

JUNE

2018

Employment transitions in Washington state – a study of job flows among individuals employed in growing and declining industries in 2014 and 2015



**Employment
Security
Department**
WASHINGTON STATE

Employment transitions in Washington state – A study of job flows among individuals employed in growing and declining industries in 2014 and 2015.

Published June 2018

Washington State Employment Security Department
Cami Feek, *Interim Commissioner*

Workforce Information and Technology Services
Cynthia Forland, Ph.D., *Assistant Commissioner and CIO*

Workforce Information and Technology Services
Gustavo Avilés, *Program Evaluation, Research and Analysis Manager*

Prepared by

Jonathan Adam Lind, *Programs and Policies Evaluator*

This workforce product was funded by grant number MI-27429-15-60-A53 awarded by the U.S. Department of Labor's Workforce Data Quality Initiative. The product was created by the recipient and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, expressed or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership. This product is copyrighted by the institution that created it. Internal use by an organization or personal use by an individual for non-commercial purposes is permissible. All other uses require the prior authorization of the copyright owner.

Employment Security Department is an equal opportunity employer/program. Auxiliary aids and services are available upon request to individuals with disabilities. Language assistance services for limited English proficient individuals are available free of charge. Washington Relay Service: 711.

Contents

Introduction	1
Data	3
Determination of growing and declining industries	9
Relative size of industries.....	13
Construction of transition matrices	15
Employment transitions among individuals working in a declining industry in 2014.....	19
Employment transitions among individuals working in a growing industry in 2015	23
A quick comparison of outflows from educational institutions.	27
Wage flows among individuals employed in declining industries in 2014.....	29
Immobile Workers	29
Declining-to-declining wage flows.....	30
Intra-industry wage flows.....	32
Declining-to-growing wage flows	35
Declining-to-other flows.....	37
Conclusion.....	39
Appendix I: Local-level mapping using text analytics with the WRIS2 data.....	41

Introduction

Employment transitions are a common occurrence in a modern economy. In this study, employment transitions refer to instances in which a worker begins, or ends, a working relationship with an employer. One common reason given for employment transitions is that they may help to facilitate upwards social mobility. Workers may be more likely to quit their present employment and take up new employment elsewhere when they perceive an opportunity that benefits them. For example, earn more income, increase their status, change residence or gain more independence. However, there are many potential reasons underlying the concept of employment transitions. For example, a pregnancy may prompt some individuals to transition out of the labor market entirely – at least for a time. The acquisition of employment after the completion of a period of education is also a type of employment transition. Migration is another source of employment transition; some individuals may perceive better opportunities elsewhere and act to take advantage of these perceptions. Further, not all employment transitions are voluntary. Individuals who experience a lay-off have often undergone an employment transition that was not desired.

Despite the different reasons motivating individuals to undergo an employment transition, one thing is clear – employment transitions are not an infrequent occurrence. However, a precise picture of how employment transitions occur, who makes them, and how they affect the individual making the transition is not readily apparent. This study seeks to gain some traction on questions of this nature. In particular, a focus will be on industries which have experienced either long-term growth, or decline, in terms of total employment. The focus on growing and declining industries stems from a belief that employment transitions are likely to be most pronounced in such industries. However, it is important to mention at the outset that there is no value judgment to any industry with the application of the terms “growing” and “declining.” In the context of this study, growing and declining simply refer to the long-term trajectories of total employment associated with each industry. In fact, it is possible for an industry that has been declining in terms of the number of workers it employs to also enjoy robust growth in terms of sales, revenue or market valuation.

Nevertheless, an industry that employs a shrinking proportion of the labor force is likely to be characterized by a different pattern of employment transitions relative to an industry that is expanding in terms of overall employment. For example, one could imagine that industries representing a shrinking proportion of the workforce might be more characterized by employment transitions that result in worker exit. As the number of jobs housed by these declining industries continues to deteriorate, some workers may have to look for employment elsewhere. Where do these workers go?

On the other hand, employment transitions involving rapidly growing industries may be more likely to result in transitions that involve the beginning of new employment relationships. Rapidly growing industries, after all, need workers to fill the new positions that are being created. Where do these workers come from?

Pursuing answers to questions such as these is useful insofar as it helps to paint a more complete picture of the dynamics of employment transitions. However, the answers to such questions shed little light on whether a given transition is beneficial from the standpoint of the worker. In order to determine whether a transition benefits the worker, a measure of worker well-being is needed. This study uses earnings data to measure worker well-being and asks, do workers who transition out of employment in industries with declining employment experience earnings growth, stability or decrease? Individuals may exit declining industries because such industries lack opportunity and higher earnings potential is available elsewhere.

On the other hand, it is possible that individuals who exit employment in declining industries tend to be forced out due to restricted labor demand, which may decrease their earnings.

Finally, due to a restricted demand for labor associated with declining industries, it may be possible that workers in such industries are more likely to seek job training or educational credentials that will better facilitate a transition into employment with better long-term prospects. This study will also explore the extent to which employment transitions out of declining industries lead to full-time enrollment in educational institutions.

In summary, this study will address the following four research questions:

1. From where do industries associated with growing employment draw their workers?
2. Where do workers who are, or were, employed in industries with declining employment end up?
3. Are workers who transition out of employment in industries with declining employment more likely to enroll in training or educational programs?
4. Do workers who transition out of employment in industries with declining employment experience earnings growth, stability, or decrease?

Data

The data used to construct this study are drawn from four separate sources. Enhanced Quarterly Unemployment Insurance (EQUI) records are used to establish a definition for growing and declining industries. EQUI is derived from the Quarterly Census of Employment and Wages (QCEW). QCEW is a program jointly run by the United States Bureau of Labor Statistics and states. QCEW collects information regarding monthly wages and covered employment from nearly all employers in the United States. In Washington state, covered employment includes all workers except:

- Certain federal and state government workers¹
- Proprietors
- Unincorporated self-employed
- Unpaid family members
- Certain farm and domestic workers
- Workers covered by the railroad unemployment insurance system
- Workers who earned no wages during the entire applicable pay period because of work stoppages, temporary layoffs, illness or unpaid vacations
- Individuals serving on a temporary basis in case of fire, storm, earthquake or other similar emergency²

Nationally, covered employment represents approximately 95 percent of the total workforce. For the purpose of this study, the focus is on employment and wages in Washington state, so only EQUI records compiled by the Washington State Employment Security Department (ESD) were used.³

ESD has collected monthly employment information from employers representing over 300 industries going back to January 1990. Industry definitions in EQUI are established by the North American Industry Classification System (NAICS). This study uses the four-digit definition of NAICS. The four-digit representation of NAICS provides a sufficient level of disaggregation to identify a wide range of business activities. Because EQUI data provide a reliable historical time series that reflects levels of employment in Washington state over a long period of time, these data are used to construct definitions of growing and declining industries. More information regarding the process used to define growing and declining industries can be found beginning on page 9.

While EQUI is used to establish definitions of growing and declining industries, records compiled by ESD's Next Generation Tax System (NGTS) are used to examine individual-level employment transitions. In Washington state, virtually all employers are required to register with ESD for the purpose of reporting wages and paying unemployment taxes. In addition to registering, employers are also required by law to file a tax and wage report with ESD on a quarterly basis. These filings include information pertaining to each employee's quarterly wages and hours. This information is received and recorded in ESD's NGTS system and database. This database serves as a comprehensive storehouse of individual-level data collected from nearly all employers and nearly all workers in Washington state.

¹ For a complete list of federal government exclusions, see *Appendix A* of the UCFE Instructions for Federal Agencies. For a complete list of state and local governments excluded services, see the coverage section of the most recent Comparison of State UI Laws.

² For a complete definition of QCEW scope and exclusions see the QCEW Handbook of Methods (<https://www.bls.gov/opub/hom/cew/concepts.htm>).

³ Covered employment represents approximately 90 percent of the total workforce in Washington state.

Due to the sheer volume of data housed in this wage database, the scope of this study was limited to examine only those employment transitions occurring from 2014 through 2015. The data used in this study identifies individuals who made an employment transition from 2014 through 2015, and were employed in either a declining industry in 2014, or a growing industry in 2015. We limit the data draw to 2014 and 2015 to match the original research questions of where do workers in growing industries come from and where do workers in declining industries go. After identifying these individuals, the data is further examined to determine the origin or destination industries of job transitioning workers.

For the two years included in this study, ESD’s wage database contains records of nearly 4.1 million unique individuals employed in Washington state. The industries in which these individuals are employed reflect Washington’s general economy. *Figure 1* presents a breakdown of people in each industry subsector in Washington state for both 2014 and 2015.⁴

Figure 1. Employment in Washington state industry subsectors*
Washington state, 2014 and 2015

Source: Employment Security Department/WITS, Next Generation Tax System (NGTS)

3-digit NAICS	Industry subsector	2014 employment	2015 employment
111	Crop production	193,946	185,565
112	Animal production and aquaculture	7,771	7,986
113	Forestry and logging	4,994	4,366
114	Fishing, hunting and trapping	2,208	2,192
115	Support activities for agriculture and forestry	49,426	49,647
211	Oil and gas extraction	26	28
212	Mining (except oil and gas)	2,437	2,436
213	Support activities for mining	279	267
221	Utilities	16,262	15,967
236	Construction of buildings	51,755	52,108
237	Heavy and civil engineering construction	27,643	25,501
238	Specialty trade contractors	137,171	136,642
311	Food manufacturing	56,832	49,683
312	Beverage and tobacco product manufacturing	11,866	11,156
313	Textile mills	571	466
314	Textile product mills	2,692	2,323
315	Apparel manufacturing	1,843	1,514
316	Leather and allied product manufacturing	751	691
321	Wood product manufacturing	18,800	16,965
322	Paper manufacturing	8,613	7,768
323	Printing and related support activities	9,078	6,699
324	Petroleum and coal products manufacturing	751	691
325	Chemical manufacturing	7,431	6,638
326	Plastics and rubber products manufacturing	11,308	9,415
327	Nonmetallic mineral product manufacturing	12,577	11,057
331	Primary metal manufacturing	6,611	6,097
332	Fabricated metal product manufacturing	25,606	22,127
333	Machinery manufacturing	21,050	17,222

⁴ While the analysis of employment transitions among workers employed in growing and declining industries aggregates at four-digit NAICS, *Figure 1* aggregates unique workers at three-digit NAICS for a more concise presentation of information.

3-digit NAICS	Industry subsector	2014 employment	2015 employment
334	Computer and electronic product manufacturing	22,747	20,259
335	Electrical equipment, appliance and component manufacturing	8,393	4,996
336	Transportation equipment manufacturing	115,236	111,383
337	Furniture and related product manufacturing	8,877	7,707
339	Miscellaneous manufacturing	13,187	11,568
423	Merchant wholesalers, durable goods	85,416	70,223
424	Merchant wholesalers, nondurable goods	59,900	56,638
425	Wholesale electronic markets and agents and brokers	31,500	25,907
441	Motor vehicle and parts dealers	48,787	48,093
442	Furniture and home furnishing stores	11,665	10,126
443	Electronics and appliance stores	12,763	11,566
444	Building material and garden equipment and supplies dealers	34,988	33,094
445	Food and beverage stores	80,647	75,055
446	Health and personal care stores	20,019	19,243
447	Gasoline stations	17,699	16,259
448	Clothing and clothing accessories stores	48,590	46,467
451	Sporting goods, hobby, musical instrument and book stores	23,354	21,576
452	General merchandise stores	88,559	90,778
453	Miscellaneous store retailers	27,821	25,950
454	Non-store retailers	32,059	35,343
481	Air transportation	16,812	13,479
482	Rail transportation	32	10
483	Water transportation	9,752	6,142
484	Truck transportation	31,287	28,415
485	Transit and ground passenger transportation	28,979	27,874
486	Pipeline transportation	306	309
487	Scenic and sightseeing transportation	1,386	1,164
488	Support activities for transportation	40,359	38,093
491	Postal service	709	574
492	Couriers and messengers	13,983	12,735
493	Warehousing and storage	7,990	7,263
511	Publishing industries (except internet)	73,489	66,927
512	Motion picture and sound recording industries	9,285	8,572
515	Broadcasting (except internet)	4,584	4,058
517	Telecommunications	24,341	23,457
518	Data processing, hosting and related services	9,704	9,352
519	Other information services	16,720	18,891
521	Monetary authorities – Central Bank	106	111
522	Credit intermediation and related activities	50,443	46,478
523	Securities, commodity contracts and other financial investments	17,353	14,297
524	Insurance carriers and related activities	49,161	45,736
525	Funds, trusts and other financial vehicles	563	287
531	Real estate	58,012	46,913
532	Rental and leasing services	12,147	11,588
533	Lessors of nonfinancial intangible assets (except copyrighted works)	358	244
541	Professional, scientific and technical services	239,040	207,713
551	Management of companies and enterprises	8,558	7,998
561	Administrative and support services	257,851	235,457
562	Waste management and remediation services	18,390	16,555

3-digit NAICS	Industry subsector	2014 employment	2015 employment
611	Educational services	288,637	291,389
621	Ambulatory healthcare services	186,886	157,534
622	Hospitals	105,796	135,467
623	Nursing and residential care facilities	100,507	80,322
624	Social assistance	164,761	175,350
711	Performing arts, spectator sports and related industries	19,210	16,934
712	Museums, historical sites and similar institutions	6,724	5,815
713	Amusement, gambling and recreation industries	78,588	66,729
721	Accommodation	49,428	43,828
722	Food services and drinking places	335,823	300,873
811	Repair and maintenance	32,612	30,482
812	Personal and laundry services	41,777	36,134
813	Religious, grant-making, civic, professional and similar organizations	46,528	37,124
814	Private households	8,194	7,762
921	Executive, legislative and other general government support	105,712	93,010
922	Justice, public order and safety activities	39,515	20,662
923	Administration of human resource programs	27,043	22,970
924	Administration of environmental quality programs	7,727	7,727
925	Admin. of housing programs, urban planning, and community dev.	1,975	753
926	Administration of economic programs	29,872	29,554
928	National security and international affairs	8,530	6,058
999	Unknown	975	771

* In this figure, employment is defined as the number of unique individuals who worked in each industry subsector each year. An individual who worked in more than one subsector in a year, will be counted more than once in each year, one for each subsector.

Declining industries are defined as those industries whose level of employment is less than what it was the previous year; however, declining industries can still experience robust growth, for example in terms of sales.

Despite the impressiveness of this wage database, it only records information pertaining to employment within the boundaries of the state of Washington. However, not all employment transitions occur within state lines. In order to capture employment transitions outside the state, this study used the Wage Record Interchange System 2 (WRIS2). WRIS2 is a data sharing system administered by the U.S. Department of Labor (DOL) and 43 states (plus D.C. and Puerto Rico) are currently participating. WRIS2 allows states to share wage information collected under the auspices of UI tax administration. This study was not able to match all potential out-of-state wages. Five states provided only partial (2015) data. This study is only able to assess patterns of out-migration for these five states. In addition, California is not currently a participant in WRIS2. Despite these limitations, WRIS2 provides some leverage to determine which industries newly arrived Washingtonians are entering, as well as which industries former Washingtonians are leaving behind. *Figure 2* provides an overview of migratory patterns both into and out of Washington state based on WRIS2 data.

Figure 2. Migratory flows into and out of Washington state
 United States, 2014 and 2015
 Source: U.S. Department of Labor, Wage Record Interchange System 2

State	In-migration	Out-migration
Alaska	4,468	3,566
Arkansas	919	634
Arizona	7,014	6,185
Connecticut	823	529
District of Columbia	732	565
Delaware	222	133
Florida	5,929	5,229
Georgia	2,014	2,306
Iowa	1,173	895
Idaho	6,335	1,976
Illinois	4,421	2,627
Indiana	718	625
Kansas	1,082	934
Kentucky	708	767
Louisiana	1,608	1,207
Maryland	1,301	1,325
Maine	491	375
Michigan	2,600	1,638
Minnesota	2,774	1,797
Missouri	1,798	1,540
Mississippi	421	432
North Carolina	2,741	2,205
North Dakota	2,255	1,566
Nebraska	1,023	840
New Jersey	1,656	1,166
New Mexico	1,383	1,029
Nevada	3,934	3,416
Ohio*	*	1,740
Oklahoma	1,529	1,212
Pennsylvania*	*	1,417
Puerto Rico	185	103
Rhode Island	203	185
South Carolina*	*	998
South Dakota*	*	403
Tennessee*	*	355
Texas	11,907	10,118
Utah	1,793	1,534
Virginia	2,493	2,152
Vermont	312	198
Wisconsin*	*	1,237
Wyoming	1,041	876

*Provided out-migration data only.

More than 4,000 people migrated into Washington state from Alaska in 2014 and 2015.

Another type of transition is movement into and out of institutions of higher education. One of the primary purposes of higher education is to provide skills that have value in the labor market. Multiple studies demonstrate that the acquisition of skills brought about via exposure to higher education tends to result in better labor market outcomes. While education is perhaps most commonly pursued by younger individuals prior to meaningful entry into the labor market, it is not uncommon for individuals to transition back into full-time educational enrollment after having accumulated significant labor market experience. Further, it is plausible that such job-market-to-full-time-student transitions may be more common among individuals whose prior labor market experience was in a declining industry. Education may provide individuals whose employment histories (and acquired skills) were in declining industries with opportunities to develop new skills that are better in tune with current market demand.

In order to assess the extent to which individuals transitioned from declining industries to full-time educational enrollment, this study used data compiled by the Washington State Education Research and Data Center (ERDC). ERDC assembles information collected by the Office of the Superintendent of Public Instruction (OSPI) and public postsecondary educational institutions to create a warehouse of longitudinal educational data that tracks student achievement from pre-school to labor force entry, excluding private institutions. Available public postsecondary two- and four-year educational enrollment records were acquired from ERDC for each individual in the NGTS database for the years 2014 and 2015.

Collectively, the 4.1 million individuals represented in the NGTS database for 2014 and 2015 attempted approximately 16.5 million college credits while enrolled at one of the state’s public two- or four-year educational institutions over the same period. An individual is classified as a full-time student in a particular year if they attempted 45 or more college credits over the course of that same year. Using this definition, approximately 52,000 full-time students in the 2014 NGTS data, as well as an additional 49,000 full-time students in the 2015 NGTS data were identified.⁵ Full-time students thus accounted for approximately 1.5 percent and 1.3 percent of the total labor force in 2014 and 2015 respectively. A summary of ERDC data is presented in *Figure 3*.

Figure 3. Educational enrollment among Washington state labor force participants
Washington state, 2014 and 2015

Source: Washington State Office of Financial Management, Education Research and Data Center

Year	Total workforce	Credits attempted	Credits earned	Completion rate	Number of full-time students	Percent full-time students
2014	3,556,239	8,532,543	7,361,207	86.3%	52,339	1.5%
2015	3,664,971	8,056,122	6,931,234	86.0%	49,233	1.3%

In 2014 and 2015, the total workforce attempted more than 16 million college credits.

⁵ A large majority (approximately 85 percent) of these full-time students were classified as full-time students in both 2014 and 2015. This study is primarily concerned with transitions into and out of full-time educational status. Consequently, most students found in the ERDC data are not analyzed because they neither entered nor exited full-time enrollment status during 2014 and 2015.

Determination of growing and declining industries

As noted earlier, a goal of this study is to describe employment transitions as they pertain to “growing” and “declining” industries. Consequently, it is necessary to define what is meant by “growing” and “declining,” as well as determine to which industries to apply these terms. First, however, it might prove useful to reiterate what is not meant by the terms growth and decline. Because this study is primarily interested in employment transitions, the use of the terms growth or decline does *not* refer to profitability, market share, net revenue nor any other metric that does not *directly* measure total employment. Instead, the definition of growth or decline is centered on long-term trajectories of total employment within an industry. For instance, an industry that presently employs 100 workers, but employed 10,000 workers in the past can reasonably be said to have experienced employment decline.

When framed in terms of long-term trajectories in total employment, the application of the terms “growing” and “declining” to particular industries provides an interesting point of departure for an analysis of employment transitions. For instance, workers employed in declining industries likely experience different patterns of employment transitions than workers who are employed in growing industries. Employment transitions in declining industries are more likely to be characterized by exits, whereas entrances may be more common among workers in growing industries. Further, the wage trajectories experienced by individuals employed in industries that are rapidly adding workers may be different from those experienced by individuals employed in industries that have shed workers over time.

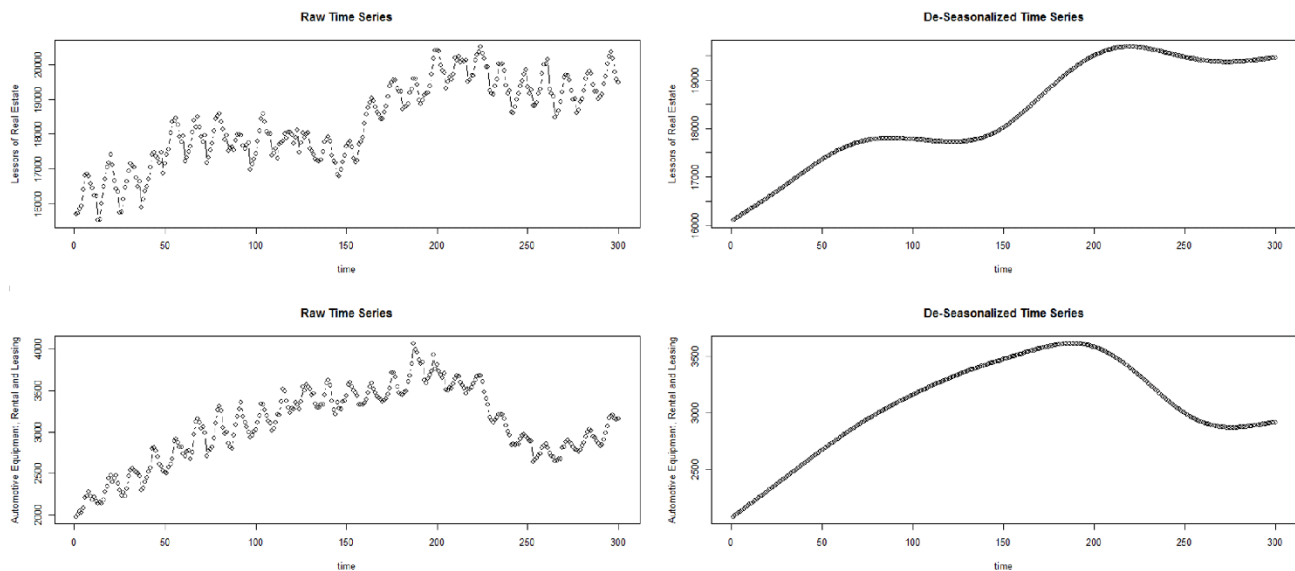
As noted earlier, this study assesses employment transitions for 2014 and 2015. While this restricted time frame enables worker transition analysis, it is inappropriate for the determination of growing and declining industries. Unlike employment transitions, which occur at a discrete point in time, industry-level growth and decline are better understood as long-term phenomena. Often changes that lead an industry to expand (or contract) employment are deeply rooted in technological change – another phenomenon that cannot be adequately understood by focusing on the short-term. Consequently, the definition of growing and declining industries used in this study relies on a much longer time series. EQUI historical time series is used for the years 1990 through 2014 to assess growth or decline over time in employment at the industry level.

The work began by aggregating the full EQUI time series to four-digit NAICS codes. This aggregation produces 319 separate time series – one for each four-digit NAICS industry classification in the combined series. A number of industries experience a great deal of seasonal fluctuation in terms of total employment. The definition of industry growth and decline relies on long-term trends in employment, and not on short-term “naturally” occurring seasonal cycles. To isolate the longer-term trends in industry-level employment, the 319 time series are broken into seasonal, trend, cyclical and irregular components. The trend component of the time series represents in employment net of any seasonal or cyclical fluctuation. Essentially, by breaking down each time series into its parts, one can capture an estimate of the long-term growth trajectories for each of the 319 industries under consideration, net of short-term fluctuations. To visually demonstrate how this decomposition smooths out fluctuations attributable to short-term seasonality, the raw and seasonally adjusted time series for two industries (lessors of real estate, and automotive equipment rental and leasing) are presented in *Figure 4*.

After adjusting for seasonality, a simple linear regression is applied to the trend component for each of the 319 industry time series. The coefficients generated by these linear regression models estimate the average number of jobs each industry added or lost per month for 1990 through 2014. It is true that, for a number of the time series under consideration, a non-linear model would produce a better fit to the data. However, the objective in modelling the de-

seasonalized time series is not to produce an accurate prediction of employment at a discrete point, but rather to generate a metric with which to compare industries in terms of employment over broad swaths of time. In this respect, the chief advantage of the linear model is that it produces one coefficient per time series. Specifically, a large positive coefficient suggests an industry has experienced growth in employment over time, whereas a large negative coefficient suggests an industry has declined. Further, because each time series is assigned a single coefficient, industries can easily be ranked in terms of growth or decline. Thus after applying a linear regression to each of the 319 time series in the EQUI data and ranking each industry in terms of the sign and magnitude of its regression coefficient, those industries with the 28 most positive and 28 most negative coefficients were selected.⁶ ESD defines those industries associated with the 28 most positive linear regression coefficients as “growing.” Conversely, those industries associated with the 28 most negative linear regression coefficients are defined as “declining.”

Figure 4. Deseasonalizing a time series – lessors of real estate and automotive equipment rental or leasing Washington state, 1990 through 2014
 Source: Employment Security Department/WITS, Enhanced Quarterly Unemployment Insurance Records



Deseasonalizing a time series allows users to see the underlying data trend. The lessors of real estate time series has for the most part been trending upwards.

⁶ Twenty-eight represents an approximately 10 percent trim off of the total distribution of industries arrayed by the linear regression coefficient.

Figures 5 and 6 detail which industries this study identifies as growing and declining, respectively, as well as the regression coefficients assigned by the linear model. The regression coefficient can be interpreted as the average number of jobs each industry added or lost per month, for 1990 through 2014.

Figure 5. Growing industries

Washington state, 1990 through 2014

Source: Employment Security Department/WITS, Enhanced Quarterly Unemployment Insurance Records

4-digit NAICS	Growing industry group	Linear regression coefficient
7225	Restaurants and other eating places	221.4
6111	Elementary and secondary schools	214.9
5112	Software publishers	178.5
6221	General medical and surgical hospitals	171.9
6241	Individual and family services	169.4
8141	Private households	122.6
5415	Computer systems design and related services	116.3
7132	Gambling industries	86.4
6211	Offices of physicians	82.1
5613	Employment services	73
6233	Continuing care retirement communities and assisted living facilities for the elderly	71.7
6113	Colleges, universities and professional schools	66.9
9211	Executive, legislative and other general government support	62.3
5617	Services to buildings and dwellings	62.2
4541	Electronic shopping and mail order houses	60.2
5413	Architectural, engineering and related services	59
2382	Building equipment contractors	53.7
5416	Management, scientific and technical consulting services	49.4
6213	Offices of other health practitioners	49.4
4251	Wholesale electronic markets and agents and brokers	49.2
1151	Support activities for crop production	45.6
7139	Other amusement and recreation industries	45.5
9221	Justice, public order and safety activities	43.3
5511	Management of companies and enterprises	38.9
5614	Business support services	38.2
6212	Offices of dentists	36.9
5417	Scientific research and development services	36.4
1113	Fruit and tree nut farming	35.4

Those industries with the largest positive linear regression coefficients are defined as growing industries.

Figure 6. Declining industries

Washington state, 1990 through 2014

Source: Employment Security Department/WITS, Enhanced Quarterly Unemployment Insurance Records

4-digit NAICS	Declining industry group	Linear regression coefficient
3364	Aerospace product and parts manufacturing	-81.4
3221	Pulp, paper and paperboard mills	-28.2
3313	Alumina and aluminum production and processing	-27
3231	Printing and related support activities	-26
3219	Other wood product manufacturing	-23.7
3341	Computer and peripheral equipment manufacturing	-19.4
1133	Logging	-17.9
5111	Newspaper, periodical, book and directory publishers	-15
3152	Cut and sew apparel manufacturing	-13.6
9281	National security and international affairs	-12
6231	Nursing care facilities (skilled)	-11.9
3345	Navigational, measuring, electro-medical and control instruments manufacturing	-10.8
4811	Scheduled air transportation	-9.7
3114	Fruit and vegetable preserving and specialty food manufacturing	-9.2
7111	Performing arts companies	-8.8
3117	Seafood product preparation and packaging	-8.4
3211	Sawmills and wood preservation	-8
5629	Remediation and other waste management services	-7.8
4471	Gasoline stations	-7.4
4512	Bookstores and news dealers	-7.3
5322	Consumer goods rental	-7.3
3118	Bakeries and tortilla manufacturing	-7.2
3212	Veneer, plywood and engineered wood product manufacturing	-6.9
3332	Industrial machinery manufacturing	-6.8
4531	Florists	-6.4
5412	Accounting, tax preparation, bookkeeping and payroll services	-5.7
1141	Fishing	-5.7
9241	Administration of environmental quality programs	-5

Aerospace product and parts manufacturing was one of the 28 industry groups defined as declining for the purpose of this study.

Relative size of industries

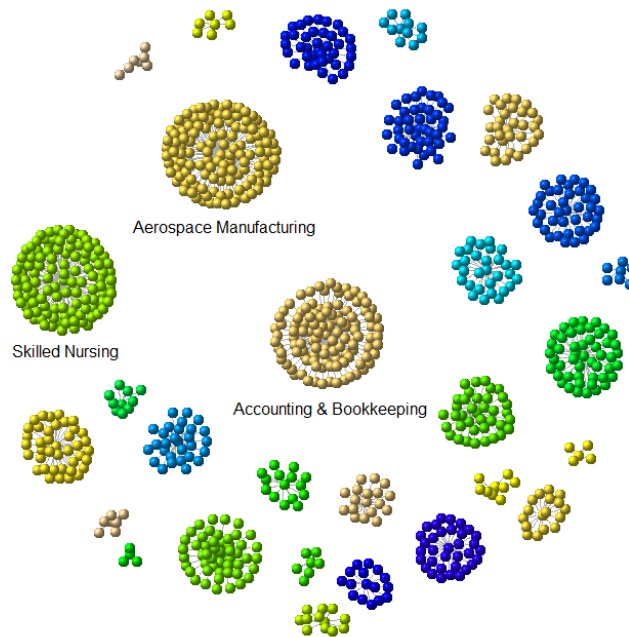
This study focuses on employment transitions among individuals employed in growing and declining industries. However, it is important to note that even though employment transitions for each growing or declining industry are analytically treated in an identical fashion, not all industries have the same overall impact on Washington's economy. Specifically, some growing or declining industries represent a much larger share of total employment relative to others. When taken as a whole, growing industries house a much larger number of workers (approximately 1.6 million) than declining industries (approximately 300,000). While these differences in industry size do not affect the transition findings, it is important for the reader to keep in mind that some growing or declining industries have a much larger impact on the economy. *Figures 7* and *8* are visual representations drawn from a random sample of workers in declining (*Figure 7*) and growing (*Figure 8*) industries in 2015. Each node in *Figure 7* represents roughly 125 workers in declining industries, while each node in *Figure 8* represents about 1,600 workers in growing industries.

A close examination of *Figure 7* reveals there are three industries that are over-represented among all workers in declining industries. The large “gold” cluster in the center of *Figure 7* represents the third largest declining industry – accounting, tax preparation, bookkeeping and payroll services. The large “green” cluster to the left of the center of *Figure 7* represents the second largest declining industry – nursing care facilities (skilled). Finally, the large “yellow” cluster in the top left portion of *Figure 7* represents the largest declining industry – aerospace product and parts manufacturing.

Figure 7. Declining industries – a cluster representation

Washington state, 2015

Source: Employment Security Department/WITS, Next Generation Tax System



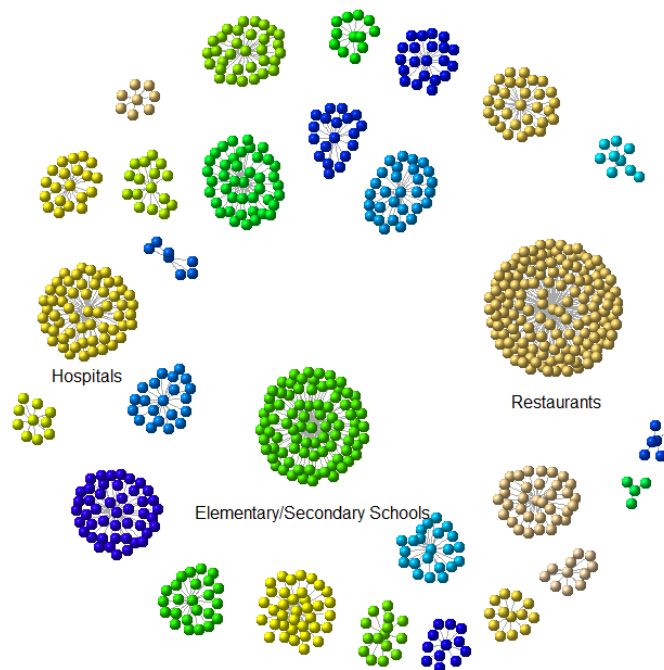
Aerospace product and parts manufacturing is the largest declining industry.

Similarly, an inspection of *Figure 8* reveals three industries that are over-represented among all workers in growing industries. The large “yellow” cluster near the left edge of *Figure 8* represents the third largest growing industry – general medical and surgical hospitals. The large “green” cluster near the center of the figure denotes the second largest growing industry – elementary and secondary schools. Finally, the large “gold” cluster near the right edge of the figure signifies the largest growing industry – restaurants and other eating places. Again, it is important to note that employment transitions into or out of any particular industry are not treated differently from others. Consequently, these six industries have a much larger impact on the overall state economy and should be the focus when a greater level of detail is needed in communicating the analysis results.

Figure 8. Growing industries – a cluster representation

Washington state, 2015

Source: Employment Security Department/WITS, Next Generation Tax System



Several industries have a larger impact on the overall economy because of their larger number of workers.

Construction of transition matrices

For the purpose of this study, a transition matrix is defined by a set of rows and columns that register employment transitions between industries, educational institutions and states (geographical areas). The origin (row) and destination (column) for each matrix depend on the industries depicted – growing or declining. The transition matrix for declining industries would have 28 rows (number of declining industries) but a larger number of columns to include all the industry groups, educational institutions and states where the workers who leave a declining industry end up. The number of rows for the growing industry matrix would be equal to the number of columns of the declining industries, but the number of columns would be 28 (number of growing industries).

While the definition of growing and declining industries in this study relied on a historical time series, a historical series of transition matrices would be too difficult to understand. Instead, the focus on employment transitions is limited to those occurring in 2014 and 2015. Focusing on these two years provides a glimpse of patterns of employment transitions at a discrete point in time without overwhelming the reader.

When constructing transition matrices, it is important to recognize that people can be employed in multiple jobs over the course of the year. For example, a person can work full time during the day at a car dealership as well as pick up a couple of evening shifts at a local restaurant one year, and then decide to go to work for a public utility and supplement one's income teaching pre-school the following year. The number of potential transitions a person can make – even over the course of a two-year period – is large. In order to make this problem more approachable, the analysis focused on primary jobs.

This study uses the primary job definition specified by the U.S. Census Longitudinal Employer-Household Dynamics program. An employed individual's "primary" job is defined as the job associated with the year/quarter combination for which the worker worked the most hours. For example, a particular person held exactly two jobs in 2014 and this individual worked 400 hours in the first quarter and 520 hours in the second quarter as an elementary school teacher. Mid-year, they began work as an aircraft mechanic working 300 hours in the third quarter, and 500 hours in the fourth quarter. The year/quarter combination for which this person worked the most hours was the second quarter of 2014. Therefore, for the purpose of this study, this person's "primary" job for 2014 is defined to be an elementary school teacher.

It is easier to analyze cross-state migration impact on industries by classifying migration as a primary activity. For example, some industries may rely on workers who migrate to Washington from out of state. Conversely, workers in other industries may be more likely to move out of state. An individual's primary activity is defined to be "out-migration" if it satisfies the following three conditions:

1. He or she appeared in the state's wages in 2014
2. Did not appear in the state's wages during 2015
3. Appeared in out-of-state wages for 2015

If all three of these conditions are met, it implies that the individual in question was employed in Washington state at some point in 2014, was not employed in Washington in 2015, and was employed in some other state in 2015. In other words, there is strong evidence to suggest that this individual migrated out of state.

In addition to employment and migration, education represents an additional type of "primary" activity. For the purpose of this study, any person who attempts at least 45 credits at a Washington state two- or four-year public postsecondary institution over the course of a

particular year is classified as a full-time student for that year. The primary activity of individuals who are identified as full-time students during a given year is considered “full-time educational enrollment” for that year.

As the above examples illustrate, one’s primary activity in a given year may not directly reflect a relationship with a particular job. Each year a large numbers of individuals enter the labor force and a similar number exit the labor force. It is possible to define a person’s primary activity during a particular year in terms of a change in labor force participation status.⁷ For the purpose of this study, an individual’s primary activity is defined as a “labor force exit” if it meets the following four conditions:

1. He or she appeared in the state’s wages in 2014.
2. Did not appear in the state’s wages in 2015.
3. Was not identified as an out-migrant.
4. Was not identified as a full-time student in 2015.

This combination of events suggests a transition from employment to labor force non-participation.⁸ Similarly, an individual’s primary activity is defined to be a “labor force entrance” if it satisfies the following four conditions:

1. He or she did not appear in the state’s wages in 2014.
2. Did appear in the state’s wages in 2015.
3. Was not identified as an in-migrant.
4. Was not identified as a full-time student in 2014.

The number of workers primarily employed in a growing or declining industry at some point in 2014 and 2015 is presented in *Figures 9* and *10*, respectively.

Figure 9. Number of workers whose primary activity was in a growing industry by NAICS code Washington state, 2014 and 2015

Source: Employment Security Department/WITS, Next Generation Tax System; U.S. Department of Labor, Wage Record Interchange System 2; Washington State Office of Financial Management, Education Research and Data Center

Growing industry	2014	Percent of 2014 total	2015	Percent of 2015 total
Fruit and tree nut farming	73,793	2.1%	73,554	2.0%
Support activities for crop production	32,896	0.9%	33,463	0.9%
Building equipment contractors	49,190	1.4%	52,328	1.4%
Wholesale electronic markets and agents	26,388	0.7%	26,674	0.7%
Electronic shopping and mail order houses	30,184	0.8%	35,482	1.0%
Software publishers	61,832	1.7%	61,983	1.7%
Architectural, engineering and related	36,356	1.0%	37,664	1.0%
Computer systems design and related	51,404	1.4%	56,489	1.5%
Management, scientific and technical consulting	28,052	0.8%	31,519	0.9%
Scientific research and development	19,644	0.6%	19,898	0.5%
Management of companies and enterprises	8,085	0.2%	8,503	0.2%
Employment services	97,428	2.7%	99,426	2.7%
Business support services	38,540	1.1%	38,512	1.1%
Services to buildings and dwellings	46,421	1.3%	48,531	1.3%

⁷ A large number of individuals have no direct relationship with the labor market as they are not labor force participants at any point during 2014 and 2015. Because this study is about labor force transitions, those individuals are excluded from the study.

⁸ Technically, a sub-set of labor force non-participation is some full-time students.

Growing industry	2014	Percent of 2014 total	2015	Percent of 2015 total
Elementary and secondary schools	179,740	5.1%	184,869	5.0%
Colleges, universities and professional schools	61,934	1.7%	62,761	1.7%
Offices of physicians	49,407	1.4%	50,225	1.4%
Offices of dentists	25,506	0.7%	25,832	0.7%
Offices of other health practitioners	23,197	0.7%	23,222	0.6%
General medical and surgical hospitals	98,787	2.8%	103,578	2.8%
Continuing care retirement facilities	35,787	1.0%	35,803	1.0%
Individual and family services	75,957	2.1%	86,725	2.4%
Gambling	22,942	0.6%	23,742	0.6%
Other amusement and recreation	36,616	1.0%	36,837	1.0%
Restaurants and other eating places	241,839	6.8%	254,617	6.7%
Private households	7,380	0.2%	7,515	0.2%
Executive, legislative and other general government	93,014	2.6%	93,843	2.6%
Justice, public order and safety	19,480	0.5%	19,780	0.5%
Total	1,571,799	44.2%	1,633,375	44.6%

In 2014, 44.2 percent of workers were employed in a growing industry. Industries are presented here according to their order in NAICS.

Figure 10. Number of workers whose primary activity was in a declining industry
Washington state, 2014 and 2015

Source: Employment Security Department/WITS, Next Generation Tax System; U.S. Department of Labor, Wage Record Interchange System 2; Washington State Office of Financial Management, Education Research and Data Center

Declining industry	2014	Percent of 2014 total	2015	Percent of 2015 total
Logging	3,936	0.1%	3,737	0.1%
Fishing	2,601	0.1%	2,877	0.1%
Fruit and vegetable preserving	14,746	0.4%	14,977	0.4%
Seafood product preparation and packaging	11,642	0.3%	11,538	0.3%
Bakeries and tortilla manufacturing	7,203	0.2%	7,393	0.2%
Cut and sew apparel manufacturing	1,499	<0.1%	1,544	<0.1%
Sawmills and wood preservation	9,902	0.3%	9,870	0.3%
Veneer, plywood and engineered wood prod. Manuf.	3,326	0.1%	3,155	0.1%
Other wood product manufacturing	4,783	0.1%	4,922	0.1%
Pulp, paper and paperboard mills	5,586	0.2%	4,881	0.1%
Printing and related	7,233	0.2%	6,953	0.2%
Alumina and aluminum production	2,463	0.1%	2,481	0.1%
Industrial machinery manufacturing	3,326	0.1%	3,357	0.1%
Computer and peripheral manufacturing	2,601	0.1%	2,352	0.1%
Navigational, measuring, electro-medical inst. manuf.	9,600	0.3%	9,766	0.3%
Aerospace product and parts manufacturing	104,416	2.9%	103,391	2.8%
Gasoline stations	16,265	0.5%	16,718	0.5%
Book stores and news dealers	2,584	0.1%	2,585	0.1%
Florists	1,530	<0.1%	1,509	<0.1%
Scheduled air transportation	12,693	0.3%	14,452	0.4%
Newspaper, periodical and book publishing	7,432	0.2%	6,910	0.2%
Consumer goods rental	2,817	0.1%	2,970	0.1%
Accounting, tax prep, bookkeeping and payroll	20,952	0.6%	21,549	0.6%
Remediation and other waste management	8,974	0.3%	8,883	0.2%

Declining industry	2014	Percent of 2014 total	2015	Percent of 2015 total
Nursing care facilities (skilled)	25,976	0.7%	25,237	0.7%
Performing arts companies	3,923	0.1%	4,135	0.1%
Administration of environmental quality programs	7,305	0.2%	7,579	0.2%
National security and international affairs	9,281	0.3%	7,459	0.2%
Total	314,595	8.8%	313,180	8.5%

In 2014 and 2015, declining industries accounted for slightly more than 8 percent of total employment. Industries are presented here according to their order in NAICS.

Figure 11. Number of workers by primary activity

Washington state, 2014 and 2015

Source: Employment Security Department/WITS, Next Generation Tax System; U.S. Department of Labor, Wage Record Interchange System 2; Washington State Office of Financial Management, Education Research and Data Center

Primary activity	2014	Percent of 2014 total	2015	Percent of 2015 total
Employed in a growing industry	1,571,799	44.2%	1,633,375	44.6%
Employed in a declining industry	314,595	8.8%	313,180	8.5%
Labor force entrances	-	-	467,997	12.8%
Labor force exits	375,639	10.6%	-	-
In-migrants	- ¹	-	79,430	2.3%
Out-migrants	67,753	1.9%	-	-
Exited full-time education	-	-	11,613	0.3%
Entered full-time education	6,897	0.2%	-	-
None of the above ²	1,219,556	34.3%	1,159,376	31.6%
Total	3,556,239	100%	3,664,971	100%

¹ As this table represents individuals' primary activities in 2014 and 2015, cells with a dash are accounted for in another cell. For example, those who exited full-time education in 2015 are likely counted in the category "none of the above" in 2014 as many of them were full-time students.

² This category includes individuals not assigned to one of the eight primary activities in *Figure 11*. Nearly all of these individuals were either primarily employed in an industry that was neither growing nor declining, or were classified as full-time students in both 2014 and 2015.

In 2014 and 2015, more than 3 million individuals were classified as workers in Washington state.

Employment transitions among individuals working in a declining industry in 2014

This section examines those individuals whose primary employment was in a declining industry in 2014 and who experienced an employment transition. Of primary interest is the patterns of outflow, in particular which workers were employed in a declining industry in 2014, and those individual's activities during 2015.

A total of 314,595 individuals were primarily employed in a declining industry in 2014. Of those 314,595 individuals, 76,346 had a different primary employer (or were otherwise engaged in a different primary activity) in 2015. Hence, 24.3 percent of all workers employed in a declining industry in 2014 either: a) changed primary employers, b) moved out of state, c) enrolled full time in a Washington state two- or four-year public educational institution, or d) otherwise exited the labor force, in 2015. These 76,346 transitioning workers (mobile workers) constitute the total outflow from declining industries in 2014 and 2015. Individuals who did not make such a transition (i.e., remained with the same primary employer over the same period) are categorized as immobile. *Figure 12* summarizes these findings.

Figure 12. Mobility among individuals whose 2014 primary employer was in a declining industry Washington state, 2014 and 2015

Source: Employment Security Department/WITS, Next Generation Tax System; U.S. Department of Labor, Wage Record Interchange System 2; Washington State Office of Financial Management, Education Research and Data Center

Mobility status	Number of individuals
Mobile	76,346
Immobile	238,249
Total	314,595

The majority of workers in a declining industry between 2014 and 2015 were considered immobile – that is, they remained with the same primary employer.

Total outflow from declining industries is most heavily concentrated in the largest declining industries. There were 10,269 individuals whose primary 2014 employer was in aerospace manufacturing, the largest declining industry in terms of numbers of individuals employed, who transitioned to a different primary employer (or a different primary activity), in 2015.⁹ A total of 9,926 individuals transitioned from a primary employer in the skilled nursing care facilities industry and 7,272 individuals transitioned from a primary employer in the accounting, tax preparation, bookkeeping and payroll services industry (the second and third largest declining industries, respectively). There was a disproportionate amount of mobility in the gasoline stations industry. Of the 16,265 individuals whose primary employer was in the gasoline stations industry in 2014, 6,909 (42.5 percent) transitioned to a different primary employer (or primary activity) in 2015. *Figure 13* details total outflow from each of the 28 declining industries.

⁹ This could be a different primary employer in the aerospace industry, however.

Figure 13. Total outflow from declining industries

Washington state, 2014 through 2015

Source: Employment Security Department/WITS, Next Generation Tax System; U.S. Department of Labor, Wage Record Interchange System 2; Washington State Office of Financial Management, Education Research and Data Center

Declining industry	Total outflow
Logging	1,398
Fishing	1,283
Fruit and vegetable preserving and specialty food manufacturing	4,143
Seafood product preparation and packaging	3,897
Bakeries and tortilla manufacturing	2,463
Cut and sew apparel manufacturing	338
Sawmills and wood preservation	1,969
Veneer, plywood and engineered wood product manufacturing	1,012
Other wood product manufacturing	1,663
Pulp, paper and paperboard mills	1,291
Printing and related support activities	1,948
Alumina and aluminum production and processing	288
Industrial machinery manufacturing	687
Computer and peripheral equipment manufacturing	644
Navigational measuring, electro-medical and control equipment manufacturing	1,669
Aerospace product and parts manufacturing	10,269
Gasoline stations	6,909
Bookstores and news dealers	977
Florists	626
Scheduled air transportation	1,502
Newspaper, periodical, book and directory publishers	2,207
Consumer goods rental	1,122
Accounting, tax preparation, bookkeeping and payroll services	7,272
Remediation and other waste management services	2,737
Nursing care facilities (skilled)	9,926
Performing arts companies	1,531
Administration of environmental quality programs	1,330
National security and international affairs	5,244
Total outflow from declining industries	76,346

76,346 individuals transitioned from the 28 listed declining industries to a new primary activity in 2015. Industries are presented here according to their order in NAICS.

The status during 2015 of individuals who left primary employment in a declining industry are detailed in *Figure 14*. There was more movement from primary employment in a declining industry to primary employment in a growing industry, than vice-versa. Of the 76,346 individuals who transitioned out of primary employment in a declining industry, 15,224 (19.9 percent) transitioned to primary employment in a growing industry, whereas only 10,759 (14.1 percent) transitioned to primary employment (with a different employer) in a declining industry. This is unsurprising as growing industries house a much larger share of the total jobs in the Washington state economy relative to declining industries. It is also interesting to note that the vast majority of declining-to-declining transitions are, in fact, intra-industry transitions. Of the 10,759 individuals who transitioned between employers within declining industries, 8,137 (75.6 percent) did so within the context of a single industry. This suggests that workers in declining industries are

much more likely to bounce from employer to employer within a declining industry than to seek employment in a different declining industry. Nevertheless, such intra-industry flows constitute only a fraction of the total outflow to growing industries, suggesting a movement from declining to growing (and other) industries is substantially more widespread than intra-industry churn.

Figure 14. Outflow destinations from declining industries

Washington state, 2014 and 2015

Source: Employment Security Department/WITS, Next Generation Tax System; U.S. Department of Labor, Wage Record Interchange System 2; Washington State Office of Financial Management, Education Research and Data Center

Destination	Outflow from declining industries
To growing industries	15,224
To declining industries	10,759
To other industries ¹	16,533
Intra-industry mobility ²	8,137
Labor force exits	26,577
Out-migration	5,501
Enrolled in full-time education	1,752

¹Neither growing nor declining.

²Intra-industry mobility is a subset of mobility to declining industries.

Individuals who were employed in a declining industry in 2014 (19.9 percent), transitioned to a growing industry in 2015.

Relatively few individuals who were employed in declining industries in 2014 migrated out of state or enrolled in a full-time educational program. Of the 76,346 individuals who transitioned out of primary employment in a declining industry, only 5,501 (7.2 percent) moved out of state and 1,752 (2.3 percent) enrolled full time at a Washington state two- or four-year public postsecondary educational institution.

Individuals leaving the labor force was the most common reason for transitions out of employment in a declining industry between 2014 and 2015. Of the 76,346 individuals who transitioned out of primary employment in a declining industry, 26,577 (34.8 percent) exited the labor force.¹⁰ While the decision to exit the labor force is a complex phenomenon subject to many different factors, such a high rate of labor force attrition may potentially suggest that some workers in declining industries may be having difficulties finding suitable employment in the fields for which they have accumulated work experience. In addition to disaggregating total outflow by origin and destination separately (*Figures 13* and *14*, respectively) the total outflow is also broken down by origin and destination simultaneously. Additional research should explore both patterns and underlying motivations for labor force exit among individuals employed in declining industries.

¹⁰ These individuals were not enrolled full-time in a Washington state two- or four-year postsecondary educational institution.

Employment transitions among individuals working in a growing industry in 2015

In contrast to the previous section, the focus of this section is on patterns of inflow among workers who were employed in a growing industry in 2015. The interest is in determining those industries or primary activities from which employers in growing industries drew new workers. In other words, what sort of primary activities were people who were employed in a growing industry in 2015 doing in the previous year?

A larger number of individuals worked in growing industries relative to declining industries. As indicated in *Figure 15*, a total of 1,633,375 individuals were primarily employed in a growing industry in 2015. Of those 1,633,375 individuals, 583,084 (35.7 percent) transitioned into primary employment in a growing industry from another primary employer or primary activity (e.g., migration, full-time educational enrollment).

Figure 15. Mobility among individuals whose 2014 primary employer was in a growing industry Washington state, 2014 and 2015

Source: Employment Security Department/WITS, Next Generation Tax System; U.S. Department of Labor, Wage Record Interchange System 2; Washington State Office of Financial Management, Education Research and Data Center

Mobility status	Number of individuals
Mobile	583,084
Immobile	1,050,291
Total	1,633,375

The majority of individuals who worked for a growing industry in 2014 were immobile in 2015.

Figure 16 presents total inflow broken down by destination (growing) industry. Total inflow is not always commensurate with overall industry size. Note that this is different from the case of outflow from declining industries, where total outflow was greatest within the largest declining industries. It is true that the industry with the single largest aggregate inflow (restaurants and other eating places) is also the largest growing industry in terms of total size. However, total inflows into the second and third largest growing industries (elementary and secondary schools and general medical and surgical hospitals) are substantially lower relative to their overall size.

There are three growing industries employing fewer total workers than either elementary or secondary schools or general medical and surgical hospitals whose total inflow is nevertheless larger than is the case for the two bigger industries. For example, a total of 67,472 individuals “flowed into” primary employment in the employment services industry between 2014 and 2015. Similarly, a total of 44,027 and 36,500 individuals “flowed into” the fruit and tree nut farming, and individual and family services industries, respectively. This suggests that some growing industries are disproportionately associated with worker churn relative to their overall size. In other words, some growing industries are more likely to house workers who tend to transition across employers (or other primary activities) at a higher rate than others.

A closer look at the nature of these three industries with disproportionately high levels of total inflow could provide greater insight. Two of these three industries (fruit and tree nut farming and employment services) are seasonal in nature. The jobs that these industries generate tend to be shorter term and have higher churn. However, an explanation for the disproportionately high rate of total inflow for the individual and family services industry is less readily apparent.

Figure 16. Total inflow into growing industries

Washington state, 2014 and 2015

Source: Employment Security Department/WITS, Next Generation Tax System; U.S. Department of Labor, Wage Record Interchange System 2; Washington State Office of Financial Management, Education Research and Data Center

Growing industry	Total inflow
Fruit and tree nut farming	44,027
Support activities for crop production	16,493
Building equipment contractors	19,203
Wholesale electronic markets, agents and brokers	8,532
Electronic shopping and mail order houses	12,760
Software publishers	10,617
Architectural, engineering and related services	10,057
Computer systems design and related services	21,630
Management, scientific and technical consulting services	12,415
Scientific research and development	4,474
Management of companies and enterprises	2,242
Employment services	67,472
Business support services	11,539
Services to buildings and dwellings	23,546
Elementary and secondary schools	30,580
Colleges, universities and professional schools	12,791
Offices of physicians	12,751
Offices of dentists	7,993
Offices of other health practitioners	8,516
General medical and surgical hospitals	19,162
Continuing care retirement	15,273
Individual and family services	36,500
Gambling	6,362
Other amusement and recreation industries	16,619
Restaurants and other eating places	128,662
Private households	3,398
Executive, legislative and other general government	16,638
Justice, public order and safety activities	2,832
Total inflow to growing industries	583,084

More than 500 thousand individuals were mobile in 2015 and flowed into a growing industry. Industries are presented here according to their order in NAICS.

Figure 17 presents total inflow broken down by origin industry group and primary activity. As is apparent from Figure 15, very few people transition from declining industries to growing industries. Of the 583,084 individuals who transitioned into primary employment in a growing industry in 2015, only 15,224 (2.6 percent) transitioned from a declining industry. Indeed, growing-to-growing and other-to-growing transitions were far more common – constituting 32 percent and 16.8 percent of all transitions. Intra-industry mobility – a transition from one employer to another within the same growing industry – was a particularly common form of growing-to-growing transition. Intra-industry transitions accounted for about 51.9 percent of all

growing-to-growing transitions. In short, Washingtonians who transitioned into primary employment in a growing industry were far more likely to have “flowed from” a growing (or other) industry than from a declining industry.

However, the 39.5 percent transitions into a growing industry was by people who were not previously part of the labor force. Note that a similar finding was presented above in regards to outflows from declining industries. Regardless of whether we are looking at outflows from declining, or inflows to growing industries, it appears that a change in labor force participation is the most common form of transition (labor force entrances and exits).

Migration from out of state and exits from enrollment in public two- or four-year educational institutions are less common sources of transition into growing industries, accounting for 6.4 percent and 2.7 percent of all such transitions respectively. However, both types of transitions are more common than declining-to-growing transitions, indicating that a person is more likely to enter a growing industry from either out of state or an educational institution than from a declining industry.

As with outflows from declining industries, total inflow was broken down by both origin and destination simultaneously.

Figure 17. Inflow origins to growing industries

Washington state, 2014 and 2015

Source: Employment Security Department/WITS, Next Generation Tax System; U.S. Department of Labor, Wage Record Interchange System 2; Washington State Office of Financial Management, Education Research and Data Center

Origin	Inflow to growing industries
From growing industries	186,603
From declining industries	15,224
From other industries	98,101
Intra-industry mobility	96,784
Labor force entrances	230,361
In-migration	37,145
Exited full-time education	15,650

Inflows to growing industries came primarily from other growing industries or a change in labor force participation.

A quick comparison of outflows from educational institutions

The study’s third question asks whether individuals who transitioned out of primary employment in a declining industry were more, or less, likely than others to transition into full time educational enrollment status at one of Washington state’s public two- or four-year institutions of higher education. *Figure 13* shows that out of a total of 76,346 individuals who transitioned out of primary employment in a declining industry, 1,752 (2.3 percent) enrolled full time in a Washington state public two- or four-year college or university. *Figure 18* describes the industry-to-education flows.

While outflow to education is 0.2 percent higher among workers who were primarily employed in “other” industries in 2014, this difference is not substantively meaningful. It appears that patterns of outflow to full-time educational enrollment at a Washington state two- or four-year college or university did not significantly differ based on industry origin type from 2014 through 2015.

Figure 18. A comparison of outflow to full-time educational enrollment across origin industry types Washington state, 2014 and 2015

Source: Employment Security Department/WITS, Next Generation Tax System; U.S. Department of Labor, Wage Record Interchange System 2; Washington State Office of Financial Management, Education Research and Data Center

Industry	Total outflow	Outflow to education	Percent of total outflow to education
Declining industries	76,346	1,752	2.3%
Growing industries	529,394	12,064	2.3%
Other industries	544,289	13,533	2.5%

The percent of total outflow to education was comparable between declining and growing industries, at 2.3 percent.

Wage flows among individuals employed in declining industries in 2014

Up to this point, the focus has been on addressing research questions one through three (see *page 3*). This section will pivot to the final research question which concerns the earnings of individuals who transitioned out of declining industries. Specifically, question four asks whether workers who transitioned out of employment in industries with declining employment do better or worse than others in terms of quarterly and hourly earnings.¹¹

Immobile workers

After accounting for outliers, there were roughly 233,000 individuals whose primary employment was in a declining industry in 2014 and who did not change primary employers between 2014 and 2015. The average quarterly wage among immobile individuals who were primarily employed in a declining industry in 2014 was \$19,530. Average quarterly wages among such immobile workers increased by about \$176 to \$19,706 in 2015. Hourly quarterly wages for immobile workers in declining industries increased by \$1.25 - rising from \$34.00 in 2014 to \$35.25 in 2015.

Breaking down immobile workers by declining industry reveals interesting patterns. Immobile workers in the scheduled air transportation industry experienced the most positive wage outcomes among all workers whose primary employer was in a declining industry. Average quarterly wages among immobile scheduled air transportation workers increased by about \$1,151 and per hour quarterly earnings increased by \$2.90 between 2014 and 2015. While speculative, it is possible that the recently passed minimum wage legislation in the city of SeaTac (home to SeaTac International Airport)¹² contributed to rising earnings among scheduled air transportation workers. While a causal connection between the shift to a \$15 per hour minimum wage and increases in average earnings among scheduled air transportation workers in 2015 cannot be established, it is nevertheless suggestive.

Immobile workers in the fishing industry, on the other hand, saw average quarterly earnings deteriorate between 2014 and 2015. Average quarterly earnings declined by about \$1,141 and per hour quarterly earnings declined by \$0.82 among immobile fishing industry workers.

The largest declining industry, aerospace product and parts manufacturing, presents something of a mixed bag in terms of earnings trajectories. Average quarterly earnings among immobile workers in the aerospace industry declined by about \$328 between 2014 and 2015, but per hour quarterly earnings among such workers actually increased \$0.91 per hour. This suggests that while wages for aerospace workers increased over time, this increase was insufficient to account for a reduction in hours, resulting in a net decline in earnings among such workers between 2014 and 2015. Full results (aggregate and broken down by industry group) of the wage trajectories for immobile workers employed in a declining industry are presented in *Figure 19*.

¹¹ It is important to note at the outset that the sample sizes for this portion of the analysis are slightly lower than reported above. The reason for this discrepancy is that there were a number of observations having implausible hourly wages. For example, there were a number of observations associated with a wage of \$0.00 per hour. There were also observations on the other extreme. One observation had \$7,744,208 per hour. In order to account for these implausible values, all observations are rank ordered in terms of hourly wages with an approximately 2 percent trim off of each side of the distribution. Finally, note that all earnings reported in this section reflect the year/quarter combination associated with each individual's primary job (see *pages 15-16*) for a discussion of the definition of the primary job).

¹² The city of SeaTac is 10 square miles (26 km²) in area and has a population of 26,909 according to the 2010 census. The city boundaries surround the Seattle-Tacoma International Airport (approximately 3 square miles (7.8 km²) in area), which is owned and operated by the Port of Seattle.

Figure 19: Wage flows – immobile workers in declining industries
 Washington state, 2014 and 2015
 Source: Employment Security Department/WITS, Next Generation Tax System (NGTS)

Immobile workers	Total quarterly earnings (2014)	Total quarterly earnings (2015)	Total earnings change	Per hour (2014)	Per hour (2015)	Per hour change	Count
Pooled	\$19,530.11	\$19,706.92	\$176.81	\$34.00	\$35.25	\$1.25	232,548
Broken down by industry group							
Logging	\$13,524.74	\$13,536.34	\$11.6	\$25.29	\$26.45	\$1.16	2,521
Fishing	\$22,334.20	\$21,193.48	\$-1,140.72	\$29.79	\$28.97	\$-0.82	1,200
Fruit and vegetable preserving and specialty food	\$11,351.85	\$12,007.16	\$655.31	\$20.25	\$21.39	\$1.14	10,204
Seafood product preparation and packaging	\$15,334.20	\$15,682.36	\$348.16	\$21.94	\$25.66	\$3.72	7,428
Bakeries and tortilla manufacturing	\$11,295.97	\$11,838.60	\$542.63	\$20.80	\$22.09	\$1.29	4,700
Cut and sew apparel manufacturing	\$10,661.30	\$11,174.58	\$513.28	\$21.60	\$22.45	\$0.85	1,128
Sawmills and wood preservation	\$16,860.50	\$16,852.60	\$-7.9	\$27.72	\$28.75	\$1.03	7,779
Veneer, plywood and engineered wood product	\$13,408.25	\$14,336.78	\$928.53	\$21.71	\$23.44	\$1.73	2,288
Other wood product manufacturing	\$10,809.55	\$11,363.03	\$553.48	\$19.01	\$20.07	\$1.06	3,080
Pulp, paper and paperboard mills	\$19,836.19	\$20,502.48	\$666.29	\$33.22	\$35.64	\$2.42	4,241
Printing and related support activities	\$12,540.70	\$12,871.03	\$330.33	\$22.96	\$23.71	\$0.75	5,102
Alumina and aluminum production and processing	\$19,484.57	\$19,368.99	\$-115.58	\$33.95	\$33.43	\$-0.52	2,156
Industrial machinery manufacturing	\$16,167.67	\$16,632.83	\$465.16	\$27.62	\$29.34	\$1.72	2,608
Computer and peripheral equipment	\$28,393.55	\$29,513.06	\$1,119.51	\$52.08	\$54.10	\$2.02	1,850
Nav., Meas., electro-medical, and control inst.	\$22,241.17	\$22,602.37	\$361.2	\$39.73	\$40.87	\$1.14	7,727
Aerospace product and parts manufacturing	\$27,266.39	\$26,938.21	\$-328.18	\$45.70	\$46.61	\$0.91	92,667
Gasoline stations	\$8,844.42	\$9,243.05	\$398.63	\$15.99	\$17.24	\$1.25	9,026
Book stores and news dealers	\$6,015.44	\$6,361.30	\$345.86	\$14.74	\$15.37	\$0.63	1,547
Florists	\$4,270.12	\$4,524.32	\$254.2	\$12.64	\$13.67	\$1.03	875
Scheduled air transportation	\$17,974.48	\$19,125.93	\$1,151.45	\$35.61	\$38.51	\$2.90	10,063
Newspaper, periodical, book and directory	\$13,190.31	\$13,859.59	\$669.28	\$25.89	\$27.10	\$1.21	5,113
Consumer goods rental	\$9,534.66	\$10,139.59	\$604.93	\$18.04	\$19.26	\$1.22	1,637
Accounting, tax prep., bookkeeping and payroll	\$14,704.84	\$15,544.48	\$839.64	\$30.28	\$31.71	\$1.43	13,120
Remediation and other waste management	\$21,323.42	\$22,109.64	\$786.22	\$36.95	\$38.57	\$1.62	6,110
Nursing care facilities (skilled nursing facilities)	\$9,812.58	\$10,200.77	\$388.19	\$19.59	\$20.43	\$0.84	15,653
Performing arts companies	\$9,690.11	\$10,402.29	\$712.18	\$30.82	\$32.13	\$1.31	2,317
Administration of environmental quality programs	\$14,250.89	\$15,084.42	\$833.53	\$25.93	\$27.49	\$1.56	5,904
National security and international affairs	\$14,930.38	\$14,384.40	\$-545.98	\$21.81	\$23.23	\$1.42	4,504

For declining industries as a whole, average per hour wages increased \$1.25 between 2014 and 2015. Industries are presented here according to their order in NAICS.

Declining-to-declining wage flows

After isolating individuals who changed primary employers, just those workers who transitioned to a declining industry between 2014 and 2015 were selected for analysis. There were just about 10,700 workers who made such a transition.

Among all workers whose 2014 primary employer was in a declining industry and who transitioned into primary employment in a declining industry (with a different employer),

average quarterly wages in 2014 increased \$582 from \$11,761 to \$12,343 in 2015. Hourly earnings among those who transitioned to a declining industry also increased from \$22.57 in 2014 to \$23.83 in 2015. This represents a \$1.26 per hour increase in hourly wages.

In terms of absolute earnings, workers who transitioned to employment in a declining industry experienced a greater quarterly average wage increase than immobile workers. However, transitioning workers were also starting off at a much lower level. One possible interpretation is that while workers who transition into primary employment in a declining industry are acting rationally as their transitions result in higher earnings, such workers are also markedly disadvantaged relative to their immobile peers in terms of overall earnings. This finding may be evidence of an entrenched core of workers in declining industries who remain immobile year after year and experience incremental annual wage growth and a periphery of more contingent workers who transition on a regular basis. Among the transitioning workers, such movements do tend to result in higher overall earnings, however the earnings increases brought about by transitions do not appear to be sufficient to bridge the overall earnings gap between immobile and mobile workers, at least in the context of declining industries.

Finally, the per hour wage increase is roughly the same across these two groups. This, coupled with the observance that average quarterly absolute wage increases are higher among transitioning workers, may suggest that peripheral workers (i.e., those who transitioned) attained higher quarterly earnings by finding a position that offered more working hours. The underlying motivation behind many of the transitions made by individuals in declining industries may not have been to seek a higher wage rate, but instead was to secure a job that provided a greater number of working hours. This may suggest that a lack of available working hours may be a bigger problem than low wage rates for workers employed in declining industries.

Among declining-to-declining transitioning workers, those employed in accounting appeared to do relatively well in terms of wage trajectories. Average quarterly earnings for declining-to-declining transitioning workers whose 2014 primary employer was in the accounting industry increased by about \$1,614. Per hour earnings among such transitioning workers increased \$1.92. Declining-to-declining aerospace transitioning workers, while experiencing positive earnings growth, fared somewhat less well. Average quarterly earnings for such workers increased by about \$241, and average hourly earnings increased \$0.38. On the other hand, declining-to-declining transitioning workers in fishing and the scheduled air transportation industries appeared to have lost ground. Average quarterly earnings for workers in these industries declined by \$1,938 and \$46 respectively. It appears that immobility is beneficial to the wage trajectories of scheduled air transportation workers whereas workers in the fishing industry saw their wages deteriorate irrespective of their mobility status, at least over the two-year period under consideration.

Full results (aggregate and broken down by industry) of the wage trajectories for declining-to-declining transitioning workers are presented in *Figure 20*.

Figure 20: Declining-to-declining wage flows

Washington state, 2014 and 2015

Source: Employment Security Department/WITS, Next Generation Tax System (NGTS)

Flows to declining	Total quarterly earnings (2014)	Total quarterly earnings (2015)	Total earnings change	Per hour (2014)	Per hour (2015)	Per hour change	Count
Pooled	\$11,760.84	\$12,343.44	\$582.6	\$22.57	\$23.83	\$1.26	10,663
Broken down by industry group							
Logging	\$10,991.96	\$11,226.93	\$234.97	\$24.48	\$25.46	\$0.98	345
Fishing	\$20,741.95	\$18,803.96	\$-1,937.99	\$25.38	\$26.57	\$1.19	326
Fruit and vegetable preserving and specialty food	\$7,850.28	\$8,353.39	\$503.11	\$16.39	\$16.82	\$0.43	350
Seafood product preparation and packaging	\$10,926.51	\$11,366.02	\$439.51	\$16.03	\$18.20	\$2.17	655
Bakeries and tortilla manufacturing	\$5,304.08	\$6,624.21	\$1,320.13	\$13.12	\$14.44	\$1.32	141
Cut and sew apparel manufacturing	\$10,326.42	\$8,885.02	\$-1,441.40	\$22.48	\$37.42	\$14.94	24
Sawmills and wood preservation	\$11,967.70	\$12,116.01	\$148.31	\$21.78	\$22.86	\$1.08	305
Veneer, plywood and engineered wood product	\$14,010.74	\$14,774.40	\$763.66	\$22.36	\$23.93	\$1.57	234
Other wood product manufacturing	\$9,124.64	\$10,670.41	\$1,545.77	\$16.02	\$17.91	\$1.89	210
Pulp, paper and paperboard mills	\$18,673.05	\$21,081.24	\$2,408.19	\$32.19	\$38.99	\$6.80	331
Printing and related support activities	\$10,667.30	\$11,495.25	\$827.95	\$20.88	\$21.89	\$1.01	183
Alumina and aluminum production and processing	\$22,374.11	\$17,468.74	\$-4,905.37	\$43.63	\$36.22	\$-7.41	17
Industrial machinery manufacturing	\$15,171.09	\$16,096.85	\$925.76	\$25.52	\$29.12	\$3.60	150
Computer and peripheral equipment	\$28,946.43	\$29,020.01	\$73.58	\$54.80	\$52.78	\$-2.02	38
Nav., meas., electro-medical and control inst. mfg.	\$19,775.61	\$20,667.61	\$890	\$36.87	\$37.62	\$0.75	377
Aerospace product and parts manufacturing	\$16,809.70	\$17,051.15	\$241.45	\$29.61	\$29.99	\$0.38	1,050
Gasoline stations	\$4,913.04	\$5,692.51	\$779.47	\$11.23	\$12.37	\$1.14	899
Book stores and news dealers	\$3,806.10	\$4,943.83	\$1,137.73	\$11.96	\$13.82	\$1.86	73
Florists	\$3,817.20	\$4,197.66	\$380.46	\$11.90	\$13.10	\$1.20	52
Scheduled air transportation	\$12,258.07	\$12,212.48	\$-45.59	\$36.28	\$33.76	\$-2.52	133
Newspaper, periodical, book and directory	\$10,369.53	\$11,394.90	\$1,025.37	\$20.47	\$22.21	\$1.74	360
Consumer goods rental	\$7,632.03	\$7,893.26	\$261.23	\$15.17	\$16.15	\$0.98	85
Accounting, tax prep., bookkeeping and payroll	\$11,063.28	\$12,677.47	\$1,614.19	\$24.97	\$26.89	\$1.92	1,164
Remediation and other waste management	\$18,126.70	\$18,714.84	\$588.14	\$32.36	\$33.17	\$0.81	363
Nursing care facilities (skilled nursing facilities)	\$9,933.78	\$10,459.89	\$526.11	\$19.80	\$20.64	\$0.84	2,259
Performing arts companies	\$6,116.47	\$6,748.51	\$632.04	\$27.41	\$28.11	\$0.70	267
Administration of environmental quality programs	\$10,837.93	\$11,732.81	\$894.88	\$20.81	\$23.35	\$2.54	98
National security and international affairs	\$15,021.28	\$10,860.88	\$-4,160.40	\$22.88	\$20.66	\$-2.22	174

There were roughly 10,700 individuals who transitioned from a declining industry to another employer in a declining industry between 2014 and 2015. Industries are presented here according to their order in NAICS.

Intra-industry wage flows

Approximately 8,100 individuals transitioned within the same declining industry but with different employers from 2014 to 2015.

Looking at the aggregate wage flows reveals that the average quarterly wage for intra-industry transitioning workers were about \$11,565 in 2014 and rose to about \$12,136 in 2015, an increase of roughly \$571. These findings are quite similar to those presented earlier for declining-to-declining transitioning workers, which perhaps is not all that surprising given that declining-to-self transitions are a subset of declining-to-declining transitions. These findings also lend themselves to a similar interpretation as presented above for declining-to-declining transitions. Namely, individuals who transitioned to a different primary employer in the same declining industry earned substantially less in absolute terms than those who did not transition and experienced a bigger absolute earnings gain relative to those who did not transition. Similarly, this may suggest the presence of two types of workers. One type is the permanent core of relatively advantaged workers who experience incremental annual wage increases and the other type are workers who are less attached to the declining industries. The latter group are those workers who float from job to job seeking out better opportunities to compensate for their relative disadvantage. Further, an examination of hourly wage increases reveals a very similar story for declining-to-declining transitioning workers. Hourly wages for declining-to-self transitioning workers increased from \$22.44 in 2014 to \$23.60 in 2015, an increase of \$1.16 per hour. It is possible that workers who transition to different primary employment within an industry are seeking job opportunities that provide more working hours, as well as higher wages. Likewise, wage pattern trends broken down by industry paint a similar picture to that presented above for declining-to-declining transitioning workers. Full results (combined and broken down by industry group) for declining-to-self transitioning workers are presented in *Figure 21*.

Figure 21: Declining-to-self (intra-industry) wage flows
 Washington state, 2014 and 2015
 Source: Employment Security Department/WITS, Next Generation Tax System (NGTS)

Flows to self	Total quarterly earnings (2014)	Total quarterly earnings (2015)	Total earnings change	Per hour (2014)	Per hour (2015)	Per hour change	Count
Pooled	\$11,565.31	\$12,136.06	\$570.75	\$22.44	\$23.60	\$1.16	8,079
Broken down by industry group							
Logging	\$11,442.98	\$11,421.73	\$-21.25	\$25.05	\$26.84	\$1.79	273
Fishing	\$23,695.27	\$20,790.95	\$-2,904.32	\$26.84	\$27.12	\$0.28	223
Fruit and veg. preserving and specialty food	\$8,116.29	\$8,546.65	\$430.36	\$16.41	\$17.11	\$0.70	227
Seafood product preparation and packaging	\$9,138.57	\$9,579.90	\$441.33	\$14.24	\$15.99	\$1.75	388
Bakeries and tortilla manufacturing	\$5,503.44	\$6,643.14	\$1,139.7	\$13.23	\$14.57	\$1.34	78
Cut and sew apparel manufacturing	\$7,131.42	\$6,623.51	\$-507.91	\$14.65	\$41.04	\$26.39	16
Sawmills and wood preservation	\$11,884.57	\$12,165.17	\$280.6	\$21.33	\$22.25	\$0.92	168
Veneer, plywood and engineered wood	\$10,632.34	\$10,730.79	\$98.45	\$18.07	\$19.05	\$0.98	35
Other wood product manufacturing	\$9,977.21	\$10,799.18	\$821.97	\$16.49	\$17.40	\$0.91	140
Pulp, paper, and paperboard mills	\$18,571.25	\$16,524.41	\$-2,046.84	\$29.03	\$27.10	\$-1.93	16
Printing and related support activities	\$12,012.27	\$12,557.11	\$544.84	\$22.82	\$23.66	\$0.84	120
Alumina and aluminum prod. and processing	\$34,601.45	\$27,475.39	\$-7,126.06	\$65.90	\$61.13	\$-4.77	4
Industrial machinery manufacturing	\$16,172.38	\$16,872.55	\$700.17	\$26.74	\$30.44	\$3.70	118
Computer and peripheral equipment	\$23,232.42	\$25,599.59	\$2,367.17	\$49.57	\$48.33	\$-1.24	2
Nav., meas., electro-med. & control inst. mfg.	\$20,928.62	\$22,144.56	\$1,215.94	\$39.36	\$40.36	\$1.00	276
Aerospace product and parts manufacturing	\$16,519.10	\$17,211.29	\$692.19	\$28.61	\$29.72	\$1.11	897
Gasoline stations	\$5,074.00	\$5,536.51	\$462.51	\$11.35	\$12.11	\$0.76	738
Book stores and news dealers	\$4,193.96	\$4,814.74	\$620.78	\$12.62	\$13.57	\$0.95	49
Florists	\$4,307.88	\$4,128.75	\$-179.13	\$12.10	\$12.74	\$0.64	38
Scheduled air transportation	\$12,356.32	\$12,096.70	\$-259.62	\$38.56	\$35.38	\$-3.18	112
Newspaper, periodical, book and directory	\$10,739.53	\$11,395.36	\$655.83	\$20.80	\$22.10	\$1.30	302
Consumer goods rental	\$8,557.58	\$8,399.86	\$-157.72	\$16.92	\$17.16	\$0.24	50
Account., tax prep., bookkeeping, and payroll	\$11,130.36	\$12,767.10	\$1,636.74	\$24.82	\$27.12	\$2.30	1,024
Remediation and other waste management	\$19,301.00	\$19,766.94	\$465.94	\$34.04	\$34.73	\$0.69	311
Nursing care facilities. (skilled nursing facs.)	\$10,081.31	\$10,624.95	\$543.64	\$19.84	\$20.68	\$0.84	2,145
Performing arts companies	\$6,417.65	\$6,929.32	\$511.67	\$27.62	\$28.29	\$0.67	237
Administration of environmental quality	\$12,042.77	\$13,196.06	\$1,153.29	\$22.72	\$25.18	\$2.46	63
National security and international affairs	\$14,904.07	\$14,703.58	\$-200.49	\$25.60	\$25.37	\$-0.23	29

Pooled total earnings changed by \$570.75 for workers in declining industries making intra-industry transitions. Industries are presented here according to their order in NAICS.

Declining-to-growing wage flows

The average quarterly earnings for declining-to-growing transitioning workers was about \$9,190 in 2014 and fell to about \$9,023 in 2015. This constitutes a decline of about \$167 during the two-year period. A couple of things stand out here. First, the baseline (2014) earnings are even lower among declining-to-growing transitioning workers than among declining-to-declining transitioning workers. This suggests that declining-to-growing transitioning workers may be less attached to the declining industries than those who transition to another primary job within a declining industry. Second, average quarterly wages actually deteriorate among individuals who make a declining-to-growing transition. This suggests that wage rates (or, perhaps, the availability of working hours) are higher in declining industries than they are in growing industries. Indeed, this may suggest that industries which are declining in terms of the absolute number of workers employed over time are nevertheless “good jobs,” meaning they offer their incumbents a higher standard of living. Further, industries which are experiencing over-time growth in terms of the number of individuals employed may also be industries that offer workers less in terms of remuneration. In many cases, it appears to be better for an individual’s wages to stay with a declining employer if one has the opportunity to do so. If one must make a transition, it appears that transitioning to primary employment in another (or the same) declining industry is a better move than attempting to transition to a growing industry, where wage prospects appear to be relatively poorer.

However, if we examine the hourly rates, we see that per hour earnings among declining-to-growing transitioning workers did actually increase over the period under consideration. Average hourly wages for declining-to-growing transitioning workers were \$19.76 in 2014 and rose to \$20.54 in 2015, an increase of \$0.78 per hour. This may suggest that declining-to-growing transitioning workers secured jobs in growing industries that offered slightly higher wages but fewer hours than their prior (declining) primary job. In any case, it appears that such transitions do not benefit the worker. Workers who make declining-to-growing transitions appear to experience lower earnings relative to non-transitioning workers, as well as declining-to-declining and declining-to-self transitioning workers.

Disaggregating declining-to-growing transitioning workers by origin (declining) industry suggests that the average decline in earnings associated with a declining-to-growing transition is driven, at least in part, by relatively large negative wage trajectories in a subset of declining industries. Exactly half of the twenty-eight declining industries in this study had lower average wages in 2015 than 2014. On average, declining-to-growing transitioning workers in the remaining 14 declining industries experienced positive earnings growth. For instance, workers in the accounting services and skilled nursing industries who transitioned into primary employment in a growing industry saw their quarterly earnings increase by an average of \$908 and \$1,553, respectively. On the other hand, workers who transitioned out of primary employment in the aerospace, national security, or sawmill industries experienced, on average, a rather drastic decrease in earnings. In the aggregate, when all declining-to-growing transitioning workers are considered, average earnings decreased from 2014 to 2015. Full results (combined and broken down by industry group) for declining-to-growing transitioning workers are presented in *Figure 22*.

Figure 22: Declining-to-growing wage flows

Washington state, 2014 and 2015

Source: Employment Security Department/WITS, Next Generation Tax System (NGTS)

Flows to growing	Total quarterly earnings (2014)	Total quarterly earnings (2015)	Total earnings change	Per hour (2014)	Per hour (2015)	Per hour change	Count
Pooled	\$9,189.68	\$9,022.52	\$-167.16	\$19.76	\$20.54	\$0.78	14,999
Broken down by industry group							
Logging	\$7,139.96	\$6,693.27	\$-446.69	\$20.65	\$17.43	\$-3.22	134
Fishing	\$10,475.99	\$5,714.75	\$-4,761.24	\$18.02	\$16.18	\$-1.84	97
Fruit and veg. preserving and specialty food	\$4,921.51	\$4,774.40	\$-147.11	\$12.58	\$12.72	\$0.14	1,030
Seafood product preparation and packaging	\$6,757.73	\$5,819.99	\$-937.74	\$13.61	\$14.53	\$0.92	560
Bakeries and tortilla manufacturing	\$4,411.89	\$5,422.05	\$1,010.16	\$12.76	\$14.66	\$1.90	679
Cut and sew apparel manufacturing	\$9,074.65	\$8,253.18	\$-821.47	\$21.30	\$21.14	\$-0.16	60
Sawmills and wood preservation	\$10,271.98	\$7,888.11	\$-2,383.87	\$20.69	\$18.78	\$-1.91	272
Veneer, plywood, and engineered wood	\$7,633.17	\$6,315.57	\$-1,317.6	\$15.59	\$15.13	\$-0.46	161
Other wood product manufacturing	\$5,640.18	\$5,286.12	\$-354.06	\$13.07	\$13.97	\$0.90	286
Pulp, paper, and paperboard mills	\$12,473.10	\$8,589.37	\$-3,883.73	\$24.15	\$22.38	\$-1.77	128
Printing and related support activities	\$10,612.21	\$11,403.58	\$791.37	\$20.13	\$21.34	\$1.21	489
Alumina and aluminum prod. and processing	\$14,259.29	\$8,732.88	\$-5,526.41	\$28.66	\$18.82	\$-9.84	42
Industrial machinery manufacturing	\$11,612.62	\$11,716.95	\$104.33	\$22.80	\$23.44	\$0.64	91
Computer and peripheral equipment	\$26,266.34	\$27,691.80	\$1,425.46	\$49.50	\$53.12	\$3.62	172
Nav., meas., electro-med., & control inst. mfg.	\$20,327.70	\$20,979.47	\$651.77	\$37.81	\$40.93	\$3.12	361
Aerospace product and parts manufacturing	\$18,706.03	\$14,445.00	\$-4,261.03	\$36.26	\$31.50	\$-4.76	1,207
Gasoline stations	\$3,807.37	\$4,641.55	\$834.18	\$10.65	\$12.85	\$2.20	1,401
Book stores and news dealers	\$2,815.22	\$5,726.43	\$2,911.21	\$11.02	\$15.97	\$4.95	250
Florists	\$2,490.69	\$4,181.91	\$1,691.22	\$11.16	\$14.58	\$3.42	95
Scheduled air transportation	\$10,838.32	\$11,117.96	\$279.64	\$24.11	\$24.93	\$0.82	163
Newspaper, periodical, book, and directory	\$10,050.43	\$11,315.36	\$1,264.93	\$22.14	\$24.49	\$2.35	422
Consumer goods rental	\$6,104.33	\$6,899.75	\$795.42	\$14.39	\$16.51	\$2.12	246
Account, tax prep., bookkeeping, and payroll	\$9,228.69	\$10,136.98	\$908.29	\$22.17	\$23.20	\$1.03	1,437
Remediation and other waste management	\$13,107.84	\$12,945.92	\$-161.92	\$26.75	\$26.63	\$-0.12	450
Nursing care facilities (skilled nursing fac.)	\$7,651.56	\$9,204.68	\$1,553.12	\$17.28	\$20.10	\$2.82	3,351
Performing arts companies	\$4,807.76	\$6,205.58	\$1,397.82	\$20.64	\$19.73	\$-0.91	253
Admin. of environmental quality programs	\$8,336.22	\$7,735.46	\$-600.76	\$18.18	\$19.24	\$1.06	260
National security and international affairs	\$14,445.62	\$8,363.58	\$-6,082.04	\$22.39	\$19.50	\$-2.89	902

While average total earnings decreased between 2014 and 2015 for declining to growing transitions, per hour wages increased, suggesting that individuals may have transitioned to jobs with higher wages but fewer available hours. Industries are presented here according to their order in NAICS.

Declining-to-other flows

A look at the aggregate wage flows for declining-to-other transitions reveals average quarterly earnings of nearly \$9,600 in 2014 and about \$9,250 in 2015. This represents an average decline of about \$320 during the two-year period. It appears that individuals who transitioned from a declining industry into an “other industry” a) earned substantially less than individuals who did not make an employment transition, and b) experienced an earnings loss after transitioning. In other words, the data suggest that individuals making a declining-to-other transition are not only disadvantaged in terms of earnings relative to immobile workers, but that their disadvantage actually becomes more acute post-transition. Indeed, declining-to-other transitioning workers appear to be the most disadvantaged group of transitioning workers. If we look at the per hour earnings among such transitioning workers, we see that wages in 2014 were approximately \$19.74 and declined to \$19.69. Thus declining-to-other transitioning workers do not even enjoy the per hour increase in earnings experienced by declining-to-growing transitioning workers. Declining-to-other transitioning workers, on average, had decreased wages regardless of how it is measured, at least among individuals making such a transition between 2014 and 2015. If the core-periphery model proposed above is an accurate description of labor market transitions, it would appear that declining-to-other transitioning workers represent the most marginalized group of workers who were employed in a declining industry in 2014. That is, declining industries have two groups of workers – those who are experienced and those who are less experienced. The less experienced tend to earn lower wages and move out of the declining industry at a higher rate. Experienced workers who stay create the stable core of a declining industry.

Breaking down the data by origin (declining) industry reveals similar patterns in wage changes as observed for declining-to-growing transitions. In particular, declining-to-other transitioning workers originating in the fishing, aluminum production, aerospace, and national security industries appear to have experienced a decrease in average quarterly earnings whereas those originating in the bookstores, florists, consumer goods rental, and wood product manufacturing industries appear to have experienced earnings growth. In the aggregate, however, those with decreased earnings overwhelmed the increased earnings experienced by others. Full results (combined and broken down by industry group) for declining-to-other transitioning workers are presented in *Figure 23*.

Figure 23: Declining-to-other wage flows
 Washington state, 2014 and 2015
 Source: Employment Security Department/WITS, Next Generation Tax System (NGTS)

Flows to other	Average quarterly earnings (2014)	Average quarterly earnings (2015)	Total earnings change	Per hour (2014)	Per hour (2015)	Per hour change	Count
Pooled	\$9,585.47	\$9,269.98	\$-315.49	\$19.74	\$19.69	\$-0.05	16,283
Broken down by industry group							
Logging	\$9,419.00	\$10,640.14	\$1,221.14	\$22.75	\$22.88	\$0.13	339
Fishing	\$12,482.64	\$9,120.47	\$-3,362.17	\$19.80	\$20.34	\$0.54	155
Fruit and veg. preserving and specialty food	\$6,225.98	\$6,686.51	\$460.53	\$14.28	\$14.50	\$0.22	958
Seafood product preparation and packaging	\$8,137.07	\$7,904.89	\$-232.18	\$15.54	\$16.94	\$1.40	709
Bakeries and tortilla manufacturing	\$5,255.83	\$5,973.05	\$717.22	\$13.70	\$15.01	\$1.31	688
Cut and sew apparel manufacturing	\$7,591.62	\$7,996.56	\$404.94	\$17.56	\$17.64	\$0.08	99
Sawmills and wood preservation	\$10,749.03	\$10,338.47	\$-410.56	\$20.78	\$21.05	\$0.27	471
Veneer, plywood and engineered wood	\$8,142.23	\$8,904.55	\$762.32	\$15.59	\$17.79	\$2.20	271
Other wood product manufacturing	\$6,668.85	\$8,093.55	\$1,424.7	\$14.12	\$16.66	\$2.54	517
Pulp, paper and paperboard mills	\$17,179.96	\$16,446.84	\$-733.12	\$29.41	\$26.28	\$-3.13	432
Printing and related support activities	\$7,719.24	\$8,254.09	\$534.85	\$16.68	\$17.94	\$1.26	444
Alumina and aluminum prod. and processing	\$14,540.23	\$9,603.02	\$-4,937.21	\$33.53	\$20.40	\$-13.13	62
Industrial machinery manufacturing	\$10,480.96	\$11,716.07	\$1,235.11	\$19.62	\$22.34	\$2.72	181
Computer and peripheral equipment	\$22,312.83	\$20,698.02	\$-1,614.81	\$42.40	\$41.04	\$-1.36	85
Nav., meas., electro-med., & control inst. mfg.	\$19,211.31	\$18,747.93	\$-463.38	\$35.31	\$35.68	\$0.37	331
Aerospace product and parts manufacturing	\$15,347.23	\$12,246.69	\$-3,100.54	\$29.92	\$24.50	\$-5.42	1,388
Gasoline stations	\$4,243.03	\$5,572.37	\$1,329.34	\$10.86	\$13.02	\$2.16	1,877
Book stores and news dealers	\$3,694.68	\$5,638.75	\$1,944.07	\$11.72	\$14.02	\$2.30	268
Florists	\$2,983.25	\$4,726.39	\$1,743.14	\$11.40	\$13.21	\$1.81	143
Scheduled air transportation	\$10,866.70	\$10,360.43	\$-506.27	\$23.45	\$21.94	\$-1.51	191
Newspaper, periodical, book and directory	\$11,000.82	\$11,504.10	\$503.28	\$22.80	\$24.18	\$1.38	571
Consumer goods rental	\$6,446.58	\$7,860.59	\$1,414.01	\$15.02	\$17.72	\$2.70	391
Account, tax prep., bookkeeping, and payroll	\$9,009.36	\$10,190.14	\$1,180.78	\$21.89	\$22.72	\$0.83	1,377
Remediation and other waste mgmt. svcs.	\$15,022.87	\$15,562.12	\$539.25	\$28.95	\$29.43	\$0.48	955
Nursing care facilities (skilled nursing facs.)	\$7,098.89	\$7,972.24	\$873.35	\$16.46	\$17.66	\$1.20	1,422
Performing arts companies	\$4,257.73	\$5,378.77	\$1,121.04	\$20.87	\$18.14	\$-2.73	271
Admin. of environmental quality programs	\$9,947.68	\$9,467.22	\$-480.46	\$19.19	\$20.43	\$1.24	266
National security and international affairs	\$14,105.62	\$7,535.83	\$-6,569.79	\$21.33	\$17.38	\$-3.95	1,421

Individuals who transition from declining to other experience the most disadvantage, enjoying neither an increase in total wages nor an increase in per hour wages on average. Industries are presented here according to their order in NAICS.

Conclusion

Most people experience several employment transitions over their working careers. While an employment transition is an extremely common occurrence, our knowledge of such transitions and the potential effects on transitioning workers, is incomplete. In this study, some of these shortcomings are addressed. In particular, this study focused on transitions occurring within the context of growing and declining industries. Growing industries need additional workers. Where do these workers come from? Declining industries employ fewer individuals than was once the case – where do workers who leave declining industries go? Finally, this study sets out to measure how much a worker benefits from leaving a declining industry. Are workers who transition out of a declining industry better off because of their transition, or do such transitions tend to be associated with a decrease in earnings?

In order to answer these questions, this study relies upon unemployment insurance records collected by the Washington State Employment Security Department. These data record quarterly employment and earnings information for nearly all workers in Washington state. This comprehensive dataset allows one to track individual employment histories (as well as earnings trajectories) over time. In order to make this an easier problem to solve, the analysis was limited to an examination of transitions occurring between 2014 and 2015. In addition, this study uses unemployment insurance (NGTS) records to examine job-to-job transitions, patterns of cross-state migration (WRIS2) as well as flows into and out of Washington state colleges and universities (ERDC).

Most workers who were employed in growing and declining industries between 2014 and 2015 did not experience an employment transition. Indeed, only 24.3 percent of workers employed in a declining industry in 2014, and 35.1 percent of individuals employed in a growing industry in 2015, experienced such a transition. While most workers remained with their primary employer over the entire period under consideration, a significant number did experience a change in their employment situation. This study contributes to our understanding of labor market dynamics by examining the details undergirding these transitions.

Among transitioning workers, the most common destination for those leaving employment in a declining industry and the most common origin for those taking up employment in a growing industry, was a change in labor force participation status (those entering or exiting the labor force). A variety of those leaving primary employment in a declining industry in 2014 exited the labor force altogether in 2015. Similarly, many individuals entering employment in a growing industry in 2015 were not in the labor force in 2014. Beyond this similarity, there are a number of differences in the dynamics of employment transitions across growing and declining industries. For instance, outflows from declining industries tend to be proportional to industry size, larger declining industries experience greater volumes of outflow. However, inflow into growing industries do not always correspond with overall industry size. Certain growing industries (employment services, fruit and tree nut farming, individual family services) are characterized by disproportionately high rates of inflow relative to their overall representation in the Washington state economy. On the other hand, other growing industries, which represent a larger overall share of statewide employment, have less in- and out-flows. Specifically, the general medical and surgical hospitals and the elementary and secondary schools industries tend to experience low levels of inflow relative to their overall presence in the economy. This suggests that certain growing industries tend to be more likely to retain workers year after year, whereas other growing industries are more characterized by worker churn. Further, the direction of worker transitions appears to be thoroughly one-sided. A far greater number of flows originate from, and terminate in, growing industries than in declining industries. This holds true

even among workers whose primary employer in 2014 was in a declining industry. Indeed, workers who transitioned out of employment in a declining industry were substantially more likely to transition to employment in a growing industry than in a declining industry. Nevertheless, inflows into growing industries originating from declining industries appear to be relatively rare, most individuals who took up employment in a growing industry (who are not labor force entrants) arrived via employment in another growing industry.

In addition to exploring the dynamics of employment transitions, this study also examined earnings flows among those employed in a declining industry in 2014. Immobile workers in declining industries tended to earn more than workers who transitioned to another primary employer. On average, wages among immobile workers grew by \$1.25 per hour over the period. While immobile workers as a group had higher earnings relative to workers who made a transition, this advantage was not shared evenly across all declining industries. Some immobile workers appeared to have benefited more than others, in particular, immobile workers in the scheduled air transportation industry, on average, saw their earnings increase rather dramatically.

On the other hand, earnings were significantly lower among workers in declining industries who transitioned to a different primary employer. This difference appears to hold even prior to transition. Lower pre-transition earnings among workers who exited primary employment in a declining industry suggests such workers were either lower skilled or had accumulated less work experience relative to their immobile counterparts. This dynamic also suggests the presence of a core-periphery model of employment in declining industries. A core group of more skilled and older workers may remain with their primary employer year after year, whereas a more marginally attached group of less skilled and younger workers may float from job to job, year after year. These findings only suggest these conclusions, future research is needed to explore whether a core-periphery model actually represents the employment relations in declining industries.

These results suggest that transitioning workers out of employment in declining industries were acting rationally. Indeed, 2015 earnings were actually higher than 2014 earnings among declining-to-declining and declining-to-self transitioning workers. This suggests that workers who made such transitions were seeking (and finding) better opportunities in declining industries but these opportunities were not sufficient to make up for their lower earnings relative to immobile workers. However, declining-to-growing and declining-to-other transitioning workers actually appeared to be harmed by their transition. Earnings decreased for both groups of transitioning workers, particularly declining-to-other transitioning workers. One possible interpretation is that declining industries tended to house better paying jobs relative to growing industries. Indeed, while wages among workers in growing industries were not a focus in this study, it does appear that wages in declining industries tended to be, on average, higher than wages in growing industries. Average quarterly earnings among immobile workers in growing industries were roughly \$14,289 in 2014 and \$14,926 in 2015. These average earnings were approximately \$5,000 lower relative to their immobile counterparts in declining industries. Hence, individuals who left declining industries for employment in growing or “other” industries may not be pursuing better opportunities as much as they are making such transitions out of necessity. This is particularly troubling in light of the finding that declining-to-growing transitions were far more common than declining-to-declining transitions.

Appendix I: Local-level mapping using text analytics with the WRIS2 data

This analysis estimated total inflow into growing industries due to in-migration, as well as total outflow from declining industries due to out-migration. However, it was limited to the state level in determining the origin or destination of migration into, and out of, Washington state. In other words, it could estimate how many individuals migrated to Washington in 2015 from another state but is unable to determine precisely *where* in that other state these migrants originated.

This appendix contains a pair of maps to better visualize these local-level patterns of migration across state lines.

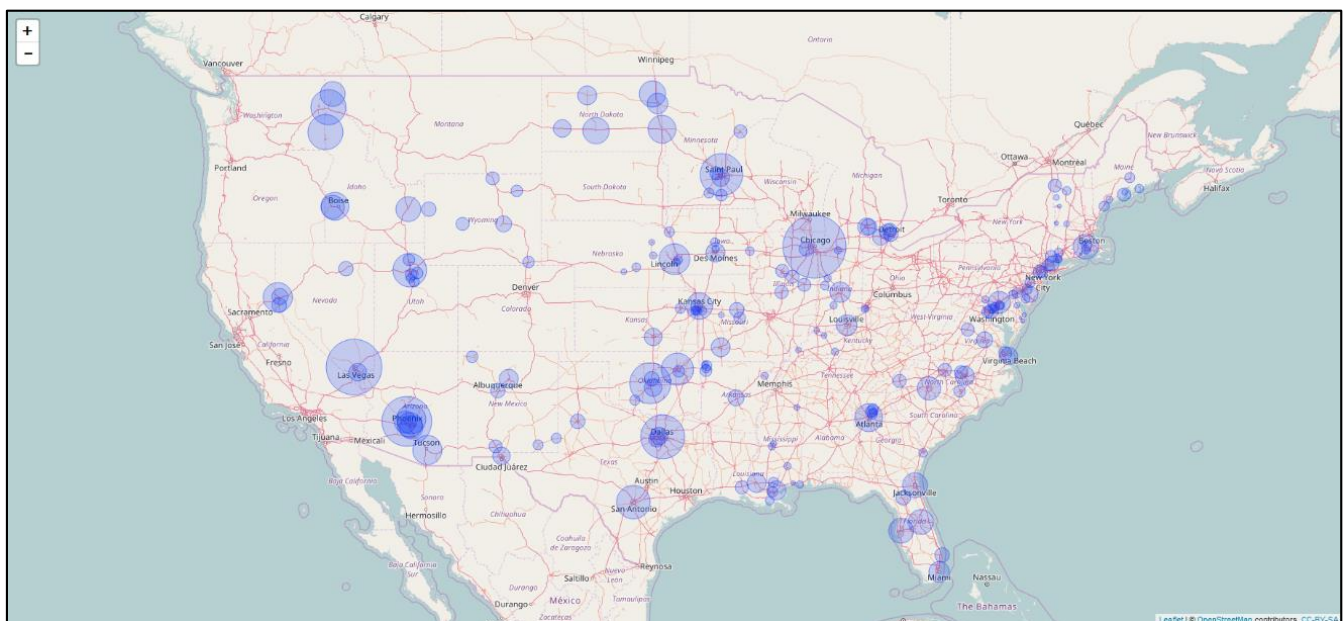
The analysis uses three sources of data to achieve these aims:

1. Matched NGTS wage-employer data for the years 2014 and 2015 (see pages 3-6).
2. WRIS2 data for the years 2014 and 2015 (see pages 6-7).
3. Geospatial data derived from the 2015 U.S. Census gazetteer.

Descriptions of the NGTS and WRIS2 data sources are provided in the main text. The U.S. Census gazetteer includes information on the latitude and longitude for every United States Postal Service designated “place” (e.g., town, city, village, etc.) in the United States (including Puerto Rico). The gazetteer serves as a comprehensive list of all localities in the United States, as well as providing the precise coordinates marking the geographic location for each locality. The Census gazetteer matches place names in the WRIS2 data and provide coordinates for mapping purposes.

Appendix figure A1-1: Estimated origin locales of in-migrants to Washington state United States, 2014 through 2015

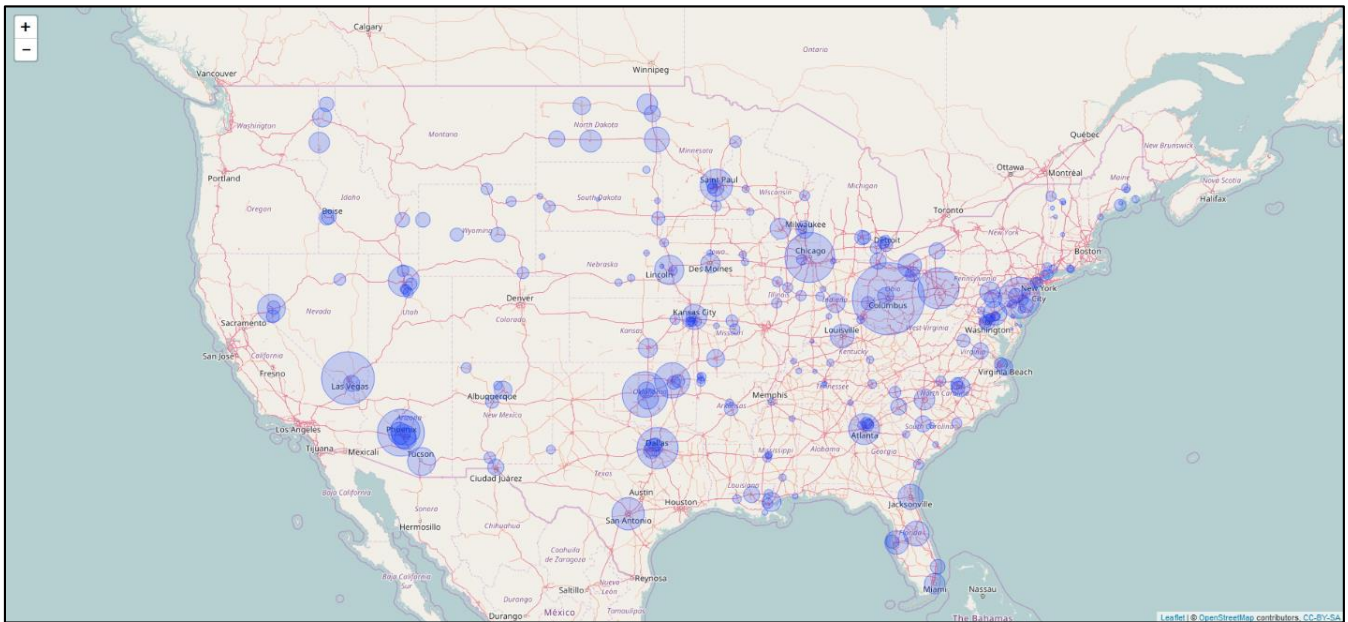
Source: U.S. Department of Labor, Wage Record Interchange System 2; Employment Security Department/WITS, Next Generation Tax System (NGTS); 2015 U.S. Census Gazetteer



The Wage Record Interchange System 2 (WRIS2) data allows us to map the origins of those individuals who relocated to Washington state between 2014 and 2015.

Appendix figure A1-2: Estimated destination locales of out-migrants from Washington state
United States, 2014 through 2015

Source: U.S. Department of Labor, Wage Record Interchange System 2; Employment Security Department/WITS, Next Generation Tax System (NGTS); 2015 U.S. Census Gazetteer



To determine patterns of employment transition, we must first examine patterns of relocation by those moving away from Washington state.