

ONLINE APPENDIX
**WORKER REALLOCATION ACROSS OCCUPATIONS:
CONFRONTING DATA WITH THEORY**

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Section A of this online appendix describes our sample dispositions and their impact on the measurement of reallocation across occupations. Section B compares the main time series of the article with similar measures based on the Panel Study of Income Dynamics. Section C analyzes worker reallocation when the time series are computed using a longer time horizon. Section D provides additional details on the main variables and the occupational data used in the analysis.

A. SAMPLE DISPOSITIONS AND SENSITIVITY ANALYSIS

A.1. Sample Dispositions. We impose three consecutive restrictions to construct our sample. To understand these restrictions, it is important to recall that detailed employment and earnings information in the March CPS refers to the year prior to the survey. Accordingly, the occupational affiliation we focus on is that of the previous year. The March CPS also asks respondents about their occupation of employment in March of the current year. We use this information to run certain cross checks mentioned in Appendix B of the paper.

The first set of restriction circumscribes the sample to civilians of working age with a job in the year prior to the survey. We exclude: (i) individuals who are not employed in the previous year, (ii) employed individuals whose annual hours worked are either below 520 (10 hours a week) or above 5096 (98 hours a week), (iii) individuals with non-positive labor earnings or with a wage twice lower than the nominal minimum hourly wage. Since usual weekly hours worked are not available prior to 1976, restriction (ii) is not applicable before that date.

The second set of restrictions consists in removing individuals who are either self-employed, employed in a family business or working for the government. This choice is motivated by the observation that, in the model, wages play a signaling role which is likely less relevant to understand mobility in, say, the public sector. Loosely speaking, the purpose of this second set of restrictions is to make data more conformable to the model.

The third sample restriction is only apparent in Section 5 of the paper. That is, when we organize the wage data as a panel of occupations, we keep only those occupations with valid wage information over the whole sample period to obtain a perfectly balanced panel. We will show below that this restriction is immaterial for selection on observables. In addition, we have verified that this restriction also has no impact on the measurement of reallocation across occupations or industries.

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Table A1. Sample restrictions: Summary statistics

	Men				Women			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Number of observations								
Total	2,075,378	1,775,201	1,486,036	1,065,655	1,729,208	1,428,748	1,125,755	860,093
Average per year	44,157	37,770	31,618	25,992	36,792	30,399	23,952	20,978
Age	37.46	37.81	37.24	37.22	37.29	37.87	37.15	37.21
<i>Race (%)</i>								
White	85.53	86.09	86.39	85.51	82.47	82.63	83.20	82.56
Black	9.88	9.46	9.08	9.36	12.66	12.61	11.85	12.00
Other	4.59	4.45	4.53	5.13	4.87	4.76	4.95	5.44
<i>Education (%)</i>								
Less than high-school	17.43	16.33	17.20	14.88	12.77	11.09	12.43	9.98
High school graduate	37.28	37.32	38.60	38.53	39.40	39.64	42.19	41.68
Some college	20.46	20.43	20.58	21.14	23.06	23.07	24.05	25.64
College or higher education	24.83	25.92	23.61	25.45	24.76	26.19	21.33	22.70
Annual Hours Worked ^(a)	1,975	2,108	2,105	2,090	1,653	1,864	1,853	1,838
Annual Wage and Salary Income (in 2000 U.S. \$) ^(b)	33,951	39,221	39,710	39,528	20,953	24,871	24,157	24,653

^(a) Annual hours worked refer to the usual number of hours worked during the previous year (see Section D). The variable is available for the years 1976 onwards.

^(b) Wage and salary income are adjusted for top-coding for the years 1971 to 1987. See Section D for details.

NOTES: For both men and women, columns (1)–(4) display summary statistics for:

Column (1): Civilians of working age, with or without a job

Column (2): Same as column (1) after applying the 1st sample restriction

Column (3): Same as column (2) after applying the 2nd sample restriction

Column (4): Same as column (3) after applying the 3rd sample restriction

Sample Characteristics. Table A1 presents a set of statistics illustrating the effects of each sample restriction. In the two columns labeled (1), we report statistics for the whole population of civilians of working age irrespective of their employment situation during the reference period. Moving on to columns (2), (3), (4), we tabulate the same statistics after applying successively the sample restrictions described above. The first two rows show that each sample restriction implies dropping about the same number of observations. We notice little changes in the observable characteristics of the sample in columns (2) to (4). Finally, after applying the three sets of restrictions, the sample remains very large: the average yearly cross section contains 46,970 observations.

A.2. Sensitivity to Sample Restrictions. The charts in Figure A1 display net reallocation rates at the 3-digit of the occupational classification obtained under various sample restrictions. In the upper charts, we extend the sample to include workers who are either self-employed, employed in a family business or working for the government (this corresponds to the columns labeled (2) in Table A1). In the middle charts, on the other hand, we use a more selected sample: we report net reallocation rates computed using male employment only. The lower charts are also based on a smaller sample: that sample includes only employed individuals aged 25 to 54.

(A) EMPLOYMENT

(B) HOURS

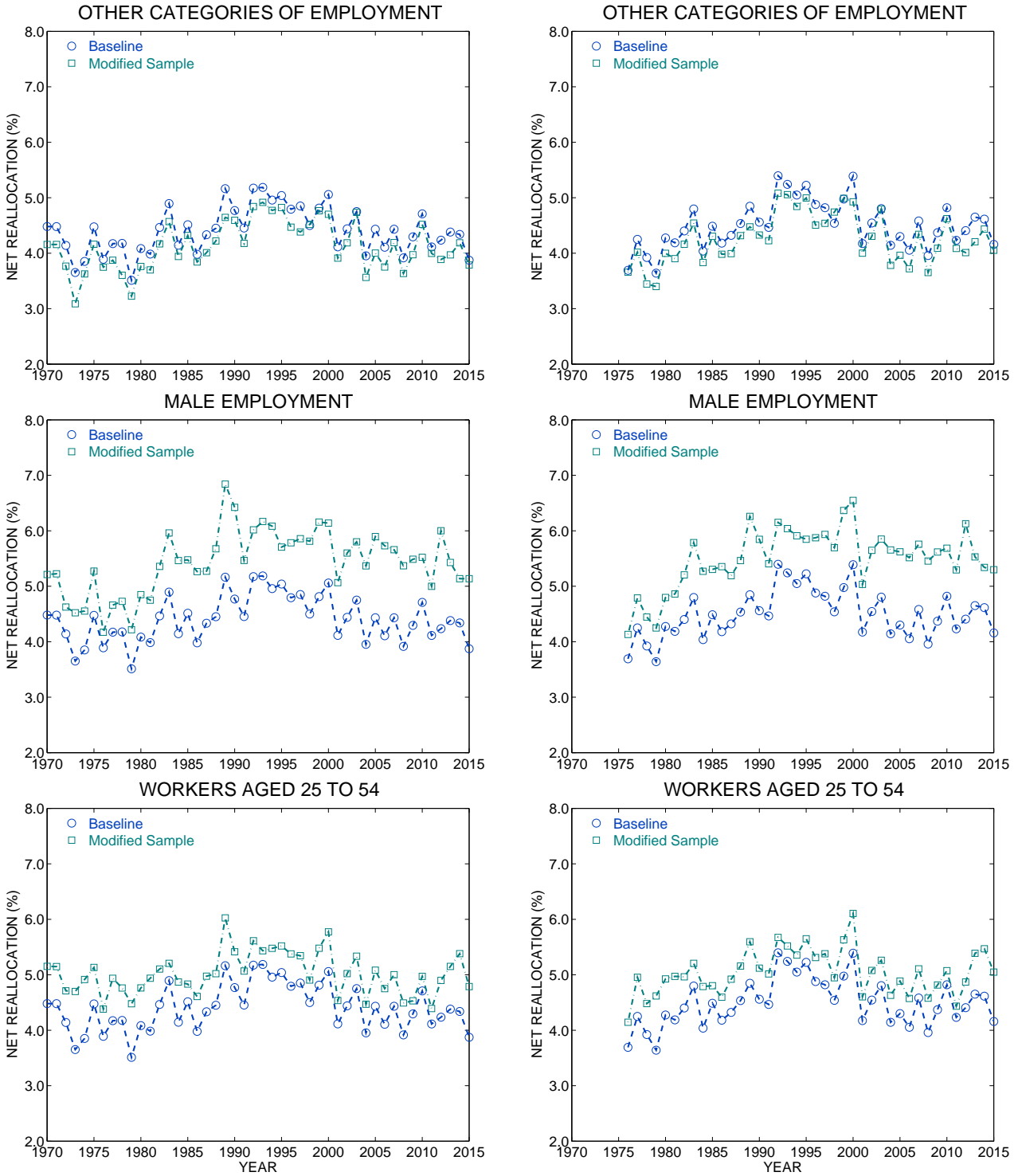


Figure A1. Net reallocation across occupations: Different sample restrictions

The different charts display net reallocation rates at the 3-digit level of the occupational classification. The left (A) and right (B) charts are based on employment-weighted and hours-weighted statistics, respectively. Circles correspond to the benchmark time series reproduced from the lower chart of Figure 1 in the paper. Squares correspond to the same time series computed using a different sample. In the upper charts, the sample includes the self-employed, workers employed in a family business and government workers. In the middle charts, the sample is restricted to male workers. In the lower charts, the sample is restricted to workers aged 25 to 54.

(A) EMPLOYMENT

(B) HOURS

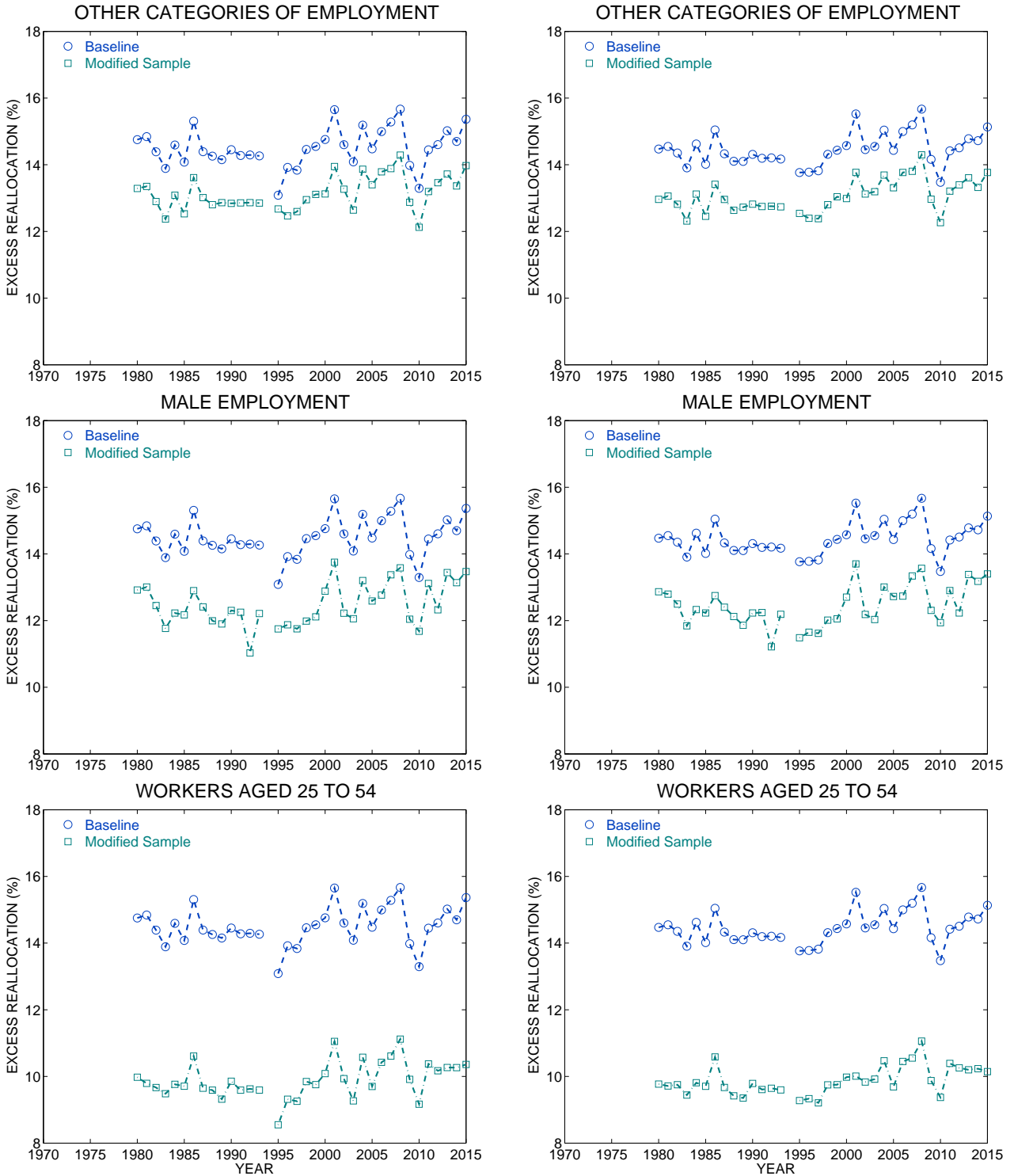


Figure A2. Excess reallocation across occupations: Different sample restrictions
 The different charts display net reallocation rates at the 3-digit level of the occupational classification. The left (A) and right (B) charts are based on employment-weighted and hours-weighted statistics, respectively. Circles correspond to the benchmark time series reproduced from the lower chart of Figure 2 in the paper. Squares correspond to the same time series computed using a different sample. In the upper charts, the sample includes the self-employed, workers employed in a family business and government workers. In the middle charts, the sample is restricted to male workers. In the lower charts, the sample is restricted to workers aged 25 to 54.

As evidenced in the upper graphs of Figure A1, including more categories of employment has little impact on net reallocation rates. The middle and lower charts, on the other hand, show that a smaller sample increases the levels of net reallocation. Indeed, there is more volatility in occupational employment shares when they are computed using fewer observations, which is picked up by net reallocation rates. This said, we note that these sample restrictions are not driving the trends observed in the different subperiods of the 1976-2015 window. For this reason, in Section 2 of the paper, we argue that shifts in occupational shares reflect actual reallocation across occupations rather than changes in labor force participation or entries to/exits from the labor market.

Similar to Figure A1, Figure A2 shows the rates of excess reallocation obtained using different sample restrictions. The upper charts illustrate that measured mobility rates are lower when employment includes the self-employed, family workers and government workers, which results in lower excess reallocation. In the middle charts, the difference with the baseline figures is, to a large extent, due to the more elevated levels of net reallocation in the male sample (cf. Figure A1). The lower charts, on the other hand, show that excess worker reallocation is substantially lower when younger workers are excluded from the sample. Again, these graphs show that the time trends (or, as the case may be, the absence of a trend) analyzed in the paper are not driven by sample restrictions.

A.3. Data and Sample for Excess Reallocation. As explained in Appendix B of the paper, in order to construct the time series of excess worker reallocation, we use two additional sources of data: the monthly files of the Merged Outgoing Rotation Group (MORG) and the biennial Job Tenure and Occupational Mobility supplements of the Current Population Survey.

When using the MORG files, we adopt similar sample dispositions as those described in Subsection A.1. These files do not contain information about the number of weeks worked during the previous year. Therefore for sample restriction (ii), we keep individuals whose usual weekly hours of paid work are between 10 and 98 hours. We employ the same approach to select observations from the Job Tenure and Occupational Mobility supplements of the CPS. Finally, in these data, the raw occupations and industries are coded using the evolving categories of the Census. We recode them using the time-invariant categories of the IPUMS-CPS project (see Section D).

B. COMPARISON WITH PSID DATA

We compare our estimates of net reallocation and excess reallocation to those based on the PSID data analyzed by Kambourov and Manovskii (2008). To maximize comparability, we use a slightly different sample which is more similar to those of the authors: we restrict the CPS sample to male heads of households aged 23 to 61 who are not self-employed or working for the government. There remain two differences with their PSID data: they exclude multiple jobholders and, more importantly, they use occupations based on the 1970 Census classification, whereas our data is based on the occupational classification provided by the IPUMS-CPS project.

Figure B1 reports the CPS-based and PSID-based estimates of net reallocation and excess reallocation. Beginning with the former (upper chart), we note that net reallocation rates are slightly higher in the PSID. This may be due to the difference in the number of occupational categories and/or the

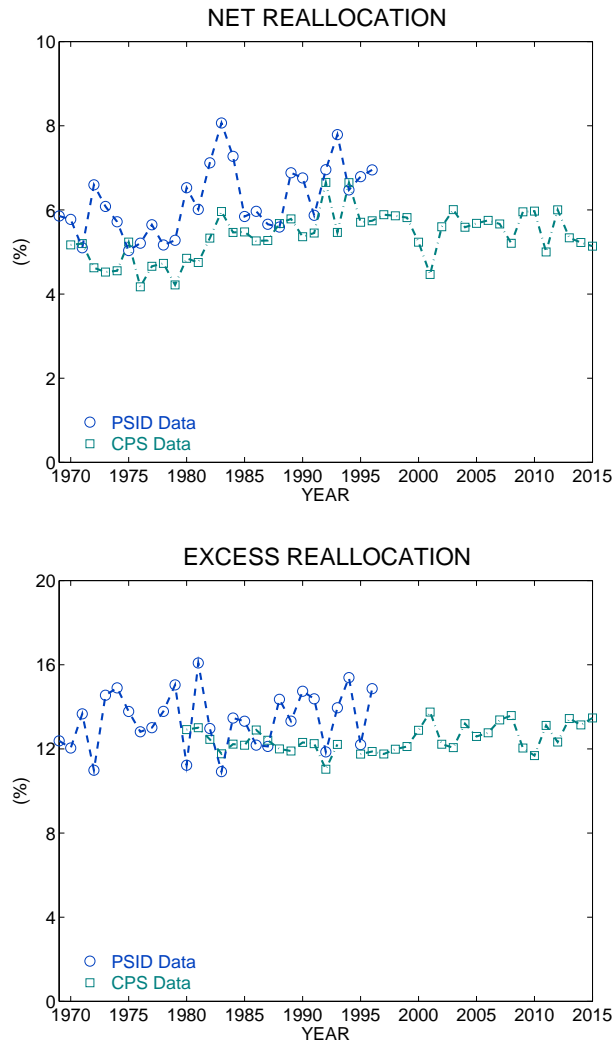


Figure B1. Worker reallocation across occupations: PSID data and CPS data

The upper and lower charts display respectively net reallocation and excess reallocation rates at the 3-digit level of the occupational classification. Circles correspond to data from the PSID, which are based on the 1970 Census classification. Squares correspond to data from the CPS.

smaller size of the PSID sample, which increases the variability of measured occupational employment shares. It is noticeable that, despite the difference in levels, both the CPS and the PSID indicate an increase in net reallocation during the 1980s. In the CPS sample used in this plot, we find that the time series then plateaus until the end of the period, whereas net reallocation in our baseline sample decreases during the 1990s before stabilizing. The lower chart of Figure B1 reveals a slight difference in the levels and volatility of excess reallocation in the PSID and the CPS. Meanwhile, both datasets indicate that this measurement of worker reallocation is stable in the long run.

In our view, the two plots of Figure B1 show a great deal of consistency between the estimates based on the CPS and the PSID data. This does not contradict the main message of Kambourov and Manovskii (2013). As explained in Appendix B of the paper, their discussion concerns gross mobility across occupations. Accordingly, to construct gross flow rates, we do need to combine different sources of data to overcome the shortcomings of the March CPS which the authors highlighted.

C. REALLOCATION OVER A LONGER TIME HORIZON

To gain insights into the reallocation process that drives the time series displayed in Figure 1 of the paper, in Figure C1 we report net reallocation rates computed over a longer time frame – that is, $1/2 \sum_o |\pi_{o,t} - \pi_{o,t-j}|$ where $j \geq 1$ is the time lag. This exercise is motivated by the following observations. If expanding and declining occupations are always the same from one year to the next, then net reallocation rates should be much higher when we compare occupational employment shares several years apart. At the other extreme, if the composition of occupations is constant over time and if all occupations are randomly losing or gaining workers every year, then the time frame should not affect the measurement of net reallocation.

The first salient pattern is that, quite reassuringly, the time frame used in the measurement affects the levels of net reallocation. Over the period considered, there have been major changes in the occupational structure of the U.S. labor market. One telling (and abundantly documented) instance is the decline of jobs involving routine tasks relative to those requiring non-routine cognitive and non-routine manual skills (Autor, Levy and Murnane, 2003). Another phenomenon related to these trends is the disappearance of “old jobs” (Autor and Dorn, 2009). These changes have become known as the “polarization” of the labor market, alluding to the fact that middle-wage occupations are more intensive in routine tasks whereas occupations at both tails of the wage distribution involve more non-routine tasks but differ in their cognitive/manual requirements (Autor, Levy and Murnane, 2003; Autor, Katz and Kearney, 2006). Labor market polarization affects broad occupational categories, and is likely to be picked up by the difference between 1-year reallocation rates and the reallocation rates that are computed over a longer time horizon.

This said, we notice that net reallocation rates are not increasing in proportion to the length of the time window. At the 3-digit level lengthening the time window to 3 years raises measured reallocation rates to 5.9 percent on average, and to 7.2 percent when the time window is 5 years. Thus, although some occupations are expanding and others are declining in the long run, these changes take time to materialize because they are the product of many small short-run changes in occupational employment shares.¹ Over a period of a decade, on the other hand, we observe a large number of occupations whose employment shares are changing yearly. Notice that in Section 5 of the paper, we analyze net reallocation decade by decade, hence effectively treating the overall occupation structure of the labor market as constant in each subperiod.

The second remarks on Figure C1 concern the evolution of the different time series. First, the time trends (or, as the case may be, the absence of a trend) apparent in Figure 1 are also present in the series computed over a longer time frame. Second, as in Figure 1 in the paper, we find no evidence of a relationship between the displayed time series and the business cycle. This is noteworthy because changes in the occupational structure of the labor market (especially the disappearance of routine jobs) have been shown to be concentrated during recessions (Jaimovich and Siu, 2012).

¹A closer look at the employment shares of specific occupations illustrates this point well. For example, “Machine Operators, Assorted Materials” [OCC = 753 to 779] and “Freight, Stock, and Material Handlers” [OCC = 875 to 889] are shrinking over time, while “Cleaning and Building Service Occupations” [OCC = 448 to 455] and “Mathematical and Computer Scientists” [OCC = 64 to 68] are expanding. However, the overall time trend is accompanied by many short-run changes (upward and downward) in the employment shares of these occupations.

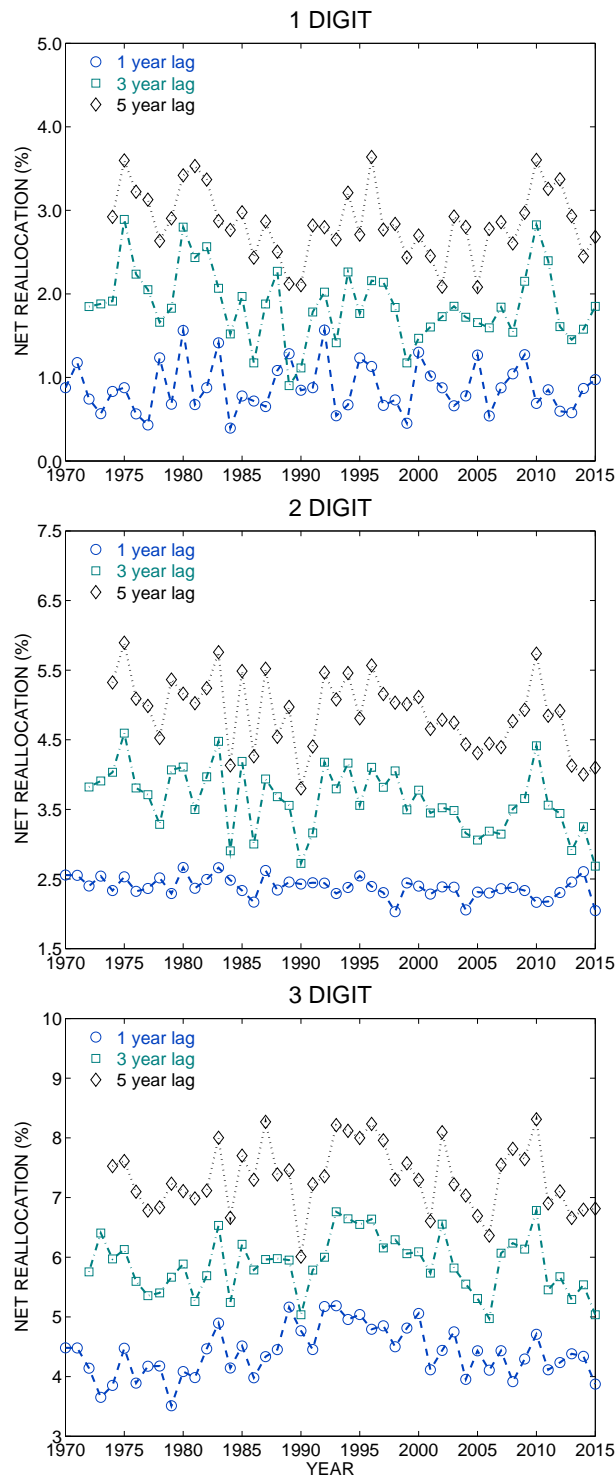


Figure C1. Net reallocation across occupations: A longer window of time
 The upper, middle and lower charts display, respectively, net reallocation rates at the 1-, 2- and 3-digit level of the occupational classification. Net reallocation rates are measured using the employment weights. Circles denote net reallocation over a window of 1 year (the baseline). Squares (resp. diamonds) denote net reallocation over a window of 3 (resp. 5) years.

D. ADDITIONAL DATA DETAILS

D.1. Variables Definitions.

Demographic variables: The demographic variables used in the wage regressions are age, marital status, race and education. Race categories are grouped to obtain three categories: “Whites”, “Blacks” and “others”. Educational levels are grouped into four categories: “less than high school”, “high school graduates”, “some college” and “college or higher education”.

Labor force status: We keep observations only for adult civilians in the labor force (POPSTAT = 1 and LABFORCE = 2) aged 15 to 64 in the year prior to the survey. We drop workers who were in military occupations in the previous year (OCC90LY = 905). Then we use the variable CLASSWLY to construct the different samples presented in Table A1.

Hours worked: To compute the annual number of hours worked in the previous year, we multiply the reported number of usual weekly hours (UHRSWORKLY) by the total number of weeks worked in the previous year (WKSWORK). Because UHRSWORKLY is available only for the years 1976 onwards, the analysis is restricted to those years when we use hours to compute reallocation rates and when we use data on hourly wages.

Wage and Salary Income: Wages and Salary income (INCWAGE) are top-coded in the CPS at \$50,000 for the 1971-1981 period, at \$75,000 for the 1982-1984 period and at \$99,999 for the 1985-1987 period. Since the benchmark specification is based on the average wage in each occupation, we adjust the data for top-coding. We use the following standard procedure:

- The underlying distribution of INCWAGE in the upper part of the wage and salary income distribution is assumed to be Pareto-distributed. We use the top decile of non-top-coded observations to fit a linear regression of the log of s_i against log-wages for each top-coded year, where s_i is the fraction of individuals in the top decile of non-top-coded observations with a wage higher than that of individual i .
- The results from this regression are used to forecast the mean wage of top-coded observations using $\beta_t/1+\beta_t$ times the top-coded wage, where β_t is the coefficient on the log of wages for year t . The adjustment factors we obtain for top-coded years are typically around 1.45.

D.2. Occupational Data. Developing a long-term consistent occupational classification is challenging because actual occupations are constantly evolving. These continuous changes are reflected by the periodical updates of the Census occupational categories: following decennial Censuses, some declining occupations are excluded, some existing ones are merged together while some others are broken out into finer categories, and finally some new ones are introduced into the classification.

The procedure followed by the IPUMS-CPS project (<http://www.ipums.umn.edu>) and the Bureau of Labor Statistics to construct consistent occupational classifications is as follows:

- First, occupational “crosswalks” are created using a series of technical papers issued by the Census Bureau. These papers explain in details how the occupational coding scheme for each census year differed from the scheme used during the previous census year. The cases that turn out to be “double coded” into the occupational schemes of the current and previous census year constitute the samples of occupational crosswalks.

- Using these occupational crosswalks, the proportion of each occupation is traced over time as the category breaks out into more specific occupations or when it is combined with others into a more general occupation. To take one example from the IPUMS documentation: of persons coded as “Gaming managers” in 2000 [OCC = 33 in 2000], 35% would have been coded as “Managers, service organizations” in 1990 [OCC = 21 in 1990], while 65% would have been coded as “Managers, food serving and lodging establishments” [OCC = 17 in 1990].
- After generating the same information for every occupational code in every Census year, occupational categories are then aggregated into a uniform classification. The aggregation procedure maximizes time consistency while keeping as many different categories as possible. The IPUMS-CPS project provides two such classifications: OCC1950 and OCC1990. We use the latter because it offers a higher level of disaggregation: 388 categories at the 3-digit level (387 in the text since we drop the armed forces category) vs. 259 in the OCC1950 scheme.

D.3. The OCC1990 Classification.

EXECUTIVE, ADMINISTRATIVE, AND MANAGERIAL OCCUPATIONS		Construction inspectors	035
Executive, Administrative, and Managerial Occupations		Inspectors and compliance officers, outside construction	036
Legislators	003	Management support occupations	037
Chief executives and public administrators	004	PROFESSIONAL SPECIALTY OCCUPATIONS	
Financial managers	007	Architects	
Human resources and labor relations managers	008	Architects	043
Managers and specialists in marketing, advertising, and public relations	013	Engineers	
Managers in education and related fields	014	Aerospace engineer	044
Managers of medicine and health occupations	015	Metallurgical and materials engineers, variously phrased	045
Postmasters and mail superintendents	016	Petroleum, mining, and geological engineers	047
Managers of food-serving and lodging establishments	017	Chemical engineers	048
Managers of properties and real estate	018	Civil engineers	053
Funeral directors	019	Electrical engineer	055
Managers of service organizations, n.e.c.	021	Industrial engineers	056
Managers and administrators, n.e.c.	022	Mechanical engineers	057
MANAGEMENT RELATED OCCUPATIONS		Not-elsewhere-classified engineers	059
Management Related Occupations		Mathematical and Computer Scientists	
Accountants and auditors	023	Computer systems analysts and computer scientists	064
Insurance underwriters	024	Operations and systems researchers and analysts	065
Other financial specialists	025	Actuaries	066
Management analysts	026	Statisticians	067
Personnel, HR, training, and labor relations specialists	027	Mathematicians and mathematical scientists	068
Purchasing agents and buyers, of farm products	028	Natural Scientists	
Buyers, wholesale and retail trade	029	Physicists and astronomers	069
Purchasing managers, agents and buyers, n.e.c.	033	Chemists	073
Business and promotion agents	034		

Atmospheric and space scientists	074	Primary school teachers	156
Geologists	075	Secondary school teachers	157
Physical scientists, n.e.c.	076	Special education teachers	158
Agricultural and food scientists	077	Teachers , n.e.c.	159
Biological scientists	078	Vocational and educational counselors	163
Foresters and conservation scientists	079	Librarians, Archivists, and Curators	
Medical scientists	083	Librarians	164
Health Diagnosing Occupations		Archivists and curators	165
Physicians	084	Social Scientists and Urban Planners	
Dentists	085	Economists, market researchers	166
Veterinarians	086	and survey researchers	
Optometrists	087	Psychologists	167
Podiatrists	088	Sociologists	168
Other health and therapy	089	Social scientists, n.e.c.	169
Health Assessment and Treating Occupations		Urban and regional planners	173
Registered nurses	095	Social, Recreation, and Religious Workers	
Pharmacists	096	Social workers	174
Dietitians and nutritionists	097	Recreation workers	175
Therapists		Clergy and religious workers	176
Respiratory therapists	098	Lawyers and Judges	
Occupational therapists	099	Lawyers	178
Physical therapists	103	Judges	179
Speech therapists	104	Writers, Artists, Entertainers, and Athletes	
Therapists, n.e.c.	105	Writers and authors	183
Physicians' assistants	106	Technical writers	184
Teachers, Postsecondary		Designers	185
Earth, environmental, and marine science instructors	113	Musician or composer	186
Biological science instructors	114	Actors, directors, producers	187
Chemistry instructors	115	Art makers: painters, sculptors, craft-artists and print-makers	188
Physics instructors	116	Photographers	189
Psychology instructors	118	Dancers	193
Economics instructors	119	Art/entertainment performers and related	194
History instructors	123	Editors and reporters	195
Sociology instructors	125	Announcers	198
Engineering instructors	127	Athletes, sports instructors, and officials	199
Math instructors	128	Professionals, n.e.c.	200
Education instructors	139		
Law instructors	145	TECHNICIANS AND RELATED SUPPORT OCCUPATIONS	
Theology instructors	147	Health Technologists and Technicians	
Home economics instructors	149	Clinical laboratory technologies and technicians	203
Humanities profs/instructors, college, n.e.c.	150	Dental hygienists	204
Subject instructors (HS/college)	154	Health record tech specialists	205
Teachers, Except Postsecondary		Radiologic tech specialists	206
Kindergarten and earlier school teachers	155	Licensed practical nurses	207

Health technologists and technicians, n.e.c.	208	Computer and peripheral equipment operators	308
Engineering and Related Technologists and Technicians		Secretaries, Stenographers, and Typists	
Electrical and electronic (engineering) technicians	213	Secretaries	313
Engineering technicians, n.e.c.	214	Stenographers	314
Mechanical engineering technicians	215	Typists	315
Drafters	217	Information Clerks	
Surveyors, cartographers, mapping scientists and technicians	218	Interviewers, enumerators, and surveyors	316
Biological technicians	223	Hotel clerks	317
Science Technicians		Transportation ticket and reservation agents	318
Chemical technicians	224	Receptionists	319
Other science technicians	225	Information clerks, n.e.c.	323
Technicians, Except Health, Engineering, and Science		Records Processing Occupations, Except Financial	
Airplane pilots and navigators	226	Correspondence and order clerks	326
Air traffic controllers	227	Human resources clerks, except payroll and timekeeping	328
Broadcast equipment operators	228	Library assistants	329
Computer software developers	229	File clerks	335
Programmers of numerically controlled	233	Records clerks	336
Legal assistants, paralegals, legal support	234	Financial Records Processing Occupations	
Technicians, n.e.c.	235	Bookkeepers and accounting and auditing clerks	337
SALES OCCUPATIONS		Payroll and timekeeping clerks	338
Supervisors and proprietors of sales jobs		Cost and rate clerks (financial records processing)	343
Supervisors and proprietors of sales jobs	243	Billing clerks and related financial records processing	344
Sales Representatives, Finance and Business Services		Duplicating, Mail, and Other Office Machine Operators	
Insurance sales occupations	253	Duplication machine operators / office machine operators	345
Real estate sales occupations	254	Mail and paper handlers	346
Financial services sales occupations	255	Office machine operators, n.e.c.	347
Advertising and related sales jobs	256	Communications Equipment Operators	
Sales Representatives, Commodities		Telephone operators	348
Sales engineers	258	Other telecom operators	349
Salespersons, n.e.c.	274	Mail and Message Distributing Occupations	
Retail sales clerks	275	Postal clerks, excluding mail carriers	354
Cashiers	276	Mail carriers for postal service	355
Door-to-door sales, street sales and news vendors	277	Mail clerks, outside of post office	356
Sales Related Occupations		Messengers	357
Sales demonstrators/promoters/models	283	Material Recording, Scheduling, and Distributing Clerks	
ADMINISTRATIVE SUPPORT OCCUPATIONS, INCLUDING CLERICAL		Dispatchers	359
Supervisors, Administrative Support Occupations		Inspectors, n.e.c.	361
Office supervisors	303	Shipping and receiving clerks	364
Computer Equipment Operators		Stock and inventory clerks	365
		Meter readers	366

Weighers, measurers, and checkers	368	Food counter and fountain workers	438
Material recording, scheduling, production planning, and expediting clerks	373	Kitchen workers	439
Adjusters and Investigators		Waiter's assistant	443
Insurance adjusters, examiners and investigators	375	Misc food prep workers	444
Customer service reps, investigators and adjusters, except insurance	376	Health Service Occupations	
Eligibility clerks for government programs social welfare	377	Dental assistants	445
Bill and account collectors	378	Health aides, except nursing	446
Miscellaneous Administrative Support Occupations		Nursing aides, orderlies, and attendants	447
General office clerks	379	Cleaning and Building Service Occupations Except Households	
Bank tellers	383	Supervisors of cleaning and building service	448
Proofreaders	384	Janitors	453
Data entry keyers	385	Elevator operators	454
Statistical clerks	386	Pest control occupations	455
Teacher's aides	387	Personal Service Occupations	
Administrative support jobs, n.e.c.	389	Supervisors of personal service jobs, n.e.c.	456
PRIVATE HOUSEHOLD OCCUPATIONS		Barbers	457
Private Household Occupations		Hairdressers and cosmetologists	458
Housekeepers, maids, butlers, stewards and lodging quarters cleaners	405	Recreation facility attendants	459
Private household cleaners and servants	407	Guides	461
PROTECTIVE SERVICE OCCUPATIONS		Ushers	462
Supervisors, Protective Service Occupations		Public transportation attendants and inspectors	463
Supervisors of guards	415	Baggage porters	464
Firefighting and Fire Prevention Occupations		Welfare service aides	465
Fire fighting, prevention, and inspection	417	Child care workers	468
Police and Detectives		Personal service occupations, n.e.c.	469
Police, detectives, and private investigators	418	FARM OPERATORS AND MANAGERS	
Other law enforcement: sheriffs, bailiffs correctional institution officers	423	Farm Operators and Managers	
Guards		Farmers (owners and tenants)	473
Crossing guards and bridge tenders	425	Horticultural specialty farmers	474
Guards, watchmen, doorkeepers	426	Farm managers, except for horticultural farms	475
Protective services, n.e.c.	427	Managers of horticultural specialty farms	476
SERVICE OCCUPATIONS, EXCEPT PROTECTIVE AND HOUSEHOLD		OTHER AGRICULTURAL AND RELATED OCCUPATION	
Food Preparation and Service Occupations		Farm Occupations, Except Managerial	
Bartenders	434	Farm workers	479
Waiter/waitress	435	Marine life cultivation workers	483
Cooks, variously defined	436	Nursery farming workers	484
		Related Agricultural Occupations	
		Supervisors of agricultural occupations	485
		Gardeners and groundskeepers	486
		Animal caretakers except on farms	487
		Graders and sorters of agricultural products	488
		Inspectors of agricultural products	489

Forestry and Logging Occupations		Drywall installers	573
Timber, logging, and forestry workers	496	Electricians	575
Fishers, Hunters, and Trappers		Electric power installers and repairers	577
Fishers, hunters, and kindred	498	Painters, construction and maintenance	579
		Paperhangers	583
MECHANICS AND REPAIRERS		Plasterers	584
Mechanics and Repairers		Plumbers, pipe fitters, and steamfitters	585
Supervisors of mechanics and repairers	503	Concrete and cement workers	588
		Glaziers	589
MECHANICS AND REPAIRERS, EXCEPT SUPERVISORS		Insulation workers	593
Vehicle and Mobile Equipment Mechanics		Paving, surfacing, and tamping equipment operators	594
and Repairers		Roofers and slaters	595
Automobile mechanics	505	Sheet metal duct installers	596
Bus, truck, and stationary engine mechanics	507	Structural metal workers	597
Aircraft mechanics	508	Drillers of earth	598
Small engine repairers	509	Construction trades, n.e.c.	599
Auto body repairers	514		
Heavy equipment and farm equipment	516	EXTRACTIVE OCCUPATIONS	
mechanics		Extractive Occupations	
Industrial machinery repairers	518	Drillers of oil wells	614
Machinery maintenance occupations	519	Explosives workers	615
Electrical and Electronic Equipment Repairers		Miners	616
Repairers of industrial electrical equipment	523	Other mining occupations	617
Repairers of data processing equipment	525		
Repairers of household appliances and	526	PRECISION PRODUCTION OCCUPATIONS	
power tools		Production supervisors or foremen	
Telecom and line installers and repairers	527	Production supervisors or foremen	628
Repairers of electrical equipment, n.e.c.	533	Precision Metal Working Occupations	
Heating, air conditioning, and refrigeration	534	Tool and die makers and die setters	634
mechanics		Machinists	637
Miscellaneous Mechanics and Repairers		Boilermakers	643
Precision makers, repairers, and smiths	535	Precision grinders and filers	644
Locksmiths and safe repairers	536	Patternmakers and model makers	645
Office machine repairers and mechanics	538	Lay-out workers	646
Repairers of mechanical controls and valves	539	Engravers	649
Elevator installers and repairers	543	Tinsmiths, coppersmiths, and sheet metal workers	653
Millwrights	544	Precision Woodworking Occupations	
Mechanics and repairers, n.e.c.	549	Cabinetmakers and bench carpenters	657
		Furniture and wood finishers	658
CONSTRUCTION TRADES		Other precision woodworkers	659
Supervisors, Construction Occupations		Precision Textile, Apparel, and Furnishings	
Supervisors of construction work	558	Machine Workers	
Construction Trades, Except Supervisors		Dressmakers and seamstresses	666
Masons, tilers, and carpet installers	563	Tailors	667
Carpenters	567	Upholsterers	668

Shoe repairers	669	Typesetters and compositors	736
Other precision apparel and fabric workers	674	Textile, Apparel, and Furnishings Machine Operators	
Precision Workers, Assorted Materials		Winding and twisting textile/apparel operatives	738
Hand molders and shapers, except jewelers	675	Knitters, loopers, and toppers textile operatives	739
Optical goods workers	677	Textile cutting machine operators	743
Dental laboratory and medical appliance technicians	678	Textile sewing machine operators	744
Bookbinders	679	Shoemaking machine operators	745
Other precision and craft workers	684	Pressing machine operators (clothing)	747
		Laundry workers	748
		Misc textile machine operators	749
Precision Food Production Occupations		Machine Operators, Assorted Materials	
Butchers and meat cutters	686	Cementing and gluing maching operators	753
Bakers	687	Packers, fillers, and wrappers	754
Batch food makers	688	Extruding and forming machine operators	755
Precision Inspectors, Testers, and Related Workers		Mixing and blending machine operatives	756
Adjusters and calibrators	693	Separating, filtering, and clarifying machine operators	757
Plant and System Operators		Painting machine operators	759
Water and sewage treatment plant operators	694	Roasting and baking machine operators (food)	763
Power plant operators	695	Washing, cleaning, and pickling machine operators	764
Plant and system operators, stationary engineers	696	Paper folding machine operators	765
Other plant and system operators	699	Furnace, kiln, and oven operators, apart from food	766
MACHINE OPERATORS, ASSEMBLERS, AND INSPECTORS		Crushing and grinding machine operators	768
Metal Working and Plastic Working Machine Operators		Slicing and cutting machine operators	769
Lathe, milling, and turning machine operatives	703	Motion picture projectionists	773
Punching and stamping press operatives	706	Photographic process workers	774
Rollers, roll hands, and finishers of metal	707	Machine operators, n.e.c.	779
Drilling and boring machine operators	708	Fabricators, Assemblers, and Hand Working Occupations	
Grinding, abrading, buffing, and polishing workers	709	Welders and metal cutters	783
Forge and hammer operators	713	Solderers	784
Fabricating machine operators, n.e.c.	717	Assemblers of electrical equipment	785
Metal and Plastic Processing Machine Operators		Hand painting, coating, and decorating occupations	789
Molders, and casting machine operators	719	Production Inspectors, Testers, Samplers, and Weighers	
Metal platers	723	Production checkers and inspectors	796
Heat treating equipment operators	724	Graders and sorters in manufacturing	799
Woodworking Machine Operators		TRANSPORTATION AND MATERIAL MOVING OCCUPATIONS	
Wood lathe, routing, and planing machine operators	726	Motor Vehicle Operators	
Sawing machine operators and sawyers	727	Supervisors of motor vehicle transportation	803
Shaping and joining machine operator (woodworking)	728	Truck, delivery, and tractor drivers	804
Nail and tacking machine operators (woodworking)	729	Bus drivers	808
Other woodworking machine operators	733	Taxi cab drivers and chauffeurs	809
Printing Machine Operators			
Printing machine operators, n.e.c.	734		
Photoengravers and lithographers	735		

Parking lot attendants	813	Helpers, Construction and Extractive Occupations	
Rail Transportation Occupations		Helpers, constructions	865
Railroad conductors and yardmasters	823	Helpers, surveyors	866
Locomotive operators (engineers and firemen)	824	Construction laborers	869
Railroad brake, coupler, and switch operators	825	Production helpers	874
Water Transportation Occupations		Freight, Stock, and Material Handlers	
Ship crews and marine engineers	829	Garbage and recyclable material collectors	875
Water transport infrastructure tenders and crossing guards	834	Materials movers: stevedores and longshore workers	876
Material Moving Equipment Operators		Stock handlers	877
Operating engineers of construction equipment	844	Machine feeders and offbearers	878
Crane, derrick, winch, and hoist operators	848	Freight, stock, and materials handlers	883
Excavating and loading machine operators	853	Garage and service station related occupations	885
Misc material moving occupations	859	Vehicle washers and equipment cleaners	887
		Packers and packagers by hand	888
		Laborers outside construction	889

REFERENCES

- Autor, David, and David Dorn.** 2009. "This job is 'getting old': Measuring changes in job opportunities using occupational age structure." *American Economic Review: Papers and Proceedings*, 99(2): 45–51.
- Autor, David, Frank Levy, and Richard J Murnane.** 2003. "The skill content of recent technological change: An empirical exploration." *Quarterly Journal of Economics*, 118(4): 1279–1333.
- Autor, David, Lawrence F Katz, and Melissa S Kearney.** 2006. "The polarization of the US labor market." *American Economic Review*, 96(2): 189–194.
- Jaimovich, Nir, and Henry E Siu.** 2012. "The trend is the cycle: Job polarization and jobless recoveries." *NBER Working Paper No. 18334*.
- Kambourov, Gueorgui, and Iourii Manovskii.** 2008. "Rising occupational and industry mobility in the United States: 1968-1997." *International Economic Review*, 49(1): 41–79.
- Kambourov, Gueorgui, and Iourii Manovskii.** 2013. "A cautionary note on using (March) CPS and PSID data to study worker mobility." *Macroeconomic Dynamics*, 17(01): 172–194.
- King, Miriam, Steven Ruggles, J. Trent Alexander, Sarah Flood, Katie Genadek, Matthew B. Schroeder, Brandon Trampe, and Rebecca Vick.** 2010. "Integrated public use microdata series, Current Population Survey: Version 3.0. [Machine-readable database]." *Minneapolis: University of Minnesota*.