication lag. For example, J2J data released in the fourth quarter of 2017 will include data for the first quarter of 2017. Data availability can vary by indicator, as most require leading or lagging data for calculation. For details on the specific number of leading or lagging quarters necessary, see the lags_j2j CSV file in Section 8.3 of the data schema.

National Series: National J2J are available from 2000 Q2 to the latest available production quarter.

State and Sub-State Level Series: Data availability at the sub-national level can vary by state, depending on availability of state UI data. Some states and MSAs will be suppressed if a neighboring state has missing data and if labor flows from the missing state are sufficiently large.[6] For details on data availability by region, see Section 8 (Metadata) in the data schema.

State-Level Origin-Destination (J2JOD) Data: If both the origin and destination state have reported UI data, state-to-state job-to-job moves are available in the state-level OD data, even if state-wide statistics have been suppressed. For example, flows of workers from Connecticut to New York are available during the quarters that Connecticut state-wide J2J data is suppressed (due to Massachusetts UI data being missing).

Coverage

Private Ownership Employment: Covered private ownership employment in the LEHD data includes most corporate officials, all executives, all supervisory personnel, all professionals, all clerical workers, many farmworkers, all wage earners, all piece workers, and all part-time workers. Workers on paid sick leave, paid holiday, paid vacation, and the like are also covered. Workers on the payroll of more than one firm during the period are counted by each employer that is subject to UI rules, as long as those workers satisfy the definition of employment. Workers have UI wages filed in every quarter they are covered, even though their wages may not be subject to UI taxes in the latter months of the year.

Notable exclusions from UI coverage among private sector employers are independent contractors, the unincorporated self-employed, railroad workers covered by the railroad unemployment insurance system, some family employees of family-owned businesses, certain farm workers, students working for universities under certain cooperative programs, salespersons primarily paid on commission, and workers of some non-profits.

State and Local Government Employment: Covered employment in the LEHD data includes most employees of state and local governments with the exception of elected officials, members of a legislative body or members or the judiciary, and some emergency employees.

Federal Government Employment: Federal government jobs are not covered by state UI and do not appear in the J2J flows data. The LEHD program does have data on federal jobs from the Office of Personal Management, but these records are not yet included in J2J.

Main Jobs vs All Jobs In addition to the coverage restrictions listed above, Job-to-Job Flows tabulates only main jobs (defined in Table 2 below) held on the first day of each quarter, ignoring secondary sources of earnings and very short

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[6] For more details on how data availability of states are affected by missing inputs from other states, see section 6.2 in Hyatt et al, *Job-to-Job Flows: New Statistics on Worker Reallocation and Job Turnover*, 2017 lehd.ces.census.gov/doc/jobtojob_documentation_long.pdf.

duration jobs that do not survive the quarter, which would otherwise contribute to an "all jobs" count. Hire and separation rates that include shorter duration jobs can be found in the Quarterly Workforce Indicators (QWI).

Data Concepts

Basic Employment Concepts

The LEHD linked employer-employee microdata is constructed by linking an individual to an employer at a point in time. Table 1 describes the key concepts that are used to define the job.

Table 1: Concepts Underlying a Job in the J2J Universe

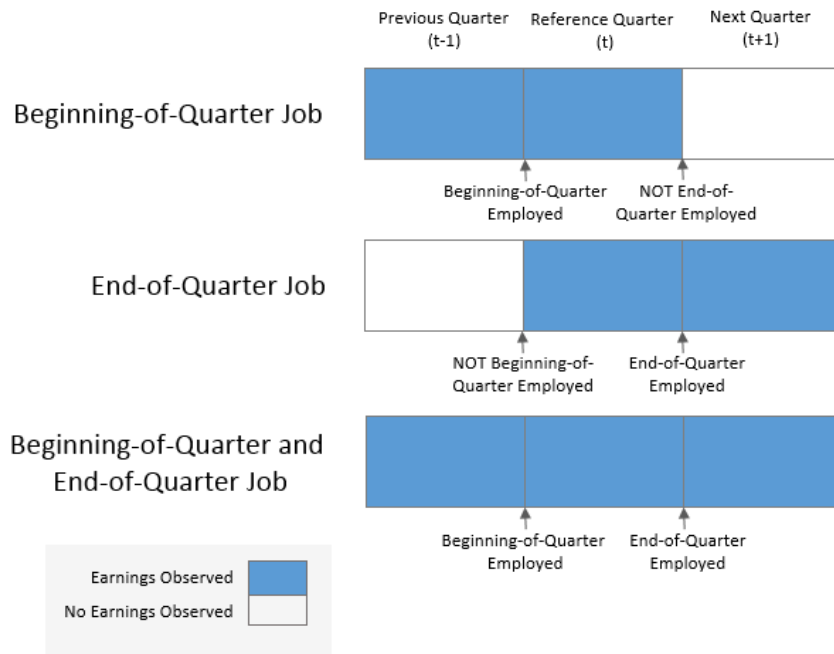| Concept	Description
Employer	A single firm, identified by the State Employer Identification Number (SEIN) assigned by the state's UI wage reporting system. State-based firms may be linked across states to a national firm, via the Federal Employer Identification Number (EIN).
Establishment	A physical place of work (SEINUNIT) within an employer SEIN that provides the geography and industry associated with a job. An employer may be a single-unit employer with one establishment or a multi-unit employer with many.
Employee	An individual worker, identified by PIK.
Dates	Earnings for each PIK are reported on a quarterly basis for the calendar year (January-March=Q1, April-June=Q2, etc.).
Job	The association of an individual PIK with an employer SEIN based on whether or not the individual received positive earnings from the employer in a given quarter. An individual may have more than one job in a quarter.

For J2J, the microdata is restricted to Main Jobs. Table 2 describes the key concepts that are used to define a Main Job.

Table 2: Concepts Underlying a Main Job in the J2J Universe

Concept	Description
Point-in-Time (Consecutive-quarter) Job	A job for which an individual PIK is associated with an employer SEIN in consecutive quarters, indicating the individual is employed at the point in time between the quarters (i.e. the last calendar day of the preceding quarter and the first calendar day of the following quarter). An individual may have multiple consecutive-quarter jobs at any point in time.
Main Job	A point-in-time job with the greatest combined earnings in the preceding and following quarters. An individual has only one main job at any point in time.
Beginning-of-Quarter Main Job	A main job at the beginning of a reference quarter (i.e. the first calendar day). An individual has only one beginning-of-quarter main job in any reference quarter. Note that a beginning-of-quarter main job in one quarter is an end-of-quarter main job in the previous quarter.
End-of-Quarter Main Job	A main job at the end of a reference quarter (i.e. the last calendar day). An individual has only one end-of-quarter main job in any reference quarter. Note that an end-of-quarter main job in one quarter is a beginning-of-quarter main job in the following quarter.

Figure 1 illustrates the concept of a point-in-time job:

Figure 1: Point-in-Time Jobs (1 employee, 1 employer)

Basic Employment Flows Concepts

Job transitions can be identified by comparing employment status at the beginning and end of a given quarter. Table 3 describes four types of job transitions that can be observed in the data when referencing a single quarter. These basic transitions, along with employment activity in surrounding quarters, are used to construct all measures.

Table 3: Transition Types in the J2J Universe

Job Transition Types	Description
Job Stayer	An individual PIK who has a beginning-of-quarter main job and an end-of-quarter main job with the same employer SEIN in a reference quarter.
Change in Main Job	An individual PIK who has a beginning-of-quarter main job with one employer SEIN and an end-of-quarter main job with a different employer SEIN in a reference quarter. This transition may be due to a separation, a hire (accession), both, or neither.[7]
Flow to Nonemployment	An individual PIK who has a beginning-of-quarter main job with an employer SEIN but no end-of-quarter main job with any employer SEIN in a reference quarter. This transition necessarily involves a separation.
Flow from Nonemployment	An individual PIK who has an end-of-quarter main job with an employer SEIN but no beginning-of-quarter main job with any employer SEIN in a reference quarter. This transition necessarily involves a hire (accession).

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[7] A change in main job can occur without a separation or a hire (accession) if an individual PIK has jobs with multiple employer SEINs at the beginning and/or end of the quarter and earnings for one or more of the jobs change such that two different jobs are the main source of earnings at the beginning and end of the quarter.

Note that of the job transition types, only *Change in Main Job* involves two main jobs: a beginning-of-quarter main job and an end-of-quarter main job. The beginning-of-quarter main job is commonly referred to as the origin job while the end-of-quarter main job is often called the destination job. The remaining three job transitions are only associated with one job. For job stayers, the main job does not change so the beginning-of-quarter main job is the same as the end-of-quarter main job. Workers flowing to nonemployment only have a beginning-of-quarter main job (origin job) while those entering the workforce from nonemployment only have an end-of-quarter main job (destination job).

Additional Terms and Concepts

Table 4 describes terms and concepts that are commonly used in the descriptions of J2J measures:

Table 4: Additional Terms and Concepts in the J2J Universe

Additional Terms and Concepts	Description
Stable (or Full-Quarter) Employment	A job for which an individual PIK receives positive earnings from an employer SEIN in a given quarter as well as the previous and following quarters. An individual with such a job is considered employed for the whole of that quarter. Many J2J measures are provided with stable versions. Note stable measures have a 'S' suffix at the end of their names.
Full-Quarter Earnings	Earnings from a quarter when an individual PIK has stable (or full-quarter) employment with an employer SEIN. Full-quarter earnings are used to represent how much this universe of individuals earned through a combination of full and part-time work.[8] They are used because the J2J data do not have information about the number of hours worked, so an hourly or weekly wage figure cannot be calculated.
Nonemployment	The lack of a main job with any employer SEIN at a particular point in time (i.e. at the beginning or end of a reference quarter).[9]
Persistent Nonemployment	The lack of a main job with any employer SEIN for two consecutive points in time (i.e. the beginning and end of a given quarter). An individual can receive earnings from one or more single quarter jobs in a given quarter while persistently nonemployed.
Full-Quarter Nonemployment	The lack of a job with any employer SEIN in a given quarter, meaning an individual PIK did not have a beginning-of-quarter main job or an end-of-quarter main job with any employer SEIN in that quarter. Note full-quarter nonemployment measures have a 'FullQ' suffix at the end of their names.

Measures

The J2J data product has measures organized in three collections: core measures (also referred to as J2J measures), rates measures (or J2JR measures), and origin-destination measures (or J2JOD measures). Each collection has its own public-use files available on the J2J webpage, in J2J Explorer, and in the LED Extraction Tool. The following section provides a brief overview of the measures provided in each collection. For more complete specifications, see section 5.3 in the data schema.

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[8] Average earnings measures are consequently calculated for workers with stable (or full-quarter) employment only.
[9] Note the concept of nonemployment is not the same as unemployment. An unemployed individual is not employed but is still looking for work. A nonemployed individual is not employed and may or may not be looking for work. The latter is a broader concept that includes the former. Examples of individuals who are not employed in the J2J data but are not unemployed are students, retirees, and individuals who are employed outside the covered jobs frame.

J2J Measures

All J2J data are based on longitudinal job histories linking an individual with a main employer at various points in time. The main job at the beginning of a quarter can then be compared with the main job at the end to determine whether a job transition has occurred. J2J measures include counts of individuals with a specified job history in each quarter. Measures are equally split between those that focus on employment activity at the beginning of the quarter and those that focus on the end of the quarter. Tabulations of these transitions provide detail about either the origin job (for beginning-of-quarter measures) or the destination job (for end-of-quarter measures). Note that by construction the origin job for a job stayer is the same as its destination job, so there is only one version of this measure. Average earnings measures associated with select job histories are also included. Select series are provided with seasonally adjusted equivalents, which are currently not available on J2J Explorer.

J2JR Measures

Most J2J core measures have corresponding rate measures, calculated by dividing the core measure by the number of main jobs (i.e. the average of beginning-of-quarter main jobs and end-of-quarter main jobs). For a complete list of J2JR measures, see section 5.3.4 in the data schema. Select series are provided with seasonally adjusted equivalents, which are currently not available on J2J Explorer.

J2JOD Measures

J2JOD measures only include counts of changes in main jobs involving both a separation and a hire (accession). Tabulations of these measures provide detail about both the origin job and the destination job. This collection also includes average earnings measures associated with jobs held before and after the transition. Seasonally adjusted equivalents of series are not provided for J2JOD measures.

Measure Concepts

This section focuses on a basic set of measures recommended for users new to using J2J data[10] and divides them into the following concept categories:

Table 5: Measure Concepts and Descriptions

Concepts	Descriptions
Employment	Employment measures include counts of main jobs at a point in time as well as a count of main jobs that do not change.
Separations	Separation measures focus on the main job at the beginning of the quarter and any transitions from that job.
Hires	Hire measures focus on the main job at the end of the quarter and any transitions to that job.
Earnings	Earnings measures provide average earnings at various points in time for workers with specified job histories.

Table 6 - Table 9 present select J2J measures by concept group. Before each group of measures, a diagram illustrates which quarters and employers from the longitudinal job history are referenced in constructing the measure. If the worker's job history with the given employer(s) matches the pattern specified in the reference quarter, the job will be

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[10] A full list of J2J and J2JOD measures is provided in the appendix. Note this basic set of measures does not match the set of recommended measures in J2J Explorer, which has a smaller set of recommended measures.

counted towards the calculation of the measure in that quarter. A number of measures are computed using measures in the public-use files rather than the confidential microdata and are only available in J2J Explorer and the LED Extraction Tool. These measures are noted as 'Data tool only' in the following tables and the formulae used to calculate these measures are provided.

For each measure, we provide the full indicator name as well as the variable name in the public-use files (first J2J in mustard yellow, then J2JOD in blue, as available).[11] We also provide a more detailed description of the measure, along with the formal rule used to identify the measure in the microdata or the aggregation rule to calculate the measure.
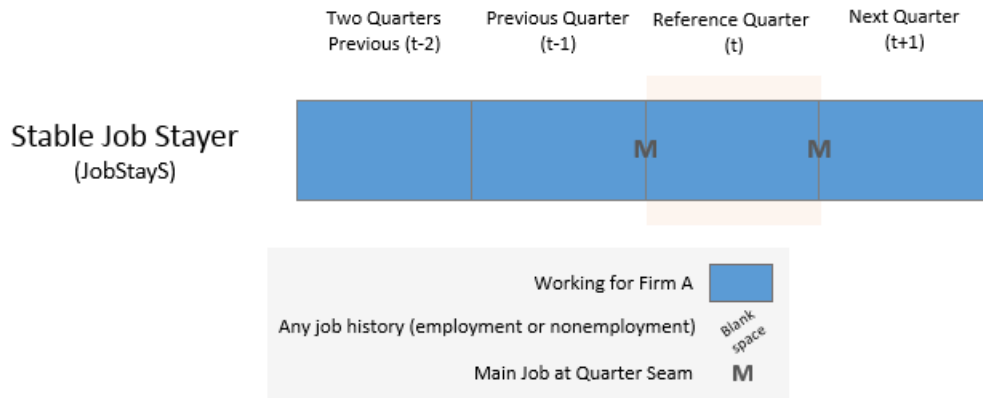
Employment

Table 6: Select Employment Indicators

Indicator	Description	Microdata Identification Rule
Employment (Beginning of Quarter) **J2J: MainB**	Main jobs held on the first day of the quarter	A worker, *i*, is defined as having a beginning-of-quarter main job with a firm, *a*, in a quarter, *t*, if *i* • receives earnings from *a* in *t* and *t-1* <u>AND</u> • the sum of those earnings are greater than those received from any other firm at which *i* receives earnings in *t* and *t-1*.
Employment (End of Quarter) **J2J: MainE**	Main jobs held on the last day of the quarter	A worker, *i*, is defined as having an end-of-quarter main job with a firm, *b*, in a quarter, *t*, if *i* • receives earnings from *b* in *t* and *t+1* <u>AND</u> • the sum of those earnings are greater than those received from any other firm at which *i* receives earnings in *t* and *t+1*.
Stable Job Stayers **J2J: JobStayS**	Stable main jobs that did not change during the reference quarter	A worker, *i*, is defined as a Stable Job Stayer with a firm, *a*, in a quarter, *t*, if *i* • has a beginning-of-quarter main job with *a* in *t*, <u>AND</u> • receives earnings from *a* in *t-2*, <u>AND</u> • has an end-of-quarter main job with *a* in *t*.

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[11] Note the appendix tables in *Job-to-Job Flows: New Statistics on Worker Reallocation and Job Turnover* list all measures in the J2J data, along with their corresponding variable names in the microdata, a short written description, and a formal mathematical definition. Indicator names for most measures can be found in the Aggregate Variable (sum) column. For average earnings measures, see the Aggregate Variable (mean) column. Note average earnings measures additionally have an Aggregation Calculation column.
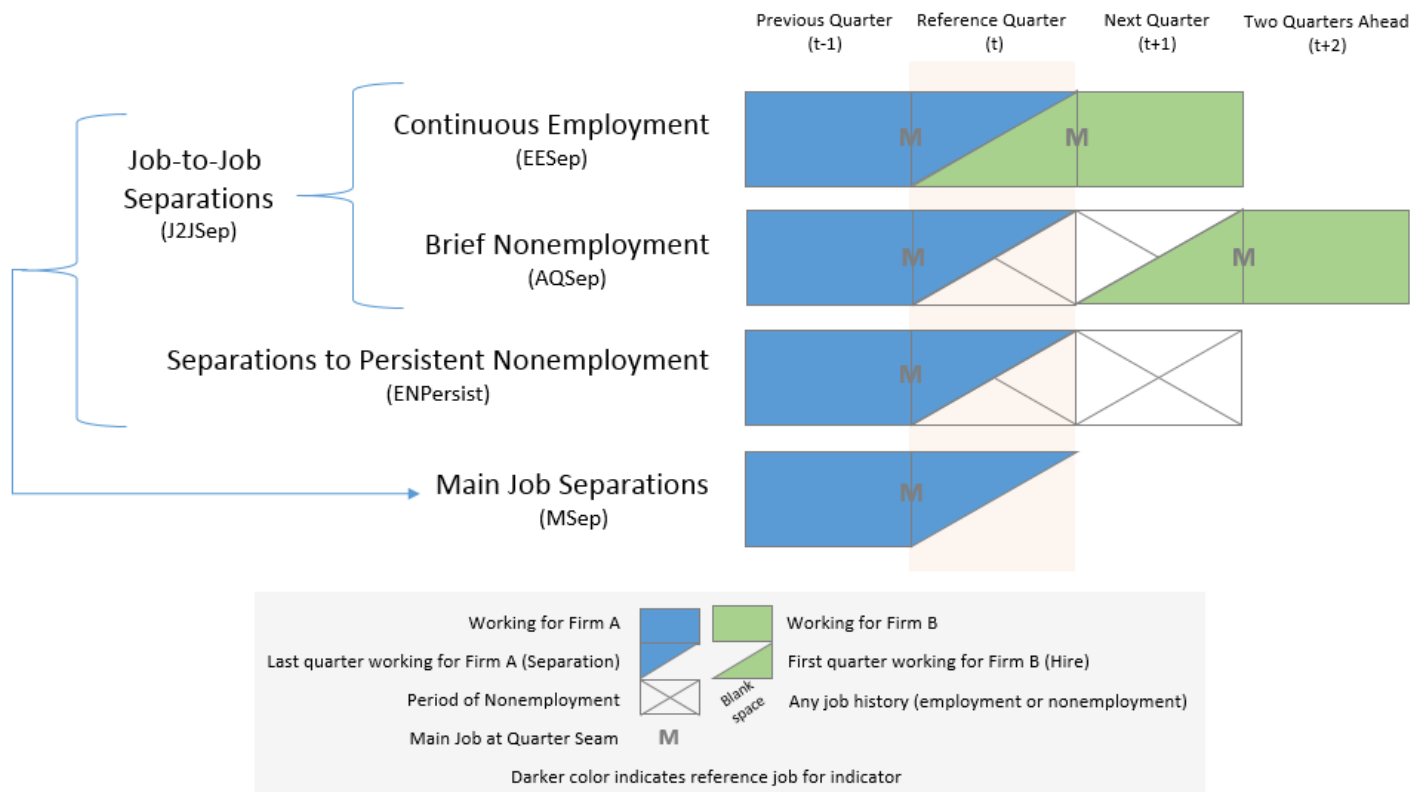
Separations

Table 7: Select Separation Indicators

Indicator	Description	Microdata Identification Rule
Main Job Separations **J2J: MSep**	Separations from a worker's main job	A worker, *i*, is defined as having a Main Job Separation from a firm, *a*, in a quarter, *t*, if *i* • has a beginning-of-quarter main job with *a* in *t* <u>AND</u> • does not receive earnings from *a* in *t+1*.
Job-to-Job Separations (Continuous Employment) **J2J: EESep** **J2JOD: EE**	Separations followed by a hire with no observed nonemployment spell	A worker, *i*, is defined as having a Job-to-Job Separation with Continuous Employment from a firm, *a*, (to another firm, *b*) in a quarter, *t*, if *i* • has a beginning-of-quarter main job with *a* in *t*, <u>AND</u> • does not receive earnings from *a* in *t+1*, <u>AND</u> • has an end-of-quarter main job with *b* in *t*, <u>AND</u> • does not receive earnings from *b* in *t-1*.
Job-to-Job Separations (Brief Nonemployment) **J2J: AQSep**	Separations followed by a hire with a short nonemployment spell	A worker, *i*, is defined as having a Job-to-Job Separation with Brief Nonemployment from a firm, *a*, (to another firm, *b*) in a quarter, *t*, if *i* • has a beginning-of-quarter main job with *a* in *t*, <u>AND</u> • has no end-of-quarter main job with any firm in *t*, <u>AND</u> • has an end-of-quarter main job with *b* in *t+1*.

Indicator	Description	Microdata Identification Rule
Job-to-Job Separations **J2J: J2JSep**	Separations followed by a hire (short or no observed nonemployment spell)	A worker, *i*, is defined as having a Job-to-Job Separation from a firm, *a*, (to another firm, *b*) in a quarter, *t*, if *i* is either a • Job-to-Job Separation with Continuous Employment from *a* in t <u>OR</u> • Job-to-Job Separation with Brief Nonemployment from *a* in *t*.
Separations to Persistent Nonemployment **J2J: ENPersist**	Separations into a spell of persistent nonemployment	A worker, *i*, is defined as having a Separation to Persistent Nonemployment from a firm, *a*, in a quarter, *t*, if *i* • has a beginning-of-quarter main job with *a* in *t* <u>AND</u> • has no end-of-quarter main job with any firm in *t* or *t+1*.

Hires

Table 8: Select Hire Indicators

Indicator	Description	Microdata Identification Rule
Main Job Hires **J2J: MHire**	Hires into a worker's main job	A worker, *i*, is defined as having a Main Job Hire to a firm, *b*, in a quarter, *t*, if *i* • has an end-of-quarter main job with *b* in *t* <u>AND</u> • does not receive earnings from *b* in *t-1*.

Indicator	Description	Microdata Identification Rule
Job-to-Job Hires (Continuous Employment) **J2J: EEHire** **J2JOD: EE**	Hires following a separation with no observed nonemployment spell	A worker, *i*, is defined as having a Job-to-Job Hire with Continuous Employment to a firm, *b*, (from another firm, *a*) in a quarter, *t*, if *i* • has an end-of-quarter main job with *b* in *t*, AND • does not receive earnings from *b* in *t-1*, AND • has a beginning-of-quarter main job with *a* in *t*, <u>AND</u> • does not receive earnings from *a* in *t+1*.
Job-to-Job Hires (Brief Nonemployment) **J2J: AQHire** **J2JOD: AQHire**	Hires following a separation with a short nonemployment spell	A worker, *i*, is defined as having a Job-to-Job Hire with Brief Nonemployment to a firm, *b*, (from another firm, *a*) in a quarter, *t*, if *i* • has an end-of-quarter main job with *b* in *t*, AND • has no beginning-of-quarter main job with any firm in *t*, <u>AND</u> • has a beginning-of-quarter job with *a* in *t-1*.
Job-to-Job Hires **J2J: J2JHire** **J2JOD: J2J** **(Data tool only)**	Hires following a separation (short or no observed nonemployment spell)	A worker, *i*, is defined as having a Job-to-Job Hire to a firm, *b*, (from another firm, *a*) in a quarter, *t*, if *i* is either a • Job-to-Job Hire with Continuous Employment to *b* in *t* <u>OR</u> • Job-to-Job Hire with Brief Nonemployment to *b* in *t*.
Hires from Persistent Nonemployment **J2J: NEPersist**	Hires following a spell of persistent nonemployment	A worker, *i*, is defined as having a Hire from Persistent Nonemployment to a firm, *b*, in a quarter, *t*, if *i* • has no beginning-of-quarter main job with any firm in *t-1* or *t* <u>AND</u> • has an end-of-quarter main job with *b* in *t*.

Earnings

Average earnings are calculated by dividing the sum of earnings received in the noted quarter by the count of workers (referred to as the base in Table 9) undergoing a specified job transition in the reference quarter. Note that, given the constraints of the LEHD infrastructure data, full-quarter earnings associated with stable (or full-quarter) employment are used when calculating earnings. Stable versions of the measures described in the previous tables are detailed in the appendix. Moreover, J2J Explorer and the LED Extraction Tool include aggregate earnings measures for job flows with continuous employment and job flows with a brief nonemployment spell to create earnings measures for both types of job flows. For more details, see the appendix.

Table 9: Select Earnings Indicators

Indicator	Description	Microdata Identification Rule	Base
Average Earnings prior to Stable Job Stayers **J2J: JobStaySEarn_Orig**	Average quarterly earnings in the previous quarter when workers stayed in a stable job	For a worker, *i*, who is defined as a Stable Job Stayer with a firm, *a*, in a quarter, *t*, take earnings received from *a* in *t-1*.	**JobStayS**

Indicator	Description	Microdata Identification Rule	Base
Average Earnings following Stable Job Stayers J2J: JobStaySEarn_Dest	Average quarterly earnings in the quarter when workers stayed in a stable job	For a worker, *i*, who is defined as a Stable Job Stayer with a firm, *a*, in a quarter, *t*, take earnings received from *a* in *t*.	JobStayS
Average Earnings prior to Stable Separations to Persistent Nonemployment J2J: ENSepSEarn_Orig	Average quarterly earnings prior to separations from stable employment into a spell of persistent nonemployment	For a worker, *i*, who is defined as a Separation to Persistent Nonemployment from a firm, *a*, in a quarter, *t*, take earnings received from *a* in *t-1*.	ENPersistS
Average Earnings following Stable Hires from Persistent Nonemployment J2J: NEHireSEarn_Dest	Average quarterly earnings following hires to stable employment from a spell of persistent nonemployment	For a worker, *i*, who is defined as a Hire from Persistent Nonemployment to a firm, *b*, in a quarter, *t*, take earnings received from *b* in *t+1*.	NEPersistS
Average Earnings prior to Job-to-Job Flows (Continuous Employment) J2J: EESepSEarn_Orig J2JOD: EESEarn_Orig	Average quarterly earnings prior to job flows with no observed nonemployment spell	For a worker, *i*, who is defined as a Stable Job-to-Job Hire (Continuous Employment) from a firm, *a*, to another firm, *b*, in a quarter, *t*, take earnings received from *a* in *t-1*.	EESepS EES
Average Earnings following Job-to-Job Flows (Continuous Employment) J2J: EEHireSEarn_Dest J2JOD: EESEarn_Dest	Average quarterly earnings following job flows with no observed nonemployment spell	For a worker, *i*, who is defined as a Stable Job-to-Job Hire (Continuous Employment) from a firm, *a*, to another firm, *b*, in a quarter, *t*, take earnings received from *b* in *t+1*.	EEHireS EES
Average Earnings prior to Job-to-Job Flows (Brief Nonemployment) J2J: AQSepSEarn_Orig	Average quarterly earnings prior to job flows with a short nonemployment spell	For a worker, *i*, who is defined as a Stable Job-to-Job Separation (Brief Nonemployment) from a firm, *a*, to another firm, *b*, in a quarter, *t*, take earnings received from *a* in *t-1*.	AQSepS

Indicator	Description	Microdata Identification Rule	Base
Average Earnings prior to Job-to-Job Flows (Brief Nonemployment) **J2JOD: AQHireSEarn_Orig**	Average quarterly earnings prior to job flows with a short nonemployment spell	For a worker, *i*, who is defined as a Stable Job-to-Job Hire (Brief Nonemployment) from a firm, *a*, to another firm, *b*, in a quarter, *t*, take earnings received from *a* in *t-2*.	**AQHireS**
Average Earnings following Job-to-Job Flows (Brief Nonemployment) **J2J: AQHireSEarn_Dest** **J2JOD: AQHireSEarn_Dest**	Average quarterly earnings following job flows with a short nonemployment spell	For a worker, *i*, who is defined as a Stable Job-to-Job Hire (Brief Nonemployment) from a firm, *a*, to another firm, *b*, in a quarter, *t*, take earnings received from *b* in *t+1*.	**AQHireS** **AQHireS**
Average Earnings prior to Job-to-Job Separations **J2J: J2JSepSEarn_Orig** **(Data tool only)**	Average quarterly earnings prior to a separation followed by a hire (short or no observed nonemployment spell)	For a worker, *i*, who is defined as a Stable Job-to-Job Hire (Continuous Employment) from a firm, *a*, to another firm, *b*, in a quarter, *t*, take earnings received from *a* in *t-1*. For a worker, *i*, who is defined as a Stable Job-to-Job Separation (Brief Nonemployment) from a firm, *a*, to another firm, *b*, in a quarter, *t*, take earnings received from *a* in *t-1*. *Note*: Since **J2JSepS** is a sum of **EESepS** and **AQSepS**, **J2JSepSEarn_Orig** is calculated as a weighted sum: $\frac{EESepS}{J2JSepS} EESepSEarn\_Orig + \frac{AQSepS}{J2JSepS} AQSepSEarn\_Orig$.	**J2JSepS**
Average Earnings prior to Job-to-Job Flows **J2JOD: J2JSEarn_Orig** **(Data tool only)**	Average quarterly earnings prior to job flows with a short or no observed nonemployment spell	For a worker, *i*, who is defined as a Stable Job-to-Job Hire (Continuous Employment) from a firm, *a*, to another firm, *b*, in a quarter, *t*, take earnings received from *a* in *t-1*. For a worker, *i*, who is defined as a Stable Job-to-Job Hire (Brief Nonemployment) from a firm, *a*, to another firm, *b*, in a quarter, *t*, take earnings received from *a* in *t-2*. *Note*: Since **J2JS** is a sum of **EES** and **AQHireS**, **J2JSEarn_Orig** is calculated as a weighted sum: $\frac{EES}{J2JS} EESEarn\_Orig + \frac{AQHireS}{J2JS} AQHireSEarn\_Orig$.	**J2JS**

Indicator	Description	Microdata Identification Rule	Base
Average Earnings following Job-to-Job Hire **J2J: J2JHireSEarn_Dest** (Data tool only) **J2JOD: J2JSEarn_Dest** (Data tool only)	Average quarterly earnings following a hire following a separation (short or no observed nonemployment spell)	For a worker, *i*, who is defined as a Stable Job-to-Job Hire (Continuous Employment) from a firm, *a*, to another firm, *b*, in a quarter, *t,* take earnings received from *b* in *t+1*. For a worker, *i*, who is defined as a Stable Job-to-Job Hire (Brief Nonemployment) from a firm, *a*, to another firm, *b*, in a quarter, *t,* take earnings received from *b* in *t+1*. *Note*: Since **J2JHireS** is a sum of **EEHireS** and **AQHireS**, **J2JHireSEarn_Dest** is calculated as a weighted sum: $\frac{EEHireS}{J2JHireS}EEHireSEarn\_Dest + \frac{AQHireS}{J2JHireS}AQHireSEarn\_Dest$. Similarly, since **J2JS** is a sum of **EES** and **AQHireS**, **J2JSEarn_Dest** is calculated as a weighted sum: $\frac{EES}{J2JS}EESEarn\_Dest + \frac{AQHireS}{J2JS}AQHireSEarn\_Dest$.	**J2JHireS** **J2JS**

J2J Aggregation Characteristics

Demographic characteristics

The demographic characteristics available on J2J include age, sex, race, ethnicity, and education. The interactions selected for publication include:

- Sex by Age
- Race by Ethnicity
- Sex by Education
  - Education is reported only for workers who are age 25 and up

Detail: Demographic characteristic categories

Sex	Male
	Female
Age	14-18
	19-21
	22-24
	25-34
	35-44
	45-54
	55-64
	65-99
Race	White Alone
	Black or African American Alone
	American Indian or Alaska Native Alone
	Asian Alone
	Native Hawaiian or Other Pacific Islander Alone
	Two or More Race Groups

Ethnicity	Not Hispanic or Latino
	Hispanic or Latino
Education	Less than high school
	High school or equivalent, no college
	Some college or Associate degree
	Bachelor's degree or advanced degree
	Educational attainment not available (workers aged 24 or younger)

Ownership

J2J data is available for the combination of state, local, and private ownership employment (reported in the All [oslp] category). Unlike QWI, it is not available for private sector employment only.

Geography

Geography is based on place of work, using the most recent release of MAF/TIGER geography for all years and quarters of data.[12] Updated geographies usually appear in the Q1 vintage release and can viewed in the data schema. Regions are reported at three different levels:

- National
- State
- Metropolitan Statistical Area (MSA)
  - Non-MSA employment assigned to a statewide residual category

For J2J and J2JR measures, geography refers to either the origin job or the destination job, depending on the measure. For J2JOD measures, geography of both the origin job and the destination job are available.[13,14]

Detail: Geographic codes

us	Nation
[st]	Any 2-digit state postal code identifier
[NNNNN]	Any valid 5-digit metropolitan area code provided by provided by the Census Bureau's Geography Division OR – if a non-MSA statewide residual – any 2-digit state postal code identifier and "999."

Industry

For all quarters, industry is reported using 2017 NAICS codes. The following detailed levels are released:

- Total, all industries
- NAICS Sectors

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[12] For more details, see section 6.18 in the data schema:
https://lehd.ces.census.gov/data/schema/j2j_latest/lehd_public_use_schema.html#_geography.

[13] In the public-use files for J2J and J2JR measures, the geography variable refers to the geography of the origin or destination job, depending on the measure. In the public-use file for J2JOD measures, the geography_orig variable refers to the origin job and the geography variable refers to the destination job.

[14] Age is calculated on the last day of the reference quarter for the measure. For J2JOD measures, the reference quarter is the quarter of the hire. Sex, race, ethnicity, and education are fixed for each worker and do not vary over time, though educational attainment is reported only for workers at least 25 years of age.

For J2J and J2JR measures, industry refers to either the origin job or the destination job, depending on the measure. For J2JOD measures, industry of both the origin job and the destination job are available.[15]

Firm Age and Size

Firm age and size are defined at the national level, rather than the state level. A national firm may frequently be larger or older than the part of that firm found in any one state. Note that firm size refers to the national employment size of the firm on March 12th of the previous year. For new firms, firm size is measured as the current year's March employment (or the employment in the first month of positive employment if born after March). Firm age and size are reported only for private sector firms and are not interacted with each other.

- Firm Age
- Firm Size

For J2J and J2JR measures, firm age and size refers to either the origin job or the destination job, depending on the measure. For J2JOD measures, firm age and size of both the origin job and the destination job are available.[16]

Detail: Firm age and size

Firm Age	0-1 Years
	2-3 Years
	4-5 Years
	6-10 Years
	11+ Years
Firm Size	0-19 Employees
	20-49 Employees
	50-249 Employees
	250-499 Employees
	500+ Employees

Interactions

Various aggregation categories are interacted for more detailed tabulations. In general, those at the national and state level have more crossings available than those at the MSA level.

Detail: Interactions

J2J and J2JR

Nationally and by state	All firms and workers
	By firm characteristics
	By worker demographics
	By industry by firm characteristics
	By industry by worker demographics
By metropolitan area	All firms and workers
	By firm characteristics

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[15] In the public-use files for J2J and J2JR measures, the industry variable refers to the industry of the origin or destination job, depending on the measure. In the public-use file for J2JOD measures, the industry_orig variable refers to the origin job and the industry variable refers to the destination job.

[16] In the public-use files for J2J and J2JR measures, the firmage and firmsize variables refer to the firm age and size of the origin or destination job, depending on the measure. In the public-use file for J2JOD measures, the firmage_orig and firmsize_orig variables refer to the origin job and the firmage and firmsize variables refer to the destination job.

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By worker demographics
By industry by worker demographics

J2JOD

By origin state/destination state[17]	All firms and workers
	By origin firm characteristics by destination firm characteristics
	By worker demographics
	By origin industry by destination industry by origin firm age/size by destination firm age/size
	By origin industry by destination industry by worker demographics
By origin metropolitan area/destination metropolitan area	All firms and workers
	By origin firm characteristics by destination firm characteristics
	By worker demographics
	By origin industry by destination industry by worker demographics

J2JOD tabulations are available by additional interactions of the characteristics listed above. Each set has its own aggregation level value, which can be found under the agg_level variable in the public-use files. For a full list of interactions, see section 6.19 in the data schema.

Table 10 lists all interactions available in the J2J public-use files:

Table 10: Available Interactions

		Nationally	*By State*	*By MSA*
All firms and workers		X	X	X
By NAICS sectors	**By firm age**	X	X	
	By firm size	X	X	
	By sex by age	X	X	X
	By sex by education	X	X	X
	By race by ethnicity	X	X	X
By firm age		X	X	X
By firm size		X	X	X
By sex by age		X	X	X
By sex by education		X	X	X
By race by ethnicity		X	X	X

Note the above interactions involving firm characteristics (i.e. geography, industry, firm age, and firm size) are available by both the origin job and destination job for J2JOD measures.

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[17] These tabulations include within-state flows.

Cell Aggregations

Cells for a given indicator can be aggregated to provide data about a subset of workers that spans multiple identifier categories (e.g. prime age workers, workers in the Pacific Northwest, etc). Below are recommendations on how to appropriately do so, assuming all cells have available data and are not missing values.[18]

Counts

Users can aggregate counts for multiple quarters by calculating a simple average. Note that counts exhibit seasonal trends so users using unadjusted public-use files should take care to select consecutive quarters in multiples of four whenever possible.[19] Job transition counts for multiple quarters can also be aggregated by calculating a sum. However, users should note that the sum is not a unique count of workers making transitions during the selected quarters as workers may experience more than one job movement during this time. Currently, J2J Explorer uses the average when aggregating counts over quarters.

When aggregating counts within a quarter over firm characteristics or worker demographics, users should take the sum. This is currently the method used in J2J Explorer.

Rates

Users can aggregate rates by calculating a weighted average. This is currently the method used in J2J Explorer.

Earnings

Users can aggregate earnings by calculating a weighted average, where the weight is the corresponding base (as shown in Table 9) over the sum of all base counts. This is currently the method used in J2J Explorer.

Status Flags

Every estimate in the J2J data has an associated status flag. These flags provide information about why items are missing, or whether the item has an elevated level of noise infused for confidentiality protection. The status flags reported are as follows:

flag	label
-2	no data available in this category for this quarter
-1	data not available to compute this estimate
1	OK
5	Value suppressed because it does not meet U.S. Census Bureau publication standards.
10	Aggregate of cells - no significant distortion
11	Aggregate of cells not released because component cells do not meet U.S. Census Bureau publication standards

Note the full suite of flags can be found in section 7 in the data schema.

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[18] Aggregations of cells where one or more cells have unavailable data will not be reliable. Cells may be unavailable outside of data ranges for regions of interest. Users should see Sections 8.2 and 8.3, respectively, of the data schema to determine if indicators are available in a J2J release for the regions and quarters of interest.

[19] Select seasonally adjusted tables are available for download from the LEHD website.

Confidentiality protection

Confidentiality of the data is protected using a system of multiplicative noise infusion, whereby all released data are "fuzzed."[20] Moreover, small data items may be synthesized. Since this happens independently by measure, there may be cases in which measures that by definition sum up to another measure do not do so in the public-use files. This typically happens at very detailed tabulations. If such cells are aggregated with other cells, totals are generally unbiased.

Questions or comments may be sent to CES.J2J.Feedback@census.gov.

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[20] For a more in-depth discussion, see Hyatt et al, *Job-to-Job Flows: New Statistics on Worker Reallocation and Job Turnover*, 2017 lehd.ces.census.gov/doc/jobtojob_documentation_long.pdf, pages 20-21.
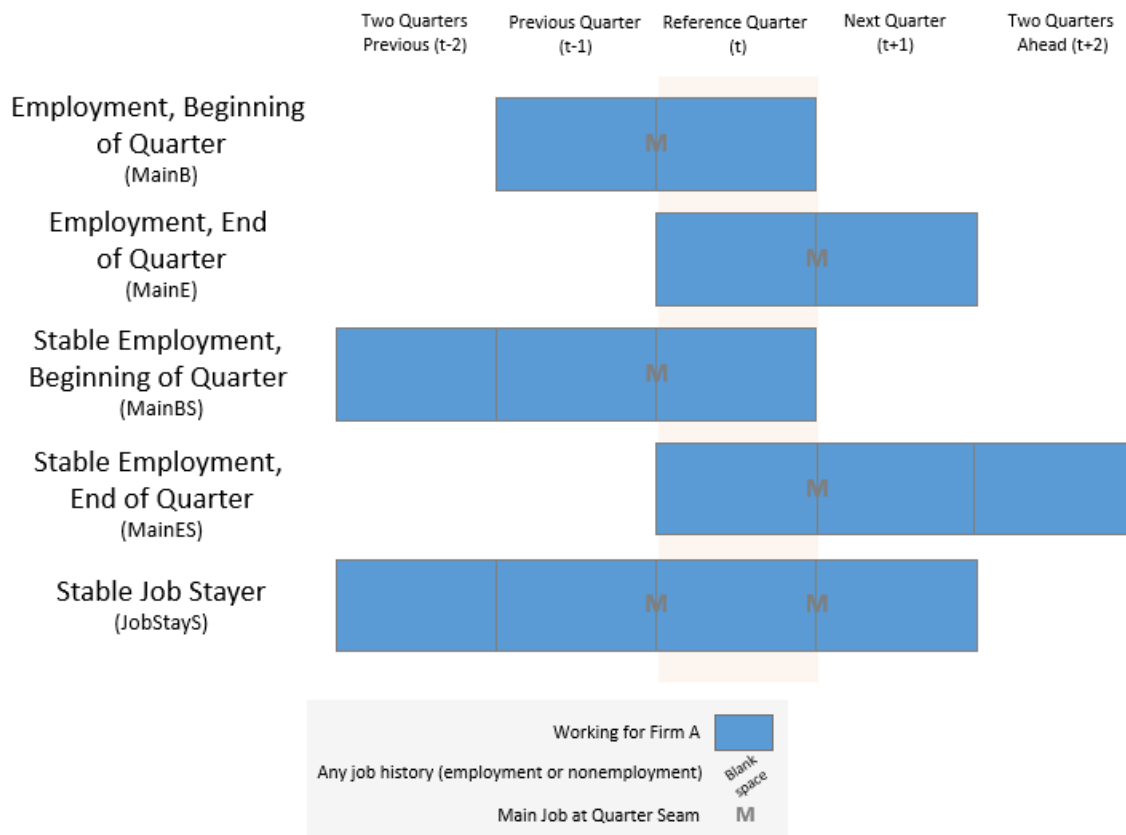
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Appendix

J2J Detailed Measure Descriptions

Table 11 - Table 14 contain a full list of J2J and J2JOD measures and their definitions. Before each group of measures, a diagram illustrates which quarters and employers from the longitudinal job history are referenced in constructing the measure. If the worker's job history with the given employer(s) matches the pattern specified in the reference quarter, the job will be counted towards the calculation of the measure in that quarter.

For each measure, we provide the full indicator name as well as the variable name in the public-use files (first J2J, then J2JOD, as available).[21] We also provide a more detailed description of the measure, along with the formal rule used to identify the measure in the microdata.

Employment

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[21] Note the appendix tables in *Job-to-Job Flows: New Statistics on Worker Reallocation and Job Turnover* list all measures in the J2J data, along with their corresponding variable names in the microdata, a short written description, and a formal mathematical definition. Indicator names for most measures can be found in the Aggregate Variable (sum) column. For average earnings measures, see the Aggregate Variable (mean) column. Note average earnings measures additionally have an Aggregation Calculation column.

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Table 11: Employment Indicators

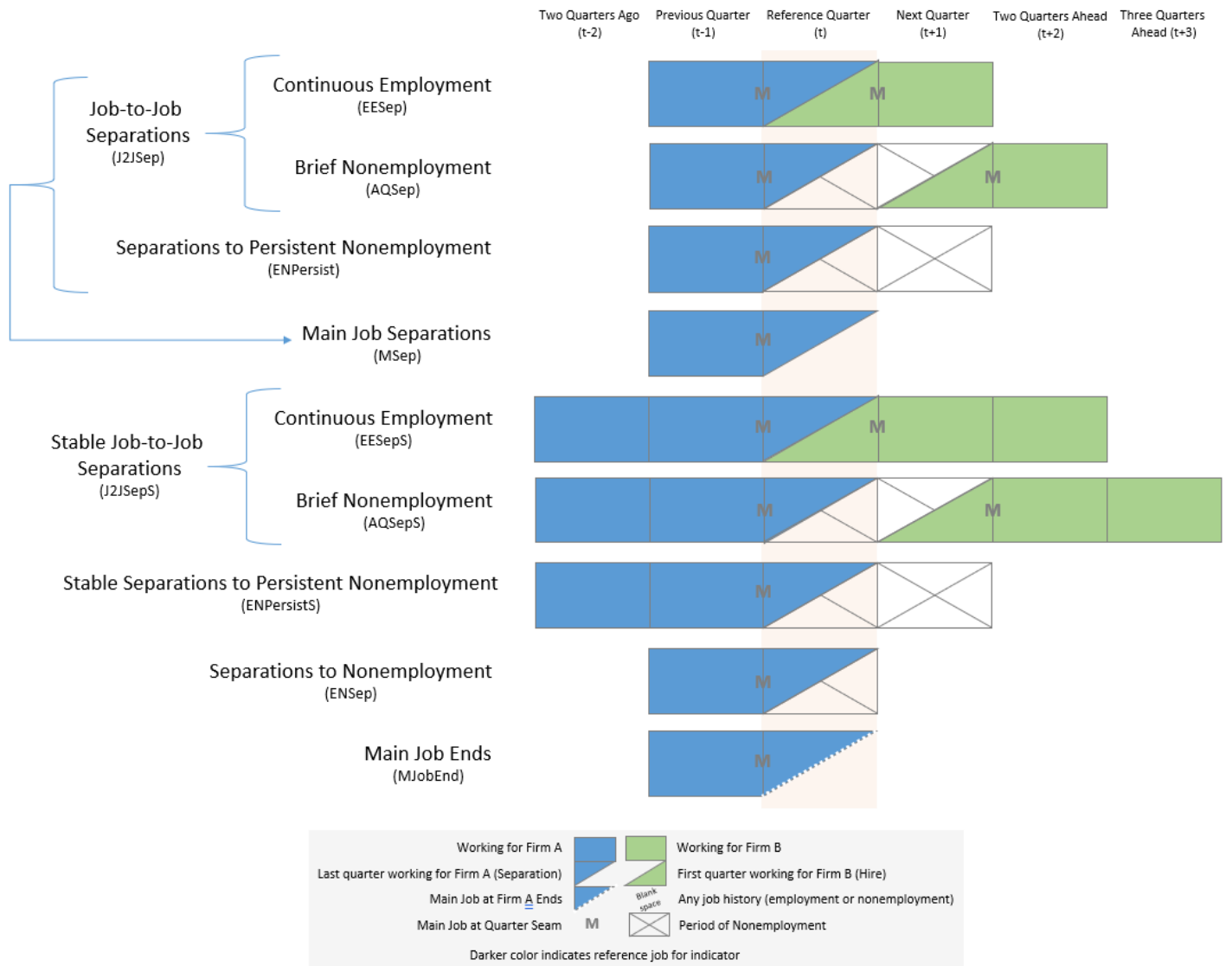| Indicator	Description	Microdata Identification Rule
Employment (Beginning of Quarter) **J2J: MainB**	Main jobs held on the first day of the quarter	A worker, *i*, is defined as having a beginning-of-quarter main job with a firm, *a*, in a quarter, *t*, if *i* • receives earnings from *a* in *t* and *t-1* <u>AND</u> • the sum of those earnings are greater than those received from any other firm at which *i* receives earnings in *t* and *t-1*.
Employment (End of Quarter) **J2J: MainE**	Main jobs held on the last day of the quarter	A worker, *i*, is defined as having an end-of-quarter main job with a firm, *b*, in a quarter, *t*, if *i* • receives earnings from *b* in *t* and *t+1* <u>AND</u> • the sum of those earnings are greater than those received from any other firm at which *i* receives earnings in *t* and *t+1*.
Stable Employment (Beginning of Quarter) **J2J: MainBS**	Stable main jobs held on the first day of the quarter	A worker, *i*, is defined as Beginning-of-Quarter Stable Employed with a firm, *a*, in a quarter, *t*, if *i* • has a beginning-of-quarter main job with *a* in *t* <u>AND</u> • receives earnings from *a* in *t-2*.
Stable Employment (End of Quarter) **J2J: MainES**	Stable main jobs held on the last day of the quarter	A worker, *i*, is defined as End-of-Quarter Stable Employed with a firm, *b*, in a quarter, *t*, if *i* • has an end-of-quarter main job with *b* in *t* <u>AND</u> • receives earnings from *b* in *t+2*.
Stable Job Stayers **J2J: JobStayS**	Stable main jobs that did not change during the reference quarter	A worker, *i*, is defined as a Stable Job Stayer with a firm, *a*, in a quarter, *t*, if *i* • has a beginning-of-quarter main job with *a* in *t*, <u>AND</u> • receives earnings from *a* in *t-2*, <u>AND</u> • has an end-of-quarter main job with *a* in *t*.

Separations

Table 12: Separation Indicators

Indicator	Description	Microdata Identification Rule
Main Job Ends `J2J: MJobEnd`	End of main jobs due to separations and instances when another job becomes the main source of earnings	A worker, *i*, is defined as having a Main Job End with a firm, *a*, in a quarter, *t*, if *i* • has a beginning-of-quarter main job with *a* in *t* <u>AND</u> • does not have an end-of-quarter main job with *a* in *t.*

Indicator	Description	Microdata Identification Rule
Main Job Separations **J2J: MSep**	Separations from a worker's main job	A worker, *i*, is defined as having a Main Job Separation from a firm, *a*, in a quarter, *t*, if *i* - has a beginning-of-quarter main job with *a* in *t* <u>AND</u> - does not receive earnings from *a* in *t+1*.
Job-to-Job Separations (Continuous Employment) **J2J: EESep** **J2JOD: EE**	Separations followed by a hire with no observed nonemployment spell	A worker, *i*, is defined as having a Job-to-Job Separation with Continuous Employment from a firm, *a*, (to another firm, *b*) in a quarter, *t*, if *i* - has a beginning-of-quarter main job with *a* in *t*, <u>AND</u> - does not receive earnings from *a* in *t+1*, <u>AND</u> - has an end-of-quarter main job with *b* in *t*, <u>AND</u> - does not receive earnings from *b* in *t-1*.
Stable Job-to-Job Separations (Continuous Employment) **J2J: EESepS** **J2JOD: EES**	Separations from stable employment followed by a hire to stable employment with no observed nonemployment spell	A worker, *i*, is defined as having a Stable Job-to-Job Separation with Continuous Employment from a firm, *a*, (to another firm, *b*) in a quarter, *t*, if *i* - has a beginning-of-quarter main job with *a* in *t*, <u>AND</u> - does not receive earnings from *a* in *t+1*, <u>AND</u> - receives earnings from *a* in *t-2*, <u>AND</u> - has an end-of-quarter main job with *b* in *t*, <u>AND</u> - does not receive earnings from *b* in *t-1*, AND - receives earnings from *b* in *t+2*.
Job-to-Job Separations (Brief Nonemployment) **J2J: AQSep**	Separations followed by a hire with a short nonemployment spell	A worker, *i*, is defined as having a Job-to-Job Separation with Brief Nonemployment from a firm, *a*, (to another firm, *b*) in a quarter, *t*, if *i* - has a beginning-of-quarter main job with *a* in *t*, <u>AND</u> - has no end-of-quarter main job with any firm in *t*, <u>AND</u> - has an end-of-quarter main job with *b* in *t+1*.
Stable Job-to-Job Separations (Brief Nonemployment) **J2J: AQSepS**	Separations from stable employment followed by a hire to stable employment with a short nonemployment spell	A worker, *i*, is defined as having a Stable Job-to-Job Separation with Brief Nonemployment from a firm, *a*, (to another firm, *b*) in a quarter, *t*, if *i* - has a beginning-of-quarter main job with *a* in *t*, <u>AND</u> - receives earnings from *a* in *t-2*, <u>AND</u> - has no end-of-quarter main job with any firm in *t*, <u>AND</u> - has an end-of-quarter main job with *b* in *t+1*, <u>AND</u> - receives earnings from *b* in *t+3*.

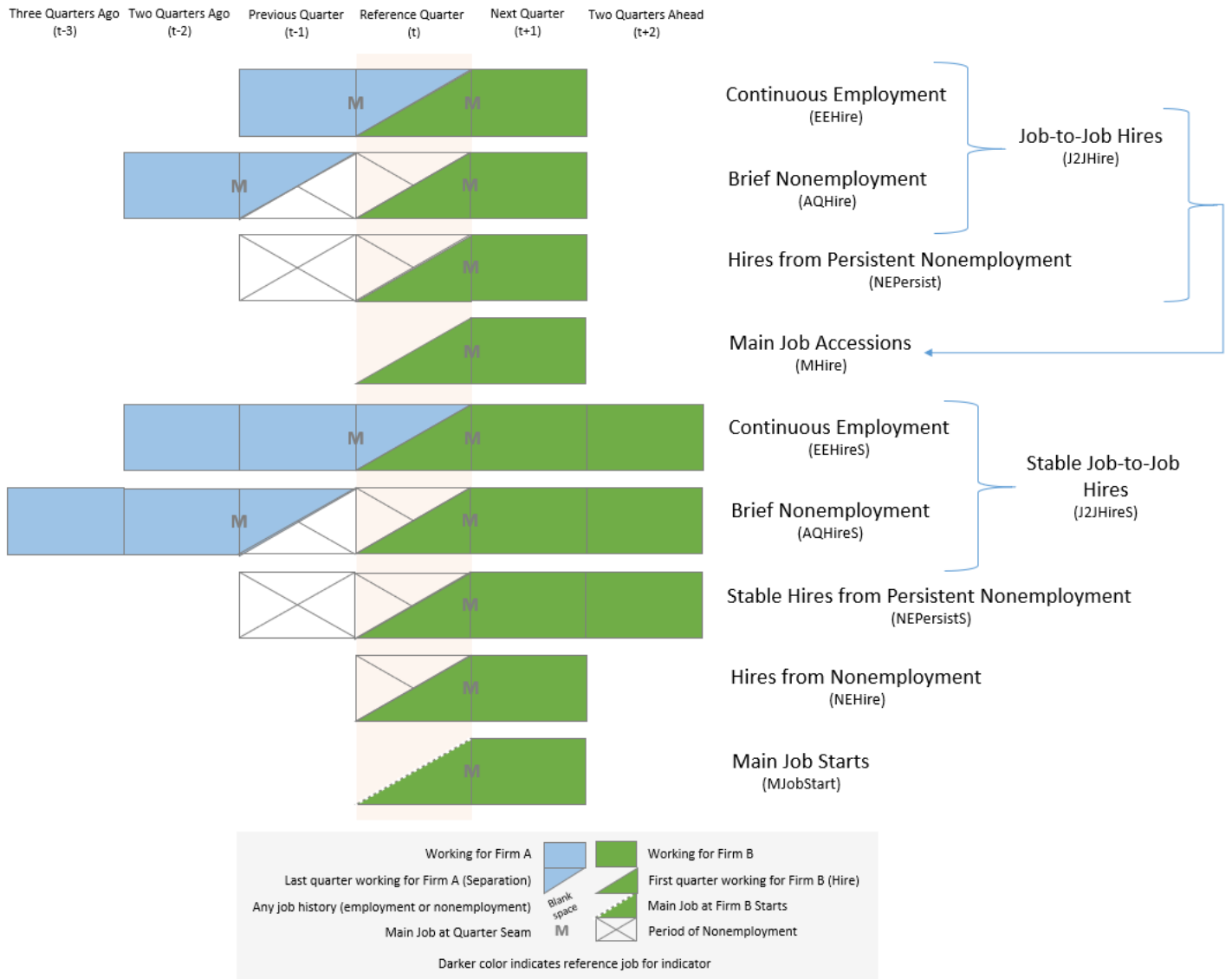| Indicator	Description	Microdata Identification Rule
Job-to-Job Separations **J2J: J2JSep**	Separations followed by a hire (short or no observed nonemployment spell)	A worker, *i*, is defined as having a Job-to-Job Separation from a firm, *a*, (to another firm, *b*) in a quarter, *t*, if *i* is either a • Job-to-Job Separation with Continuous Employment from *a* in *t* OR • Job-to-Job Separation with Brief Nonemployment from *a* in *t*.
Stable Job-to-Job Separations **J2J: J2JSepS (Data tool only)**	Separations from stable employment followed by a hire to stable employment (short or no observed nonemployment spell)	A worker, *i*, is defined as having a Stable Job-to-Job Separation from a firm, *a*, (to another firm, *b*) in a quarter, *t*, if *i* is either a • Stable Job-to-Job Separation with Continuous Employment from *a* in *t* OR • Stable Job-to-Job Separation with Brief Nonemployment from *a* in *t*.
Separations to Nonemployment **J2J: ENSep**	Separations into any spell of nonemployment	A worker, *i*, is defined as having a Separation to Nonemployment from a firm, *a*, in a quarter, *t*, if *i* • has a beginning-of-quarter main job with *a* in *t* AND • has no end-of-quarter main job with any firm in *t*.
Separations to Persistent Nonemployment **J2J: ENPersist**	Separations into a spell of persistent nonemployment	A worker, *i*, is defined as having a Separation to Persistent Nonemployment from a firm, *a*, in a quarter, *t*, if *i* • has a beginning-of-quarter main job with *a* in *t* AND • has no end-of-quarter main job with any firm in *t* or *t+1*.
Stable Separations to Persistent Nonemployment **J2J: ENPersistS**	Separations from a stable main job into a spell of persistent nonemployment	A worker, *i*, is defined as having a Stable Separation to Persistent Nonemployment from a firm, *a*, in a quarter, *t*, if *i* • has a beginning-of-quarter main job with *a* in *t*, • receives earnings from *a* in *t-2*, AND • has no end-of-quarter main job with any firm in *t* or *t+1*.
Separations to Full-Quarter Nonemployment **J2J: ENFullQ**	Separations into a spell of full-quarter nonemployment (does not include intermittently employed)	A worker, *i*, is defined as having a Separation to Full-Quarter Nonemployment from a firm, *a*, in a quarter, *t*, if *i* • has a beginning-of-quarter main job with *a* in *t* AND • does not receive earnings from any firm in *t+1*.

Hires

Table 13: Hire Indicators

Indicator	Description	Microdata Identification Rule
Main Job Starts `J2J: MJobStart`	New main jobs due to hires and instances when a previously existing secondary job becomes the main source of earnings	A worker, *i*, is defined as having a Main Job Start with a firm, *b*, in a quarter, *t*, if *i* • has an end-of-quarter main job <u>BUT</u> • does not have a beginning-of-quarter main job with *b* in *t*.
Main Job Hires `J2J: MHire`	Hires into a worker's main job	A worker, *i*, is defined as having a Main Job Hire to a firm, *b*, in a quarter, *t*, if *i* • has an end-of-quarter main job with *b* in *t* <u>AND</u> • does not receive earnings from *b* in *t-1*.

Job-to-Job Hires (Continuous Employment)
`J2J: EEHire`
`J2JOD: EE`
	Hires following a separation with no observed nonemployment spell	A worker, *i*, is defined as having a Job-to-Job Hire with Continuous Employment to a firm, *b*, (from another firm, *a*) in a quarter, *t*, if *i*
		• has an end-of-quarter main job with *b* in *t,* AND
		• does not receive earnings from *b* in *t-1,* AND
		• has a beginning-of-quarter main job with *a* in *t,* <u>AND</u>
		• does not receive earnings from *a* in *t+1*.

Stable Job-to-Job Hires (Continuous Employment)
`J2J: EEHireS`
`J2JOD: EES`
	Hires to stable employment following a separation from stable employment with no observed nonemployment spell	A worker, *i*, is defined as having a Stable Job-to-Job Hire with Continuous Employment to a firm, *b*, (from another firm, *a*) in a quarter, *t*, if *i*
		• has an end-of-quarter main job with *b* in *t,* AND
		• does not receive earnings from *b* in *t-1,* AND
		• receives earnings from *b* in *t+2,* AND
		• has a beginning-of-quarter main job with *a,* AND
		• does not receive earnings from *a* in *t+1,* AND
		• receives earnings from *a* in *t-2.*

Indicator	Description	Microdata Identification Rule
Job-to-Job Hires (Brief Nonemployment) **J2J: AQHire** **J2JOD: AQHire**	Hires following a separation with a short nonemployment spell	A worker, *i*, is defined as having a Job-to-Job Hire with Brief Nonemployment to a firm, *b*, (from another firm, *a*) in a quarter, *t*, if *i* • has an end-of-quarter main job with *b* in *t*, AND • has no beginning-of-quarter main job with any firm in *t*, <u>AND</u> • has a beginning-of-quarter job with *a* in *t-1*.
Stable Job-to-Job Hires (Brief Nonemployment) **J2J: AQHireS** **J2JOD: AQHireS**	Hires to stable employment following a separation from stable employment with a short nonemployment spell	A worker, *i*, is defined as having a Stable Job-to-Job Hire with Brief Nonemployment to a firm, *b*, (from another firm, *a*) in a quarter, *t*, if *i* • has an end-of-quarter main job with *b* in *t*, AND • receives earnings from *b* in *t+2*, AND • has no beginning-of-quarter main job with any firm in *t*, AND • has a beginning-of-quarter main job with *a* in *t-1*, AND • receives earnings from *a* in *t-3*.
Job-to-Job Hires **J2J: J2JHire** **J2JOD: J2J** **(Data tool only)**	Hires following a separation (short or no observed nonemployment spell)	A worker, *i*, is defined as having a Job-to-Job Hire to a firm, *b*, (from another firm, *a*) in a quarter, *t*, if *i* is either a • Job-to-Job Hire with Continuous Employment to *b* in *t* <u>OR</u> • Job-to-Job Hire with Brief Nonemployment to *b* in *t*.
Stable Job-to-Job Hires **J2J: J2JHireS** **(Data tool only)** **J2JOD: J2JS** **(Data tool only)**	Hires to stable employment following a separation from stable employment (short or no observed nonemployment spell)	A worker, *i*, is defined as having a Stable Job-to-Job Hire to a firm, *b*, (from another firm, *a*) in a quarter, *t*, if *i* is either a • Stable Job-to-Job Hire with Continuous Employment to *b* in *t* <u>OR</u> • Stable Job-to-Job Hire with Brief Nonemployment to *b* in *t*.
Hires from Nonemployment **J2J: NEHire**	Hires following any spell of nonemployment	A worker, *i*, is defined as having a Hire from Nonemployment to a firm, *b*, in a quarter, *t*, if *i* • has no beginning-of-quarter main job with any firm in *t* <u>AND</u> • <u>has</u> an end-of-quarter main job with *b* in *t*.
Hires from Persistent Nonemployment **J2J: NEPersist**	Hires following a spell of persistent nonemployment	A worker, *i*, is defined as having a Hire from Persistent Nonemployment to a firm, *b*, in a quarter, *t*, if *i* • has no beginning-of-quarter main job with any firm in *t-1* or *t* <u>AND</u> • has an end-of-quarter main job with *b* in *t*.
Stable Hires from Persistent Nonemployment **J2J: NEPersistS**	Hires to a stable main job following a spell of persistent nonemployment	A worker, *i*, is defined as having a Stable Hire from Persistent Nonemployment to a firm, *b*, in a quarter, *t*, if *i* • has an end-of-quarter main job with *b* in *t*, <u>AND</u> • receives earnings from *b* in *t+2*, <u>AND</u> • has no beginning-of-quarter main job with any firm in *t-1* or *t*.

Indicator	Description	Microdata Identification Rule
Hires from Full-Quarter Nonemployment J2J: NEFullQ	Hires following a spell of full-quarter nonemployment (does not include intermittently employed)	A worker, *i*, is defined as having a Hire from Full-Quarter Nonemployment to a firm, *b*, in a quarter, *t*, if *i* • has an end-of-quarter main job with *b* in *t*, <u>AND</u> • does not receive earnings from any firm in *t-1*.

Earnings

Average earnings are calculated by dividing the sum of earnings received in the noted quarter by the count of workers (referred to as the base in Table 14) undergoing a specified job transition in the reference quarter. Note that, given the constraints of the LEHD infrastructure data, full-quarter earnings associated with stable (or full-quarter) employment are used when calculating earnings.
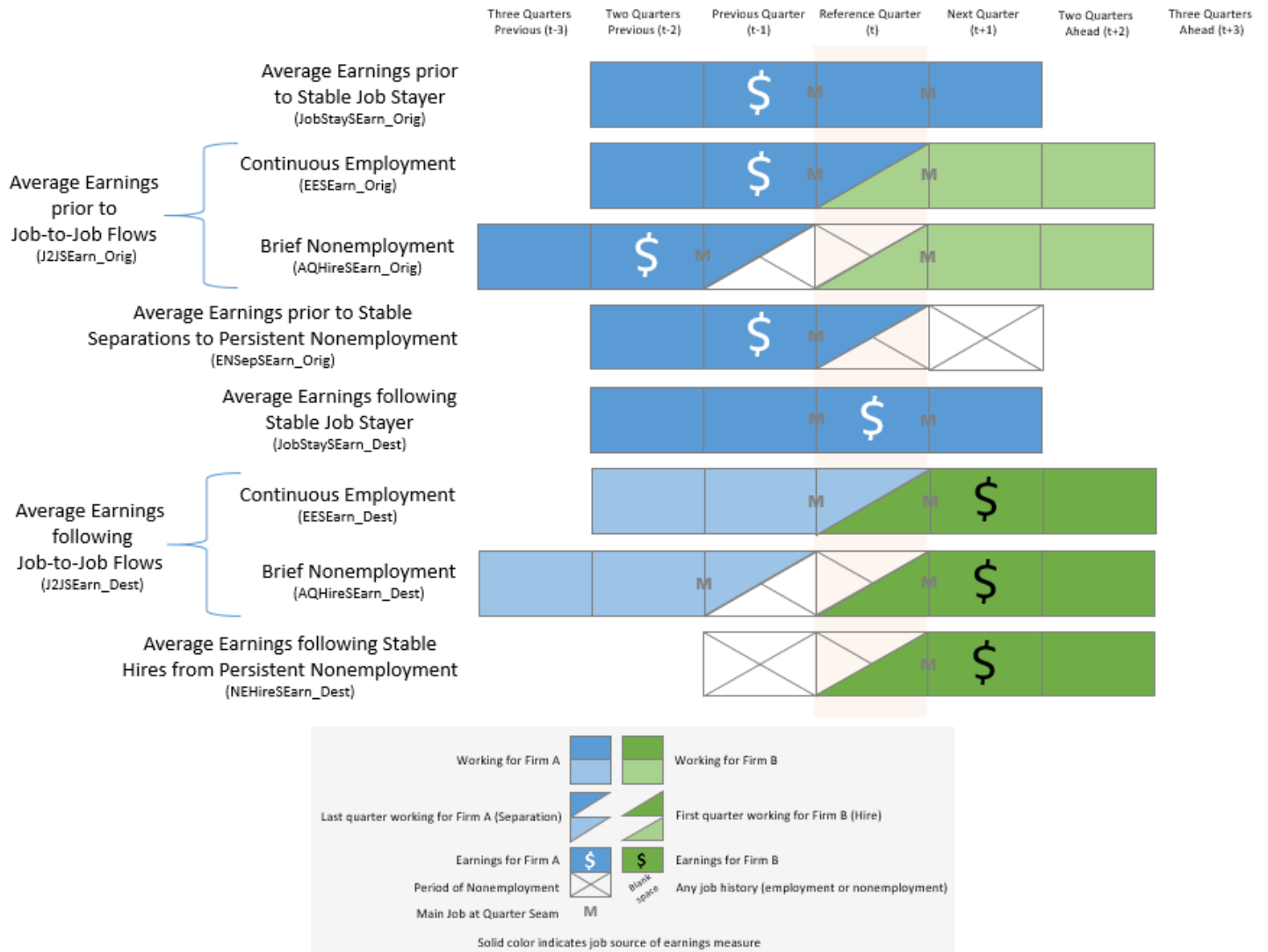
Table 14: Earnings Indicators

Indicator	Description	Microdata Identification Rule	Base
Average Earnings prior to Stable Job Stayers `J2J: JobStaySEarn_Orig`	Average quarterly earnings in the previous quarter when workers stayed in a stable job	For a worker, i, who is defined as a Stable Job Stayer with a firm, a, in a quarter, t, take earnings received from a in $t-1$.	`JobStayS`
Average Earnings following Stable Job Stayers `J2J: JobStaySEarn_Dest`	Average quarterly earnings in the quarter when workers stayed in a stable job	For a worker, i, who is defined as a Stable Job Stayer with a firm, a, in a quarter, t, take earnings received from a in t.	`JobStayS`
Average Earnings prior to Stable Separations to Persistent Nonemployment `J2J: ENSepSEarn_Orig`	Average quarterly earnings prior to separations from stable employment into a spell of persistent nonemployment	For a worker, i, who is defined as a Separation to Persistent Nonemployment from a firm, a, in a quarter, t, take earnings received from a in $t-1$.	`ENPersistS`
Average Earnings following Stable Hires from Persistent Nonemployment `J2J: NEHireSEarn_Dest`	Average quarterly earnings following hires to stable employment from a spell of persistent nonemployment	For a worker, i, who is defined as a Hire from Persistent Nonemployment to a firm, b, in a quarter, t, take earnings received from b in $t+1$.	`NEPersistS`

Average Earnings prior to Job-to-Job Flows (Continuous Employment)
`J2J: EESepSEarn_Orig`
`J2JOD: EESEarn_Orig`
	Average quarterly earnings prior to job flows with no observed nonemployment spell	For a worker, i, who is defined as a Stable Job-to-Job Hire (Continuous Employment) from a firm, a, to another firm, b, in a quarter, t, take earnings received from a in $t-1$.	`EESepS`
			`EES`

Indicator	Description	Microdata Identification Rule	Base
Average Earnings following Job-to-Job Flows (Continuous Employment) **J2J: EEHireSEarn_Dest** **J2JOD: EESEarn_Dest**	Average quarterly earnings following job flows with no observed nonemployment spell	For a worker, i, who is defined as a Stable Job-to-Job Hire (Continuous Employment) from a firm, a, to another firm, b, in a quarter, t, take earnings received from b in $t+1$.	**EEHireS** **EES**
Average Earnings prior to Job-to-Job Flows (Brief Nonemployment) **J2J: AQSepSEarn_Orig**	Average quarterly earnings prior to job flows with a short nonemployment spell	For a worker, i, who is defined as a Stable Job-to-Job Separation (Brief Nonemployment) from a firm, a, to another firm, b, in a quarter, t, take earnings received from a in $t-1$.	**AQSepS**
Average Earnings prior to Job-to-Job Flows (Brief Nonemployment) **J2JOD: AQHireSEarn_Orig**	Average quarterly earnings prior to job flows with a short nonemployment spell	For a worker, i, who is defined as a Stable Job-to-Job Hire (Brief Nonemployment) from a firm, a, to another firm, b, in a quarter, t, take earnings received from a in $t-2$.	**AQHireS**
Average Earnings following Job-to-Job Flows (Brief Nonemployment) **J2J: AQHireSEarn_Dest** **J2JOD: AQHireSEarn_Dest**	Average quarterly earnings following job flows with a short nonemployment spell	For a worker, i, who is defined as a Stable Job-to-Job Hire (Brief Nonemployment) from a firm, a, to another firm, b, in a quarter, t, take earnings received from b in $t+1$.	**AQHireS** **AQHireS**
Average Earnings prior to Job-to-Job Separations **J2J: J2JSepSEarn_Orig** **(Data tool only)**	Average quarterly earnings prior to a separation followed by a hire (short or no observed nonemployment spell)	For a worker, i, who is defined as a Stable Job-to-Job Hire (Continuous Employment) from a firm, a, to another firm, b, in a quarter, t, take earnings received from a in $t-1$. For a worker, i, who is defined as a Stable Job-to-Job Separation (Brief Nonemployment) from a firm, a, to another firm, b, in a quarter, t, take earnings received from a in $t-1$. *Note*: Since **J2JSepS** is a sum of **EESepS** and **AQSepS**, **J2JSepSEarn_Orig** is calculated as a weighted sum: $\frac{EESepS}{J2JSepS} EESepSEarn\_Orig + \frac{AQSepS}{J2JSepS} AQSepSEarn\_Orig$.	**J2JSepS**

Indicator	Description	Microdata Identification Rule	Base

Average Earnings prior to Job-to-Job Flows
`J2JOD: J2JSEarn_Orig`
`(Data tool only)`
	Average quarterly earnings prior to job flows with a short or no observed nonemployment spell	For a worker, *i*, who is defined as a Stable Job-to-Job Hire (Continuous Employment) from a firm, *a*, to another firm, *b*, in a quarter, *t,* take earnings received from *a* in *t-1*.
		
		For a worker, *i*, who is defined as a Stable Job-to-Job Hire (Brief Nonemployment) from a firm, *a*, to another firm, *b*, in a quarter, *t,* take earnings received from *a* in *t-2*.
		
		Note: Since `J2JS` is a sum of `EES` and `AQHireS`, `J2JSEarn_Orig` is calculated as a weighted sum: $\frac{EES}{J2JS}EESEarn\_Orig + \frac{AQHireS}{J2JS}AQHireSEarn\_Orig$.
			`J2JS`

Average Earnings following Job-to-Job Hire
`J2J: J2JHireSEarn_Dest`
`(Data tool only)`
`J2JOD: J2JSEarn_Dest`
`(Data tool only)`
	Average quarterly earnings following a hire following a separation (short or no observed nonemployment spell)	For a worker, *i*, who is defined as a Stable Job-to-Job Hire (Continuous Employment) from a firm, *a*, to another firm, *b*, in a quarter, *t,* take earnings received from *b* in *t+1*.
		
		For a worker, *i*, who is defined as a Stable Job-to-Job Hire (Brief Nonemployment) from a firm, *a*, to another firm, *b*, in a quarter, *t,* take earnings received from *b* in *t+1*.
		
		Note: Since `J2JHireS` is a sum of `EEHireS` and `AQHireS`, `J2JHireSEarn_Dest` is calculated as a weighted sum:
		$\frac{EEHireS}{J2JHireS}EEHireSEarn\_Dest + \frac{AQHireS}{J2JHireS}AQHireSEarn\_Dest$.
		Similarly, since `J2JS` is a sum of `EES` and `AQHireS`, `J2JSEarn_Dest` is calculated as a weighted sum: $\frac{EES}{J2JS}EESEarn\_Dest + \frac{AQHireS}{J2JS}AQHireSEarn\_Dest$.
			`J2JHireS`
			`J2JS`

Identities

Measures and their Components

Many J2J measures can be summed to equal other J2J measures. Often, these identities are not complete and a remainder can be defined. Many remainders are related to instances in which workers hold multiple jobs and experience changes in main job due to relative changes in quarterly earnings from one or more jobs rather than being due to a separation from an origin job and a hire to a destination job. See the Measure Relatedness Diagram[22] for a visualization of these identities.

Precision of Identities

Identities may not hold exactly in the public-use files. Precision is affected by fuzzing and data synthesis of small data items (both confidentiality protection measures), as well as rounding of non-integer establishment employment

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[22] The Measure Relatedness Diagram is available at lehd.ces.census.gov/doc/help/j2j_explorer/J2JVariableRelatedness.pdf

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imputes. National totals may also be imputed to correct for missing states. Each of these is performed independently by measure so that discrepancies between measures and the sum of their components may occur, particularly for more detailed tabulations. Future J2J releases will include variance estimates associated with the imputation of national totals.

Table 15: Measures and their Components

Measure	Components	Explanation
Employment (Beginning of Quarter) **MainB**	Main Job Ends **MJobEnd** Stable Job Stayers **JobStayS** *remainder*	Beginning-of-quarter employment in *t* can be decomposed into the following components: • Those that are also end-of-quarter main jobs (**JobStayS** + *remainder*). • Those that are NOT also end-of-quarter main jobs (**MJobEnd**). The *remainder* is the set of non-stable job stayers in *t* who did not receive earnings in *t-2* from the beginning-of-quarter main job in *t*.
Employment (End of Quarter) **MainE**	Main Job Starts **MJobStart** Stable Job Stayers **JobStayS** *remainder*	End-of-Quarter employment in *t* can be decomposed into the following components: • Those that were also beginning-of-quarter main jobs (**JobStayS** + *remainder*). • Those that were NOT also beginning -of-quarter main jobs (**MJobEnd**). The *remainder* is the set of non-stable job stayers in *t* who did not receive earnings in *t-2* from the beginning-of-quarter main job in *t*.
Stable Employment (Beginning of Quarter) **MainBS**	Stable Job Stayers **JobStayS** *remainder*	Beginning-of-quarter employment in *t* can be decomposed into the following components: • Those that are also end-of-quarter main jobs (**JobStayS**). • Those that are NOT also end-of-quarter main jobs (*remainder*). The *remainder* is the set of job stayers in *t-1* who have an end-of-quarter main job with a different firm in *t* or no end-of-quarter main job in *t*.

Measure	Components	Explanation
Main Job Ends `MJobEnd`	Main Job Separations `MSep` *remainder*	Main jobs that end in *t* can be decomposed into the following components: • Those from which workers separated in *t* (`MSep`). • Those from which workers did NOT separate in *t* (*remainder*). The *remainder* is the set of workers whose beginning-of-quarter main job in *t* becomes a secondary job at the end of the quarter. These workers continue to receive earnings in *t+1* from the beginning-of-quarter main job in *t*.
Main Job Starts `MJobStart`	Main Job Hires `MHire` *remainder*	Main jobs that start in *t* can be decomposed into the following components: • Those to which workers were hired in *t* (`MHire`). • Those to which workers were NOT hired in *t* (*remainder*). The *remainder* is the set of workers whose secondary job at the beginning of the quarter becomes the end-of-quarter main job in *t*. These workers received earnings in *t-1* from the end-of-quarter main job in *t*.
Main Job Separations `MSep`	Job-to-Job Separations (Continuous Employment) `EESep` Job-to-Job Separations (Brief Nonemployment) `AQSep` Separations to Persistent Nonemployment `ENPersist`	Main job separations in *t* can be decomposed into the following components: • Those that are followed by an end-of-quarter main job with a different firm in *t* (`EESep`). • Those that are NOT followed by an end-of-quarter main job in *t* (`ENSep`, see more below).
Main Job Hires `MHire`	Job-to-Job Separations (Continuous Employment) `EEHire` Job-to-Job Hires (Brief Nonemployment) `AQHire` Hires from Persistent Nonemployment `NEPersist`	Main job hires in *t* can be decomposed into the following components: • Those that are preceded by a beginning-of-quarter main job with a different firm in *t* (`EEHire`). • Those that are NOT preceded by a beginning-of-quarter main job in *t* (`NEHire`, see more below).

Measure	Components	Explanation

Job-to-Job Separations
`J2JSep`
	Job-to-Job Separations (Continuous Employment)
	`EESep`
	
	Job-to-Job Separations (Brief Nonemployment)
	`AQSep`
		Job-to-Job Separations in *t* are followed by an end-of-quarter main job with a different firm in:
		• *t* (`EESep`) <u>OR</u>
		• *t+1*, after having no end-of-quarter main job with any firm in *t* (`AQSep`).

Job-to-Job Hires
`J2JHire`
`J2JOD: J2J`
`(Data tool only)`
	Job-to-Job Separations (Continuous Employment)
	`EEHire`
	`J2JOD: EE`
	
	Job-to-Job Hires (Brief Nonemployment)
	`AQHire`
	`J2JOD: AQHire`
		Job-to-Job Hires in *t* are preceded by a beginning-of-quarter main job with a different firm in:
		• *t* (`EEHire`) <u>OR</u>
		• *t-1*, before having no beginning -of-quarter main job with any firm in *t* (`AQHire`).

Stable Job-to-Job Separations
`J2JSepS`
`(Data tool only)`
	Stable Job-to-Job Separations (Continuous Employment)
	`EESepS`
	
	Stable Job-to-Job Separations (Brief Nonemployment)
	`AQSepS`
		Stable Job-to-Job Separations are followed by an end-of-quarter main job with a different firm in:
		• *t*, with workers also receiving earnings in *t+1* from the end-of-quarter main job in *t* (`EESepS`) <u>OR</u>
		• *t+1*, after having no end-of-quarter main job with any firm in *t*, with workers also receiving earnings in *t+2* from the end-of-quarter main job in *t+1* (`AQSepS`).

Stable Job-to-Job Hires
`J2JHireS`
`(Data tool only)`
`J2JOD: J2JS`
`(Data tool only)`
	Stable Job-to-Job Hires (Continuous Employment)
	`EEHireS`
	
	Stable Job-to-Job Hires (Brief Nonemployment)
	`AQHireS`
		Stable Job-to-Job Hires are preceded by a beginning-of-quarter main job with a different firm in:
		• *t*, with workers also receiving earnings in *t-1* from the beginning-of-quarter main job in *t* (`EEHireS`), <u>OR</u>
		• *t-1*, before having no beginning -of-quarter main job with any firm in *t*, with workers also receiving earnings in *t-2* from the beginning-of-quarter main job in *t-1* (`AQHireS`).

Separations to Nonemployment
`ENSep`
	Job-to-Job Separations (Brief Nonemployment)
	`AQSep`
	
	Separations to Persistent Nonemployment
	`ENPersist`
		Separations to Nonemployment in *t* can be decomposed into the following components:
		• Those that are followed by an end-of-quarter main job in *t+1* (`AQSep`).
		• Those that are NOT followed by end-of-quarter main job in *t+1* (`ENPersist`).

Measure	Components	Explanation
Hires from Nonemployment **NEHire**	Job-to-Job Hires (Brief Nonemployment) **AQHire** Hires from Persistent Nonemployment **NEPersist**	Hires from Nonemployment in *t* can be decomposed into the following components: • Those that are preceded by a beginning-of-quarter main job in *t-1* (**AQHire**). • Those that are NOT preceded by a beginning-of-quarter main job in *t-1* (**NEPersist**).

Aggregate Measure Equivalence

Certain J2J measures equal each other at the highest level of aggregation. Others only equal each other in some instances. Table 16 lists and explains these relationships:

Table 16: Equality of Aggregated Measures

Measures	Explanation
Job-to-Job Separations (Continuous Employment) **EESep** *in Quarter t* <u>AND</u> Job-to-Job Hires (Continuous Employment) **EEHire** *in Quarter t*	**EESep** and **EEHire** are counts of workers who experience a separation and a hire (with no observed nonemployment spell) in the same quarter. For $EESep_t$, the quarter of the separation and the quarter of the hire is *t*. The same is true for $EEHire_t$. Since the separation and hire for workers defined as $EESep_t$ occur in the same quarters as they do for workers defined as $EEHire_t$, $EESep_t$ and $EEHire_t$ equal each other. *Exceptions:* None.
Stable Job-to-Job Separations (Continuous Employment) **EESepS** *in Quarter t* <u>AND</u> Stable Job-to-Job Hires (Continuous Employment) **EEHireS** *in Quarter t*	See above.

Measures	Explanation
Job-to-Job Separations (Brief Nonemployment) **AQSep** *in Quarter t-1* <u>AND</u> Job-to-Job Hires (Brief Nonemployment) **AQHire** *in Quarter t*	**AQHire** and **AQSep** are counts of workers who experience a separation and a hire (with a short nonemployment spell) in adjacent quarters. For $AQSep_t$, the quarter of the separation is quarter *t* while the quarter of the hire is *t+1*. For $AQHire_t$, the quarter of the separation is *t-1* while the quarter of the hire is *t*. Since the separation and hire for workers defined as $AQSep_t$ occur in different quarters than they do for workers defined as $AQHire_t$, $AQSep_t$ and $AQHire_t$ may not equal each other. However, for $AQSep_{t-1}$, the quarter of the separation is *t-1* while the quarter of the hire is *t*. Since the separation and hire for workers defined as $AQSep_{t-1}$ occur in the same quarters as they do for workers defined as $AQHire_t$, $AQSep_{t-1}$ and $AQHire_t$ equal each other. *Exceptions:* This equality only holds at the highest level of aggregation. It does not hold at lower levels of aggregations as workers may move across geographies or switch into firms with different industries, firm ages, or firm sizes.
Stable Job-to-Job Separations (Brief Nonemployment) **AQSepS** *in Quarter t-1* <u>AND</u> Stable Job-to-Job Hires (Brief Nonemployment) **AQHireS** *in Quarter t*	See above.
Job-to-Job Separations **J2JSep** <u>AND</u> Job-to-Job Hires **J2JHire**	**J2JSep** and **J2JHire** are sums. **J2JSep** is a sum of EESep and AQSep while **J2JHire** is a sum of EEHire and AQHire. Since AQSep and AQHire do not equal each other in any given quarter, **J2JSep** also does not equal **J2JHire** in any given quarter. Similarly, since $EESep_{t-1}$ may not equal $EEHire_t$, $J2JSep_{t-1}$ may not equal $J2JHire_t$. *Exceptions:* None.

Measures	Explanation

Stable Job-to-Job Separations
`J2JSepS`
`(Data tool only)`
AND
Stable Job-to-Job Hires
`J2JHireS`
`(Data tool only)`
	`J2JSepS` and `J2JHireS` are sums. `J2JSepS` is a sum of EESepS and AQSepS while `J2JHireS` is a sum of EEHireS and AQHireS.
	
	Since AQSepS and AQHireS do not equal each other in any given quarter, `J2JSepS` also does not equal `J2JHireS` in any given quarter. Similarly, since EESepS$_{t-1}$ may not equal EEHireS$_t$, `J2JSepS`$_{t-1}$ may not equal `J2JHireS`$_t$.
	
	Exceptions: None.

Aggregated Earnings Measures for Job-to-Job Flows

The J2JOD public-use files provide earnings measures for job flows with continuous employment (i.e. `EESEarn_Orig` and `EESEarn_Dest`) and job flows with a brief nonemployment spell (i.e. `AQHireSEarn_Orig` and `AQHireSEarn_Dest`). For users' convenience, these measures have been aggregated to create two earnings measures for both types of job flows: `J2JSEarn_Orig` and `J2JSEarn_Dest`.

Users interested in comparing earnings before and after job flows for the same set of workers should use `J2JSEarn_Orig` and `J2JSEarn_Dest`. These workers were hired to a firm in quarter *t* and separated from another firm in quarter *t* if they were continuously employed or *t-1* if they experienced a brief nonemployment spell. Note that because `J2JSEarn_Orig` and `J2JSEarn_Dest` refer to the same set of workers, they have the same base count – `J2JS`. However, because J2JS combines groups of workers with slightly different separation timings, `J2JSEarn_Orig` is calculated using earnings from two different quarters, *t-1* (continuous employment) and *t-2* (brief nonemployment spell), while `J2JSEarn_Dest` is calculated using earnings from one quarter, *t+1*.

Two additional aggregated earnings measures are provided in the J2J public-use files: `J2JSepSEarn_Orig` and `J2JHireSEarn_Dest`. Users interested in the earnings of workers who left a firm in quarter *t* before joining another firm, regardless of whether they were hired by another firm in the same or following quarter, should use `J2JSepSEarn_Orig`. Similarly, users interested in the earnings of workers hired to a firm in quarter *t* after separating from another firm, regardless of whether they left the prior firm in the same or previous quarter, should use `J2JHireSEarn_Dest`. Note that `J2JSepSEarn_Orig` and `J2JHireSEarn_Dest` do not refer to the same set of workers and this is reflected in their having different base counts – `J2JSepS` and `J2JHireS`. These base counts are not required to equal each other in any given quarter; for more information, see Aggregate Measure Equivalence.

Differences in the timing of separations and hires for the components of web-only earnings measures are summarized in Table 17.

Table 17: Quarters of Separations and Hires for Components of Web-Only Earnings Measures

	Job Flows with Continuous Employment (EES/EEHireS)		Job Flows with a Brief Nonemployment Spell (AQHireS/AQHireS)	
	Quarter of Separation	*Quarter of Hire*	*Quarter of Separation*	*Quarter of Hire*
J2JSEarn_Orig	t	t	t-1	t
J2JSEarn_Dest	t	t	t-1	t
J2JSepSEarn_Orig	t	t	t	t+1
J2JHireSEarn_Dest	t	t	t-1	t

Note that separations and hires for the components of J2JSEarn_Dest and J2JHireSEarn_Dest occur in the same quarters, meaning these measures equal each other. For the same reason, their respective base counts – J2JS and J2JHireS – equal each other as well. J2JSEarn_Orig and J2JSepSEarn_Orig, however, do not equal each other and have different base counts.