INTERNATIONAL ECONOMIC REVIEW
Vol. 50, No. 1, February 2009

OCCUPATIONAL SPECIFICITY OF HUMAN CAPITAL*

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We find that returns to occupational tenure are substantial. Everything else being constant, 5 years of occupational tenure are associated with an increase in wages of 12%–20%. Moreover, when occupational experience is taken into account, tenure with an industry or employer has relatively little importance in accounting for the wage one receives. This finding is consistent with human capital being occupation specific.

1. INTRODUCTION

On average, a currently employed worker who was displaced from a job in the preceding 5 years suffers a 15% reduction in weekly earnings.[2] This well-known result appears to be prima facie evidence for the importance of firm-specific effects in individual wages. Let us, however, partition the above sample of displaced workers into those who switched their occupations upon displacement and those who did not. We find that those who stay in the same occupation after displacement experience only a 6% drop in their weekly earnings, whereas those who switch their occupation experience an 18% drop. Similar results hold even after conditioning on pre-displacement job tenure. This suggests that occupation-specific effects may also serve as important determinants of wages. In this article, we assess the importance of these effects.

We provide evidence of the considerable returns to occupational tenure. We find that, everything else being constant, the first 5 years of occupational tenure are associated with an increase in wages of 12%–20%. In addition, we find that employer tenure has a relatively small impact on wages once the effect of occupational experience is accounted for. These findings are consistent with occupational specificity of human capital.

* Manuscript received May 2007; revised January 2008.

[1] We would like to thank Andrés Erosa, Miana Plesca, Todd Stinebrickner, Gustavo Ventura, two anonymous referees, and participants at the 2003 Canadian Macroeconomics Study Group Meeting, the 2004 Cleveland Fed Workshop on Human Capital, the 2004 Society for Economic Dynamics Annual Meeting, and numerous academic seminars for their comments. This research has been supported by the National Science Foundation Grant No. SES-0617876 and the Social Sciences and Humanities Research Council of Canada Grant No. 410-2007-299. Please address correspondence to: Iourii Manovskii, Department of Economics, University of Pennsylvania, 160 McNeil Building, 3718 Locust Walk, Philadelphia, PA 19104-6297, U.S.A. E-mail: *manovski@econ.upenn.edu.*

[2] We use data from the 1984, 1986, 1988, 1990, and 1992 Survey of Displaced Workers, restricted to male workers between the ages of 20 and 60 who report that they have been displaced from a job in the last 5 years and are currently employed. Similar results can be found in Topel (1991), Jacobson et al. (1993), and Kletzer (1998) among many others.

The implications of our result for the theories of the wage formation process are significant. Most of the theoretical literature has rationalized the positive relationship between employer tenure and wages based on assumptions of employer-specific human capital[3] as well as agency or incentives provision considerations.[4] Occupation-specific human capital is distinct from employer-specific because it is transferable across employers and thus its accumulation cannot be financed by them. In this sense it should be thought of as general human capital. The notion that an occupation is either a party to a contract or an enforcer of a contract also does not seem appealing. Thus, although one can rationalize wage growth through explicit or implicit contracting between a worker and a firm, such contracts between workers and occupations appear less plausible.

Neal (1995) and Parent (2000) have argued that the observed correlation between wages and employer tenure is in fact attributable to the wage growth with industry experience that is correlated with employer tenure and generally omitted from wage regressions. We find, however, that tenure in an industry has a very small impact on wages once the effect of occupational experience is accounted for. This finding is not unexpected. The Standard Industrial Classification system was never designed to reflect specific human capital. At the same time the main characteristics of the job performed are the basis of any recent Standard Occupational Classification. Even narrowly defined industries typically encompass many distinct economic activities. For example, the hotels and motels industry would include those working in a hotel restaurant, bar, front desk, gift shop, etc. Although it is true that the work setting (industry) can affect the job one performs, it seems implausible that the human capital of these workers is specific to the industry they work in rather than to the type of work they do (their occupation). As another example, it appears natural to expect that when a truck driver switches industries (say, from wholesale trade to retail trade) or employers, he loses less of his human capital generated by the truck-driving experience than when he switches his occupation and becomes a cook.

In earlier papers, Shaw (1984, 1987) argued that investment in occupation-specific skills is an important determinant of earnings. Surprisingly and unfortunately, the literature failed to build on her seminal insight. Perhaps, this was due to the well-known fact that survey data on occupation and industry affiliation are riddled with measurement error. Since the information on occupation or industry tenure is not directly available in the data, one first needs to identify occupational and industry switches from the available noisy occupation and industry codes. One approach is to consider an identified occupation (industry) switch to be genuine

[3] See Becker (1962), Oi (1962), Mincer (1974), Mortensen (1978), Hashimoto (1981) for explanations of a significant wage–tenure profile based on the assumption of firm-specific human capital.

[4] Lazear (1979) and Viscusi (1980) develop models in which firms defer compensation in order to induce workers not to shirk. Freeman (1977) and Harris and Holmstrom (1982) argue that an increasing wage–tenure profile provides insurance for risk-averse workers uncertain about their future productivity. Salop and Salop (1976), Nickell (1976), Guasch and Weiss (1982) argue that firms use wage–tenure profiles to discourage unproductive workers from applying to the firm. Burdett and Coles (2003) and Stevens (2004) argue that firms may offer increasing equilibrium wage–tenure contracts to reduce worker turnover.

only if it coincides with some other significant labor market change, such as an employer switch. Other possible avenues exist as well, for example, using information on position changes with the same employer. However, the choice among different procedures has been problematic, since it has not been possible for researchers to show whether these methods are indeed successful in identifying true switches.

In 1999, the PSID released the Retrospective Occupation-Industry Supplemental Data Files (Retrospective Files hereafter) that retrospectively assign 3-digit 1970 census codes to the reported occupations and industries of household heads and wives for the period 1968–80. We argue that the methodology employed by the PSID in constructing the Retrospective Files—different from the one employed in the original coding of the occupation and industry affiliation data—minimizes the error in identifying true industry and occupation switches. This allows us to use the Retrospective Files to document that the originally coded occupation and industry affiliation data in the PSID are often incorrect and to evaluate a number of methods for identifying genuine occupation and industry switches.

Consider, for example, a widely used method that treats an occupation (industry) switch observed in the data as being true if and only if it coincides with an employer switch. We document that when, for instance, the 1-digit classification is used, such a partition will detect only 51.42% of true occupational and 78.10% of true industry switches. On the other hand, out of all the switches such a partition identifies, only 77.70% of the occupational and 88.43% of the industry switches are indeed genuine.

Having evaluated 16 different partitions for ascertaining genuine occupation (industry) switches in the noisy data, we demonstrate that the use of raw or improperly corrected occupational and industry data may bias the results of an empirical investigation substantially. The choice among partitions depends on the relative costs of biases caused by either identifying too few genuine switches with high precision or detecting most genuine switches whereas also identifying many switches that have not actually occurred. Importantly, our results on the economic and statistical significance of the returns to occupational tenure are robust to the choice of the partitions.

The article is organized as follows. In Section 2, we briefly describe the data and the estimation procedure and present the main results of the article. In subsequent sections we analyze the sensitivity of our findings. First, in Section 3 we study the effects of possible selection biases on our estimates and argue that they are not likely to drive our findings of large returns to occupational experience. Second, in Section 4 we turn to a more thorough discussion of the data issues. We document a significant degree of disagreement between the originally assigned occupation and industry codes and the codes assigned to the same individuals in the Retrospective Files. We also provide evidence that the Retrospective Files are more reliable. Next, we describe and test the performance of various methods for identifying genuine occupation and industry switches in the noisy data. Finally, we show that our findings are robust to alternative ways of identifying true occupation and industry switches. We conclude with a summary of the findings and a brief discussion in Section 5.

2. OCCUPATIONAL SPECIFICITY OF HUMAN CAPITAL

In this section, we present the main finding of this article: there are substantial returns to occupational tenure. In addition, tenure with an employer or an industry has relatively little importance in accounting for wages.

2.1. *Data.* The data we use come from the PSID for the 1968–93 period. Following the related literature, the sample is restricted to employed white male heads of household, aged 18–64, and living in the continental United States. We eliminate all observations that at the time of the interview worked for the government or received real hourly wages of less than one dollar in constant 1979 dollars. Those who worked less than 500 hours or had total earnings of zero in a given year are excluded from the sample in that year. Those who reported being self-employed or being simultaneously employed by someone else and self, being in the military, or being a farmer in any year after 1975 are excluded from the sample altogether. Earnings functions are estimated on the sample spanning the years 1981–92.[5]

We define occupations and industries using the 1-, 2-, and 3-digit classifications used by the 1970 Census of Population and provided by the PSID for the 1968–93 period. Appendix B1 contains the description of the 3-digit occupation and industry codes. These codes may be further aggregated into 2- and 1-digit codes, with the details of the aggregation presented in Appendices B2 and B3. Occupational and industry affiliation data for the 1968–80 period come from the PSID Retrospective Occupation-Industry Supplemental Data Files (Retrospective Files). We will document below that these data can be used to reliably identify occupation and industry switches. Starting in 1981, when Retrospective Files are no longer available, we identify an occupational (industry) switch whenever a switch on the original PSID data is accompanied by (1) an employer switch, or (2) either an employer or a position switch that is not a promotion. We call these partitions *Employer_t* and *Position*, respectively. We precisely measure the errors resulting from these procedures and study the extent of the downward bias in estimated returns to occupational tenure in Section 4. Having identified occupation and industry switches over the whole 1969–93 period we construct consistent occupation and industry tenure series. The details of the procedure are found in Appendix A1. Since we do not know the occupational (industry) tenure of an individual entering the sample, we initialize it with employer tenure and define the occupational

[5] For 1979 and 1980, there are no data on employer tenure in the PSID. In 1978, information on employer tenure is available only for individuals younger than 45 years. From 1969 till 1975, the PSID provides information on job tenure only—a mixture of position and employer tenure. As a result, there are no reliable data on employer tenure before 1981. In addition, since occupation and industry tenure is initialized with employer tenure for all individuals in 1968 and all newcomers in later years, in the 1970s the three series would be highly correlated. That would make it difficult to separate the effect that each of them has on wages. Finally, the PSID has not yet officially released the data files after 1993. Although preliminary releases of that data exist, they are still being cleaned by the PSID, and certain variables that we use in our analysis, such as county unemployment and region, have not yet been filled. Our explorations with extending the sample up to 1997 using the pre-released variables shows that all our results are robust.

TABLE 1
DESCRIPTIVE STATISTICS

Age	39.24
Years of Education	13.01
Percent Married	83.05
Percent Unionized	26.13
Overall Experience	20.38
Employer Tenure	9.87

	Average Tenure					
	1-Digit		2-Digit		3-Digit	
	Occupation (1)	Industry (2)	Occupation (3)	Industry (4)	Occupation (5)	Industry (6)
Employer_t	10.87	12.44	10.21	11.50	9.09	10.68
Employer_24t	10.36	12.06	9.67	10.91	8.45	9.94
Position	10.43	12.10	9.80	11.07	8.69	10.25
Position_t	9.55	11.81	8.78	10.47	7.39	9.24
Position_24t	9.24	11.53	8.46	10.07	7.01	8.76
Uncontrolled Data	6.79	9.41	5.75	7.19	3.60	5.28

NOTES: The data come from the PSID for the 1981–92 period. The sample includes employed white male household heads, aged 18–64, and living in the continental United States. Those who report being self-employed or being simultaneously employed by someone else and self, being in the military, or being a farmer in any year after 1975 are excluded from the sample altogether. We eliminate all observations that at the time of the interview worked for the government or received real hourly wages of less than 1 dollar in constant 1979 dollars. Those who worked less than 500 hours or had total earnings of zero in a given year are excluded from the sample in that year. Also excluded from the sample are individuals who have less than three reliable reports of an occupation and an industry over the 1981–92 period. The partitions are defined in Sections 4.2.1 and 4.2.2.

(industry) tenure series to be reliable if (1) an individual entered the sample before 1981 (most enter in 1968) or (2) after an individual who entered the sample after 1981 has switched an occupation (industry) for the first time. Only reliable spells are used in the estimation. In addition, we eliminate individuals who have less than three reliable reports of both occupation and industry over the 1981–92 period.

Employer switches are identified using Partition T that Brown and Light (1992) find acceptable. Simply put, Partition T identifies an employer switch whenever the reported length of present employment is smaller than the time elapsed since the last interview date. We explain the method in more detail below in Section 4.2.1. Table 1 contains summary statistics of the sample used in the estimation.

2.2. *Earnings Function Estimation.* In order to assess the relationship between wages and occupation, employer, and industry tenure, we will estimate various versions of the following econometric model:

$$(1)\quad \ln w_{ijmnt} = \beta_0 Emp\_Ten_{ijt} + \beta_1 OJ_{ijt} + \beta_2 Occ\_Ten_{imt} + \beta_3 Ind\_Ten_{int} + \beta_4 Work\_Exp_{it} + \theta_{it},$$

where w_{ijmnt} is the real hourly wage of person i working in period t with employer j in occupation m and industry n. *Emp_ten*, *Occ_Ten*, and *Ind_Ten* denote tenure with the current employer, occupation, and industry, respectively. *OJ* is a dummy variable that equals one if the individual is not in the first year with the current employer. *Work_Exp* denotes overall labor market experience. Other variables in (1) include an intercept term, 1-digit occupation and industry dummies,[6] a union dummy, a marital status dummy, year dummies, region dummies, education, as well as unemployment rate and lagged unemployment rate in the county of residence. The model also contains the square term of employer tenure and education and the square and cube terms of occupation and industry tenure and overall work experience.

In addition to the above-mentioned observed variables, unobserved individual-specific characteristics and match components may affect wages as well. For example, individuals with the same level of overall work experience would receive different wages, since they would differ in certain unobserved individual characteristics—say, ability to learn or industriousness. Similarly, individuals with the same observable characteristics might be receiving different wages due to the fact that some of them formed better employer, industry, or occupation matches. Therefore,

$$\theta_{it} = \mu_i + \lambda_{ij} + \xi_{im} + \upsilon_{in} + \epsilon_{it}, \tag{2}$$

where μ_i is an individual-specific component, λ_{ij}—a job-match component, ξ_{im}—an occupation-match component, υ_{in}—an industry-match component, and ϵ_{it} is the error term.

We will start by estimating the econometric model (1) with the OLS. However, the unobserved match-specific components are likely to be correlated with the tenure variables and with the dependent variable. One would expect a worker with a better employer match to have higher employer tenure and receive higher wages. Similarly, a worker in a good occupational match is more likely to be receiving high wages and to accumulate significant tenure in that occupation. This correlation will bias the estimates in an OLS regression. To deal with this problem we will also employ the instrumental variable procedure similar to that proposed by Altonji and Shakotko (1987) and used by Parent (2000). Specifically, if X_{imt} is the occupational tenure of individual i who is in occupation m in period t and $\bar{X}_{im}$ is the average tenure of individual i during the current spell of working in occupation m, then the instrumental variable is $\tilde{X}_{imt} = X_{imt} - \bar{X}_{im}$. The squared and cubed occupational tenure variables are instrumented in a similar way: $(\tilde{X}_{imt})^2 = X^2_{imt} - \bar{X}^2_{im}$ and $(\tilde{X}_{imt})^3 = X^3_{imt} - \bar{X}^3_{im}$. By construction these instruments are orthogonal to the occupation-match component. Similarly, we instrument the industry and employer tenure variables, as well as the *OJ* dummy and overall experience, with their deviations from the spell-specific means.

[6] We assume that an individual works in the occupation (industry) that is reported most frequently within a spell between two consecutive occupational (industry) switches.

The instrumental variable approach we employ does not address the possible correlation between the tenure variables and the unobserved non-own match-specific components. In Section 3, however, we show that such correlations do not account for our finding of large returns to occupational experience. Further, since we are using panel data and are following individuals over time, the error terms within an individual would be serially correlated. Consequently, we estimate the instrumented model with generalized least squares—a procedure we refer to as IV-GLS.

2.3. *Main Result.* The returns to 2, 5, and 8 years of occupational, employer, and industry experience constructed using partitions *Employer_t* obtained by estimating the econometric model (1) with the OLS and IV-GLS are presented in Table 2. The corresponding estimated coefficients are found in columns 5, 10, and 15 of Tables 3 and 4. We do not report the estimated coefficients for the regression based on partition *Position* since they are very similar. Instead, we summarize them as returns to years of experience in Table 5.

The estimation results reveal that occupational tenure is an important determinant of wages. For example, we find that 5 years of 3-digit occupational tenure are associated with a 12%–20% increase in wages based on the IV-GLS and OLS estimates, respectively. We also find that one's tenure with an employer or an industry has a weak and quantitatively small relationship with the wage one receives.

Tables 3 and 4 also contain the results of estimating four additional versions of model (1).[7] The three panels of each table correspond to the definition of occupation and industry tenure on 1, 2, and 3 digits. Consider panel 3 of Table 4 referring to tenure in 3-digit occupations and industries. Column 11 indicates that employer tenure appears to be an important determinant of wages if industry and occupation tenure is left out of the regression. The results in column 11 of Table 4 come from the same estimation procedure as in Altonji and Shakotko (1987). However, although they find no returns to firm tenure, we find them to be positive and significant. As Topel (1991) shows, on Altonji and Shakotko's sample, we can obtain positive returns to firm tenure with their IV-GLS methodology if we (1) clean the noisy firm tenure variable in the data and (2) control appropriately for the time trend in wage growth if the sample is not representative over time.[8] In our estimation, we deal with both of these issues. First, as discussed in Section 4.2.1, we construct a reliable firm tenure variable. Second, the PSID sample we use is representative. Therefore, the time dummies we use in the estimation correctly capture the time trend in wage growth over time. Our estimates of the returns to firm tenure are similar to those reported in a recent article by Altonji and Williams (2005), which aims to reconcile the findings in Altonji and Shakotko (1987) and Topel (1991).

[7] In estimating alternative versions of model (1), for example, with or without the occupational tenure variables, we restrict the sample to observations with reliable occupation and/or industry tenure data (as appropriate for the model being estimated).

[8] A nonrepresentative sample might cause problems since, for instance, an increase in the average "quality" of the sample due to attrition or due to sample aging over time would lead to a wage growth that would be attributed to the time trend rather than the tenure variables.

TABLE 2

RETURNS TO TENURE, PARTITION *EMPLOYER_t*

		1-Digit			2-Digit			3-Digit		
		2 Years (1)	5 Years (2)	8 Years (3)	2 Years (4)	5 Years (5)	8 Years (6)	2 Years (7)	5 Years (8)	8 Years (9)
A.	OLS									
	Occupation	0.0730*	0.1616*	0.2243*	0.0750*	0.1666*	0.2321*	0.0891*	0.1995*	0.2794*
		(0.0076)	(0.0170)	(0.0232)	(0.0078)	(0.0172)	(0.0237)	(0.0082)	(0.0186)	(0.0259)
	Industry	0.0279*	0.0707*	0.1134*	0.0279*	0.0695*	0.1098*	0.0109	0.0306	0.0690*
		(0.0079)	(0.0167)	(0.0224)	(0.0080)	(0.0169)	(0.0228)	(0.0081)	(0.0170)	(0.0227)
	Employer	0.0103	0.0056	0.0030	0.0012	−0.0083	−0.0151	0.0010	−0.0106	−0.0194
		(0.0139)	(0.0144)	(0.0160)	(0.0137)	(0.0145)	(0.0164)	(0.0136)	(0.0149)	(0.0172)
B.	IV-GLS									
	Occupation	0.0368*	0.0802*	0.1108*	0.0496*	0.1069*	0.1418*	0.0539*	0.1197*	0.1680*
		(0.0064)	(0.0139)	(0.0194)	(0.0065)	(0.0145)	(0.0204)	(0.0068)	(0.0153)	(0.0220)
	Industry	0.0212*	0.0464*	0.0634*	0.0054	0.0132	0.0204	−0.0020	−0.0064	−0.0123
		(0.0068)	(0.0146)	(0.0199)	(0.0067)	(0.0141)	(0.0191)	(0.0071)	(0.0149)	(0.0201)
	Employer	0.0022	0.0034	0.0062	−0.0003	0.0023	0.0060	0.0008	0.0019	0.0044
		(0.0093)	(0.0118)	(0.0152)	(0.0093)	(0.0124)	(0.0163)	(0.0095)	(0.0136)	(0.0182)

NOTES: Standard errors are in parentheses.

*Denotes statistical significance at the 5% level.

Returns to employer, industry, and occupation tenure are computed from the econometric model (1) in the text. See the text for a description of partition *Employer_t*.

TABLE 3

EARNINGS FUNCTIONS ESTIMATES, OLS. OCCUPATION AND INDUSTRY TENURE CONSTRUCTED USING PARTITION *EMPLOYER_1*

Independent Variable	1-Digit					2-Digit					3-Digit				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Employer tenure	0.0182*	0.0035	0.0062*	...	−0.0024	0.0183*	0.0019	0.0052*	...	−0.0042	0.0173*	0.0022	0.0018	...	−0.0049*
	(0.0016)	(0.0021)	(0.0019)		(0.0021)	(0.0016)	(0.0022)	(0.0019)		(0.0022)	(0.0016)	(0.0024)	(0.0019)		(0.0024)
Emp. ten.^{2} × 100	−0.0297*	−0.0015	−0.0071	...	0.0119	−0.0302*	0.0015	−0.0051	...	0.0148*	−0.0278*	−0.0001	0.0019	...	0.0151*
	(0.0048)	(0.0063)	(0.0054)		(0.0064)	(0.0048)	(0.0067)	(0.0054)		(0.0067)	(0.0047)	(0.0069)	(0.0054)		(0.0059)
Occupation tenure	...	...	0.0446*	0.0386*	0.0391*	...	...	0.0447*	0.0390*	0.0400*	...	...	0.0483*	0.0457*	0.0472*
			(0.0035)	(0.0040)	(0.0040)			(0.0035)	(0.0040)	(0.0041)			(0.0036)	(0.0042)	(0.0043)
Occ. ten.^{2} × 100	...	...	−0.1973*	−0.1951*	−0.1988*	...	...	−0.2019*	−0.1944*	−0.2008*	...	...	−0.2217*	−0.2270*	−0.2357*
			(0.0224)	(0.0261)	(0.0263)			(0.0226)	(0.0264)	(0.0267)			(0.0230)	(0.0272)	(0.0276)
Occ. ten.^{3} × 100	...	...	0.0030*	0.0033*	0.0033*	...	...	0.0031*	0.0032*	0.0033*	...	...	0.0034*	0.0037*	0.0038*
			(0.0004)	(0.0005)	(0.0005)			(0.0004)	(0.0005)	(0.0005)			(0.0004)	(0.0005)	(0.0005)
Industry tenure	...	0.0350*	...	0.0126*	0.0138*	...	0.0358*	...	0.0120*	0.0139*	...	0.0322*	...	0.0026	0.0049
		(0.0038)		(0.0040)	(0.0040)		(0.0038)		(0.0040)	(0.0044)		(0.0038)		(0.0042)	(0.0045)
Ind. ten.^{2} × 100	...	−0.1241*	...	0.0050	0.0022	...	−0.1366*	...	−0.0029	−0.0060	...	−0.1289*	...	0.0297	0.0271
		(0.0251)		(0.0293)	(0.0294)		(0.0250)		(0.0293)	(0.0295)		(0.0249)		(0.0295)	(0.0296)
Ind. ten.^{3} × 100	...	0.0015*	...	−0.0007	−0.0008	...	0.0018*	...	−0.0005	−0.0006	...	0.0018*	...	−0.0008	−0.0009
		(0.0005)		(0.0006)	(0.0006)		(0.0005)		(0.0006)	(0.0006)		(0.0005)		(0.0006)	(0.0006)
Old job	0.0517*	0.0276	0.0118	0.0114	0.0146	0.0468*	0.0229	0.0048	0.0018	0.0091	0.0466*	0.0272	0.0012	0.0030	0.0103
	(0.0135)	(0.0148)	(0.0143)	(0.0137)	(0.0147)	(0.0131)	(0.0145)	(0.0140)	(0.0137)	(0.0144)	(0.0125)	(0.0141)	(0.0135)	(0.0135)	(0.0141)
Total experience	0.0378*	0.0203*	0.0189*	0.0180*	0.0175*	0.0396*	0.0213*	0.0209*	0.0197*	0.0192*	0.0404*	0.0245*	0.0227*	0.0229*	0.0226*
	(0.0043)	(0.0052)	(0.0051)	(0.0052)	(0.0052)	(0.0041)	(0.0050)	(0.0049)	(0.0050)	(0.0050)	(0.0039)	(0.0048)	(0.0047)	(0.0048)	(0.0048)
Experience^2	−0.0011*	−0.0005*	−0.0004	−0.0005*	−0.0005*	−0.0011*	−0.0005*	−0.0005*	−0.0005*	−0.0005*	−0.0011*	−0.0005*	−0.0005*	−0.0006*	−0.0005*
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Exp.^{3} × 100	0.0006	0.0003	0.0002	0.0004	0.0003	0.0010*	0.0002	0.0002	0.0003	0.0003	0.0010*	0.0002	0.0002	0.0003	0.0003
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Observations	7056	6738	6749	6710	6710	7320	6957	6958	6930	6930	7753	7284	7270	7249	7249
Individuals	844	844	844	844	844	880	880	880	880	880	936	936	936	936	936

NOTES: Standard errors are in parentheses.

*Denotes statistical significance at the 5% level.

The dependent variable is log real hourly wages ($1979). Other covariates include an intercept, 1-digit occupation and industry dummies, a union dummy, a marital status dummy, region dummies, year dummies, education, education squared, unemployment rate, and lagged unemployment rate in the county of residence. OLS estimation procedure is used. See the text for a description of partition *Employer_1*.

TABLE 4

EARNINGS FUNCTIONS ESTIMATES, IV-GLS. OCCUPATION AND INDUSTRY TENURE CONSTRUCTED USING PARTITION *EMPLOYER_1*

Independent	1-Digit					2-Digit					3-Digit				
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Employer tenure	0.0080*	0.0037	0.0034	...	−0.0002	0.0079*	0.0051*	0.0028	...	0.0004	0.0066*	0.0057*	0.0002	...	−0.0001
	(0.0018)	(0.0022)	(0.0020)		(0.0023)	(0.0018)	(0.0024)	(0.0021)		(0.0024)	(0.0018)	(0.0026)	(0.0022)		(0.0027)
Emp. ten.^{2} × 100	−0.0128*	0.0030	−0.0054	...	0.0086	−0.0129*	−0.0031	−0.0017	...	0.0065	−0.0101	−0.0007	0.0007	...	0.0071
	(0.0059)	(0.0073)	(0.0062)		(0.0072)	(0.0059)	(0.0082)	(0.0063)		(0.0079)	(0.0059)	(0.0087)	(0.0064)		(0.0086)
Occupation tenure	...	...	0.0235*	0.0205*	0.0200*	...	...	0.0270*	0.0278*	0.0272*	...	...	0.0275*	0.0293*	0.0289*
			(0.0030)	(0.0034)	(0.0034)			(0.0031)	(0.0034)	(0.0035)			(0.0031)	(0.0034)	(0.0036)
Occ. ten.^{2} × 100	...	...	−0.1225*	−0.0974*	−0.1001*	...	...	−0.1484*	−0.1501*	−0.1541*	...	...	−0.1417*	−0.1365*	−0.1377*
			(0.0186)	(0.0233)	(0.0228)			(0.0187)	(0.0231)	(0.0230)			(0.0191)	(0.0233)	(0.0238)
Occ. ten.^{3} × 100	...	...	0.0021*	0.0018*	0.0019*	...	...	0.0025*	0.0026*	0.0027*	...	...	0.0024*	0.0024*	0.0024*
			(0.0003)	(0.0004)	(0.0004)			(0.0003)	(0.0004)	(0.0004)			(0.0003)	(0.0004)	(0.0004)
Industry tenure	...	0.0210*	...	0.0117*	0.0115*	...	0.0155*	...	0.0034	0.0027	...	0.0129*	...	−0.0009	−0.0008
		(0.0034)		(0.0034)	(0.0034)		(0.0035)		(0.0036)	(0.0038)		(0.0035)		(0.0036)	(0.0040)
Ind. ten.^{2} × 100	...	−0.1110*	...	−0.0510*	−0.0505*	...	−0.0886*	...	−0.0016	−0.0003	...	−0.0883*	...	−0.0059	−0.0087
		(0.0206)		(0.0250)	(0.0244)		(0.0207)		(0.0248)	(0.0245)		(0.0206)		(0.0245)	(0.0252)
Ind. ten.^{3} × 100	...	0.0015*	...	0.0005	0.0003	...	0.0014*	...	−0.0002	−0.0003	...	0.0014*	...	0.0001	−0.0001
		(0.0004)		(0.0005)	(0.0005)		(0.0004)		(0.0005)	(0.0005)		(0.0004)		(0.0005)	(0.0005)
Old job	0.0136	0.0044	0.0046	0.0006	0.0023	0.0100	0.0028	−0.0026	−0.0022	−0.0013	0.0113	0.0041	−0.0006	0.0001	0.0007
	(0.0092)	(0.0097)	(0.0092)	(0.0094)	(0.0095)	(0.0089)	(0.0095)	(0.0090)	(0.0091)	(0.0092)	(0.0086)	(0.0090)	(0.0087)	(0.0087)	(0.0090)
Total experience	0.0736*	0.0391*	0.0498*	0.0352*	0.0395*	0.0820*	0.0454*	0.0494*	0.0433*	0.0595*	0.0776*	0.0511*	0.0511*	0.0560*	0.0485*
	(0.0088)	(0.0052)	(0.0070)	(0.0053)	(0.0060)	(0.0099)	(0.0051)	(0.0065)	(0.0056)	(0.0099)	(0.0071)	(0.0051)	(0.0059)	(0.0074)	(0.0054)
Experience^2	−0.0011*	−0.0006*	−0.0007*	−0.0005*	−0.0005*	−0.0012*	−0.0008*	−0.0008*	−0.0007*	−0.0007*	−0.0014*	−0.0010*	−0.0009*	−0.0009*	−0.0009*
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Exp.^{3} × 100	0.0010*	0.0004	0.0005	0.0003	0.0004	0.0011*	0.0006*	0.0006*	0.0005	0.0006*	0.0013*	0.0008*	0.0008*	0.0007*	0.0008*
	(0.0002)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0002)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0002)	(0.0003)	(0.0002)	(0.0003)	(0.0003)
Observations	7056	6738	6749	6710	6710	7320	6957	6958	6930	6930	7753	7284	7270	7249	7249
Individuals	844	844	844	844	844	880	880	880	880	880	936	936	936	936	936

NOTES: Standard errors are in parentheses.

*Denotes statistical significance at the 5% level.

The dependent variable is log real hourly wages ($1979). Other covariates include an intercept, 1-digit occupation and industry dummies, a union dummy, a marital status dummy, region dummies, year dummies, education, education squared, unemployment rate and lagged unemployment rate in the county of residence. IV-GLS estimation procedure is used. See the text for a description of partition *Employer_1*.

TABLE 5

RETURNS TO TENURE, PARTITION POSITION

		1-Digit			2-Digit			3-Digit		
		2 Years (1)	5 Years (2)	8 Years (3)	2 Years (4)	5 Years (5)	8 Years (6)	2 Years (7)	5 Years (8)	8 Years (9)
A.	OLS									
	Occupation	0.0504*	0.1093*	0.1492*	0.0498*	0.1098*	0.1530*	0.0655*	0.1430*	0.1958*
		(0.0072)	(0.0155)	(0.0227)	(0.0074)	(0.0160)	(0.0215)	(0.0077)	(0.0168)	(0.0228)
	Industry	0.0244*	0.0632*	0.1034*	0.0227*	0.0557*	0.0866*	0.0049	0.0175	0.0352
		(0.0079)	(0.0166)	(0.0222)	(0.0080)	(0.0167)	(0.0221)	(0.0078)	(0.0162)	(0.0213)
	Employer	0.0165	0.0252	0.0334*	0.0117	0.0214	0.0303	0.0205	0.0270	0.0332
		(0.0145)	(0.0148)	(0.0163)	(0.0144)	(0.0150)	(0.0169)	(0.0143)	(0.0152)	(0.0173)
B.	IV-GLS									
	Occupation	0.0298*	0.0643*	0.0879*	0.0412*	0.0875*	0.1165*	0.0509*	0.1105*	0.1510*
		(0.0058)	(0.0125)	(0.0170)	(0.0064)	(0.0138)	(0.0189)	(0.0065)	(0.0143)	(0.0200)
	Industry	0.0096	0.0206	0.0271	0.0012	0.0023	0.0020	−0.0096	−0.0211	−0.0299
		(0.0066)	(0.0140)	(0.0188)	(0.0068)	(0.0143)	(0.0192)	(0.0069)	(0.0142)	(0.0188)
	Employer	0.0012	0.0086	0.0170	−0.0054	−0.0007	0.0052	0.0005	0.0036	0.0074
		(0.0093)	(0.0115)	(0.0147)	(0.0095)	(0.0123)	(0.0160)	(0.0094)	(0.0127)	(0.0168)

NOTES: Standard errors are in parentheses.

*Denotes statistical significance at the 5% level.

Returns to employer, industry, and occupation tenure are computed from the econometric model (1) in the text. See the text for a description of partition *Position*.

Column 12 indicates that, in the absence of occupation tenure, industry tenure is significant, although the importance of employer tenure remains essentially unchanged. Column 13, in which we estimate a version of the model that includes only occupation and employer tenure, reveals that the estimated coefficients on employer tenure decline sharply in the presence of occupation tenure in the regression. Similarly, in column 14, industry tenure becomes statistically insignificant in the presence of occupation tenure. Finally, when employer, industry, and occupation tenure are included in one regression in column 15, occupation tenure variables are the only ones that have a significant positive effect on wages. It should be noted that once occupation (or industry) tenure is included in the analysis, the estimated wage growth due to the accumulation of overall work experience declines as well. The implication is that if occupation tenure is omitted from the wage regression, its effect would be captured by employer tenure (or industry tenure if it is included in the model) and overall work experience.

The discussion is fully applicable to panels 1 and 2 of Tables 3 and 4 referring to 1- and 2-digit occupation and industry tenure. The only exception is that at the 1-digit level, as seen in column 5, whereas employer tenure is insignificant, both occupation and industry tenure remain significant. However, the estimated returns to, say, 5 years of occupation tenure are almost twice as large as the corresponding returns to industry tenure. We will document below in Section 4 that these results hold despite a much higher level of measurement error in the occupational tenure variables than in the industry tenure ones.

2.4. *Discussion.* The examination of the occupational titles provided in the Appendix suggests that human capital is likely to be 3-digit rather than 1- or 2-digit specific. A close look at the 3-digit occupation classification reveals that skills accumulated in a given 3-digit occupation may not be easily transferable to another 3-digit occupation. For example, if an economics professor becomes a psychologist or a librarian, then, despite staying in the same 1- and 2-digit occupation, she would not be able to use most of her human capital accumulated while being in economics. Our results confirm this intuition. Specifically, in the case of the IV-GLS estimation, we find that the returns to 5 years of occupational experience are as high as 8% at the 1-digit level, 10% at the 2-digit level, and 12% at the 3-digit level.

Even the 3-digit occupational classification, however, may not perfectly represent the specific human capital. First, a finer partition may be required for some 3-digit occupations such as, for example, computer programmers or medical and osteopathic physicians. Second, there may exist subsets of the 3-digit occupational classification such that no human capital is destroyed when switching occupations within such a subset. Although the data availability does not permit one to address the first concern, it appears interesting but difficult to construct a metric of how transferable occupational experience is between two given occupations.[9] Despite

[9] See Ingram and Neumann (2000) for an attempt to construct such a metric by merging the occupational titles contained in the Current Population Survey (CPS) with the job characteristic information contained in the Dictionary of Occupational Titles (DOT). Gathmann and Schonberg (2007) use a rich German data set to measure the transferability of skills in the labor market.

these limitations, our use of the occupational classification directly available in the data appears to be a reasonable first step.

We should note, however, that if human capital is partially transferable across subsets of occupations, our estimated returns to occupational experience are biased downward whereas the returns to overall experience are biased upward. This happens because, upon a switch, an individual who effectively has, say, 3 years of experience in the new occupation would be recorded as having no experience at all. This bias is akin to the one generated by the measurement error in identifying occupational switches. When an erroneous switch is identified, the researcher will treat an individual as becoming inexperienced, although no loss of experience has actually occurred. We evaluate such biases below in Section 4.

Before moving on to the analysis of the sensitivity of our findings, we would like to reiterate that properly attributing the specificity of human capital is important for understanding the wage formation process. For example, our finding suggests that considerably more human capital is likely destroyed upon an occupational switch, as compared to an employer or industry switch. This is important since the level and time trend of occupational mobility are different from those of job or industry mobility. In fact, Kambourov and Manovskii (2008) found a very substantial increase in occupational mobility in the United States over the 1968–97 period. This has implications for a number of actively researched issues. It has been documented that, since the late 1960s, there was a considerable increase in (within-group) wage dispersion, a decline in wage stability, and a pronounced flattening of the life-cycle profiles of earnings for the cohorts of workers entering the labor market later in the period. Kambourov and Manovskii (2004, forthcoming) argue that the increase in occupational mobility coupled with occupational specificity of human capital provides a natural explanation for those facts. Relatedly, a number of researchers, e.g., Bertola and Ichino (1995) and Ljungqvist and Sargent (1998), have described the 1970s and 1980s as a period of increased "economic turbulence." The term "turbulence" is typically defined as an unobservable increase in the rate of skill depreciation upon a job switch during the two decades. Our results suggest that a potentially more useful definition may be an observable increase in occupational mobility over the period. Finally, anecdotal evidence and surveys of worker perceptions suggest that job stability and job security have declined in the 1980s and 1990s. It turned out to be difficult, however, to find a substantial increase in job (employer) mobility in the United States over the last three decades (see *Journal of Labor Economics* (1999) special issue). In light of the occupational specificity of human capital, it may be appropriate to reinterpret workers' feeling of insecurity as a realization that they are now more likely to switch occupations.

3. SENSITIVITY ANALYSIS: ENDOGENEITY BIAS

The instrumental variable approach we employ does not address the correlation between the tenure variables and the unobserved non-own match-specific components. For example, if workers move to better occupation matches over time, the returns to overall experience would be biased upward and the returns to occupational tenure downward. Earlier literature, e.g., Altonji and Shakotko (1987) and Topel (1991), has faced a similar problem when debating the issue of

what fraction of the wage growth during a worker-employer relationship was due to the growth of overall labor market experience and what fraction was driven by factors specific to the worker–employer relationship. Unfortunately, the literature has failed to find a resolution to this issue.[10] Fortunately, such correlations in our model are likely to bias the estimate of the returns to occupational tenure downward rather than upward. Thus, the substantial returns to occupational tenure we identify may serve as a lower bound on the true returns.

There are 13 potential non-own correlations in the model. With the notation of Equations (1) and (2), employer tenure may be correlated with μ_i, ξ_{im}, and υ_{in}. Occupational tenure may be correlated with μ_i, λ_{ij}, and υ_{in}. Industry tenure may be correlated with μ_i, λ_{ij}, and ξ_{im}. Finally, overall experience may be correlated with $\mu_i, \lambda_{ij}, \xi_{im}$, and υ_{in}.

Most of these correlations are not likely to lead to an overestimation of the returns to occupational tenure. First, the instruments we define for employer, occupation, and industry tenure, and overall work experience are uncorrelated with the individual-specific term μ_i by construction. Second, if overall experience is positively correlated with the employer-, occupation-, and industry-specific matches, then the coefficient on overall experience would be overestimated and the coefficients on employer, occupation, and industry tenure would be underestimated. This is unlikely to change our finding that occupation tenure is much more important in the wage formation process than the other two. Third, workers might be moving into better occupation matches within employer spells. If this is indeed the case, the returns to occupation tenure would be underestimated, whereas the returns to employer tenure would be overestimated. A similar argument applies if workers are shopping for better and better occupations within industry spells. Fourth, within industry spells, individuals could be shopping for better employers. Parent (2000), however, argues that industry tenure is unlikely to be correlated with the quality of employer matches. Finally, since it is rarely the case that workers switch industries within employer spells, a possible positive correlation between employer tenure and the quality of the industry-specific match is of minor concern for our analysis.

We need to pay special attention to the remaining two possible correlations: a positive correlation between occupation tenure and the quality of the industry match and between occupation tenure and the quality of the employer match. If these correlations existed, then we would be overestimating the returns to occupation tenure and underestimating the returns to employer and/or industry experience. We discuss the effects of possible employer shopping within occupations, but most of the points apply also to the case in which there is industry shopping within occupations.

1. Topel and Ward (1992) argue that most of the employer switching happens early in one's career: during the first 10 years in the labor market,

[10] We see value in trying to identify such biases by estimating structural models of the wage dynamics. We think, however, that this article is not a place for such analysis. We would like to preserve as much methodological continuity with previous work as possible to clearly isolate the effect of incorporating measures of occupational tenure in Mincerian wage regressions. With this step accomplished, we hope that our findings will help motivate further structural work.

TABLE 6
RETURNS TO TENURE, WORKERS OLDER THAN 35 YEARS, PARTITION *EMPLOYER_1*.

	OLS			IV-GLS		
	2 Years (1)	5 Years (2)	8 Years (3)	2 Years (4)	5 Years (5)	8 Years (6)
Occupation	0.0791*	0.1767*	0.2473*	0.0376*	0.0812*	0.1111*
	(0.0099)	(0.0223)	(0.0309)	(0.0071)	(0.0158)	(0.0222)
Industry	0.0072	0.0240	0.0464	−0.0039	−0.0077	−0.0099
	(0.0102)	(0.0216)	(0.0291)	(0.0079)	(0.0168)	(0.0229)
Employer	−0.0236	−0.0300	−0.0343	−0.0011	0.0124	0.0256
	(0.0204)	(0.0209)	(0.0228)	(0.0129)	(0.0158)	(0.0206)

NOTES: Standard errors are in parentheses. Three-digit occupation and industry tenure is used. Returns to employer, industry, and occupation tenure are computed from the estimates of econometric model (1). See the text for a description of partition *Employer_1*.
*Denotes statistical significance at the 5% level.

a worker will hold seven jobs, which constitutes two-thirds of his career total. Therefore, job shopping is observed predominantly among young workers. Thus, a possible test of the robustness of our result of high returns to occupation tenure is to reestimate the model on a subset of older workers.[11] Table 6 shows the OLS and IV-GLS results for workers older than 35 years. Our main result is clearly present: the returns to occupation tenure are substantial, whereas there are no significant returns to industry or firm tenure.

2. Altonji and Shakotko (1987) suggest that, on average, a worker's wage would increase by 5% if an employer switch is a quit and would fall upon a layoff. Using this observation, we divide the sample into workers who switched their occupation upon an employer switch (occupation switchers) and those who did not switch their occupation upon an employer switch (occupation stayers). For both of these groups we compute the fractions of quits and layoffs. The results, reported in Table 7, indicate that approximately two-thirds of all employer switches are quits, regardless of whether individuals switch their occupation or not. This implies that occupation tenure is not likely to be correlated with the quality of employer matches. The finding might still indicate that the quality of employer matches is positively correlated with overall work experience. In that case, however, it would be the returns to overall work experience that would be overestimated, not the returns to occupation tenure.

Further, we have found that the returns to 5 years of 3-digit occupation tenure are in the 12%–20% range. Note that only 28% of all employer

[11] One may question whether this is the appropriate test in light of the finding in Neal (1999), who documents that workers follow a two-stage job-switch strategy: They first choose a suitable career, and once they find it, they look for a suitable employer. It turns out that the hazard functions of an occupational and employer switch decline sharply with age so that the probability of an employer switch per year of occupational tenure declines with age as well. Thus, our test on the sample of older workers is the appropriate one.

TABLE 7
REASON FOR AN EMPLOYER CHANGE WITHIN AND BETWEEN OCCUPATION SPELLS, 1981–87

	1-Digit		2-Digit		3-Digit	
	Occupation Switchers (1)	Occupation Stayers (2)	Occupation Switchers (3)	Occupation Stayers (4)	Occupation Switchers (5)	Occupation Stayers (6)
Number of Quits	183	149	215	135	265	108
Number of Layoffs	108	85	126	78	161	56
Fraction of Layoffs	0.371	0.363	0.370	0.366	0.378	0.341
	(0.0283)	(0.0314)	(0.0261)	(0.0330)	(0.0235)	(0.0370)

NOTES: Standard errors are in parentheses.
Number of Quits refers to the number of individuals who report quitting as the reason for their employer change. Number of Layoffs refers to the number of individuals who report one of the following reasons for their employer change: company folded/changed hands/moved out of town, employer died/went out of business, strike, lockout, laid off, fired.

switches occur within 3-digit occupation spells and only 70% of these switches are quits. This implies that even if there were some employer shopping within occupations, the estimated returns to occupation tenure would not decrease by too much if the estimate of a 5% wage gain per quit is reasonable.

3. We will document below a substantial measurement error in identifying occupation switches. One could expect this measurement error to weaken the relationship between occupation tenure and the employer-specific effect, if one indeed existed.
4. Finally, higher experience in an occupation could be a prerequisite for a better employer match: The high-paying employers might be hiring workers only after they have accumulated enough human capital in that occupation. In this case the observed increase in wages is rightly attributable, at least partially, to higher occupation tenure.

Thus, we conclude that the returns to occupational tenure that we identify are not likely biased upward due to the standard correlations between the tenure variables and the unobserved non-own match-specific components. Instead, they are more likely biased downward. There is an additional selection bias that makes us underestimate the returns to occupational experience. As documented in Kambourov and Manovskii (2008), relative sizes of occupations fluctuate substantially over time. When a demand for the services of a particular occupation (or its relative productivity) declines, the wages paid in that occupation decline, and lower-experienced workers in that occupation leave it for a better paying one. Thus, high-experience workers are disproportionately represented in low-paying occupations, whereas low-experience workers are disproportionately represented in high-paying ones. We include 1-digit occupation dummies in the regression to partially account for this effect. This is clearly not enough, and some downward bias remains in our estimates of the returns to occupational experience.

4. SENSITIVITY ANALYSIS: IDENTIFYING OCCUPATION AND INDUSTRY SWITCHES

The previous sections introduced the main finding of the article: Occupational tenure is an important determinant of wages and is considerably more important than either firm or industry tenure. In this section we will argue that the results are robust to alternative methods used for identifying occupation and industry switches in the data. This section may also be interesting in its own right because, for the first time, it documents the extent of the errors made when different ways of identifying switches in the noisy data are used.

4.1. *Occupation and Industry Affiliation Data.* To construct occupation, industry, and employer tenure, we have used the PSID data from 1968 on. The PSID has used the 1970 census occupation and industry codes from 1968 on. However, 1-digit occupation codes were used in 1968–75, 2-digit occupation codes in 1976–80, and 3-digit occupation codes in 1974 and after 1981. The industry affiliation was coded at a 2-digit level in 1971–80 and at a 3-digit level after 1981.

In 1999, the PSID released the Retrospective Occupation-Industry Supplemental Data Files that retrospectively assign 3-digit 1970 Census codes to the originally reported occupations and industries of household heads and wives for the 1968–80 period. This allows for the creation of a series of 1970 Census 3-digit occupation and industry codes that runs from 1968 to 1993.[12]

There is a significant degree of disagreement between the originally assigned PSID occupation and industry codes and the codes assigned to the same individuals in the Retrospective Files. Consider the 2-digit occupational mobility (the fraction of people switching occupations between two consecutive years) for the 1976–80 period. During this period the PSID provides the originally assigned occupation (industry) codes as well as the codes reassigned in the Retrospective Files. One would expect the level of occupational mobility computed on these two series to be similar, if not exactly the same, since both are based on the same raw information—the respondent's description of his or her occupation. Any difference must come from the way the original raw information is transferred into an occupation code. One finds, however, that the level of occupational mobility in the Retrospective Files during the 1976–80 period is roughly two times smaller, at approximately 11%, than the mobility obtained in the originally coded occupations. Moreover, the occupational mobility of approximately 26% derived from the original 2-digit occupational codes assigned in 1976–80 is close to the one obtained by converting the originally assigned 3-digit codes into 2-digit codes in 1981–93.

It appears plausible that the difference between the originally and the retrospectively assigned occupation and industry codes may have been caused by differences in the methodology employed by the PSID in constructing these data.

[12] The PSID has recoded occupations and industries for most household heads and wives in the sample but not all. The head or wife had to be living as of 1992, be an original sample member (not married into the study), and had to report a minimum of three main jobs between 1968 and 1992 with at least one report during the 1968–80 period. All original sample household heads and wives who were known to be deceased as of 1992 and who had at least one report between 1968 and 1980 were also included.

When coding the occupation (industry) data in 1981–93 or when originally coding these data before 1981, the PSID coder did not compare the current year description to the one in the previous year. As a result, for a respondent who is in the same occupation (industry) in both years, similar occupational (industry) descriptions could end up being coded differently.[13] This was not the case with the constructed Retrospective Files, where as reported in the PSID (1999), "To save time and increase reliability, the coder coded all occupations and industries for each person across all required years before moving on to the next case." Thus, in constructing the Retrospective Files, the coders had access not only to the respondents' description of their current occupation (industry), but also to the description of their past and future occupations (industries). This allowed them to compare these descriptions, decide whether they are similar, and assign the same occupational (industry) code where appropriate.

Our hypothesis is further corroborated by the results of an experiment summarized in Mathiowetz (1992). Reports of occupations obtained in interviews of employees of a large company were checked against company records. This was done in two ways. First, the coders were asked to compare simultaneously the two descriptions and to code them as being in agreement if they could result in the same 3-digit classification. The procedure resulted in a disagreement rate of 12.7%. Second, the coders independently coded the two descriptions at the 1- and 3-digit level. The comparison of the independently assigned codes resulted in a disagreement rate of 48.2% at the 3-digit level and 24.3% at the 1-digit level. The results indicate that the differences in coding methodology may significantly affect the amount of error in occupational or industry affiliation data.[14]

In view of this evidence we conjecture that the occupation and industry codes from the Retrospective Files are more reliable, and that there is a higher degree of misclassification of occupations and industries in the originally coded data. Additional evidence is presented below indicating that the data contained in the Retrospective Files are indeed more reliable for identifying occupation and industry switches.

4.2. *Identifying True Occupation (Industry) Switches in the Originally Coded Data.* Unfortunately, the reliable Retrospective Files cover only the 1968–80 period, and for the years after that, only the originally coded data are available. In this section we propose and evaluate various methods for identifying genuine occupation and industry switches in the noisy originally coded data. This information is necessary in order to construct measures of workers' tenure in an occupation or an industry. We demonstrate that the estimated returns to the occupation or industry tenure vary depending on the magnitude of the error in identifying genuine occupation and industry switches.

[13] Alternatively, for a respondent who works in two different occupations (industries) in both years, different occupational (industry) descriptions could end up being coded similarly.

[14] In a related paper Mellow and Sider (1983) find that a direct comparison of independently coded individual responses to the CPS with employer records yielded an agreement rate of only 92.3% and 81% for 1-digit industries and occupations, respectively, and 84.1% and 57.6% for 3-digit industries and occupations, respectively.

It has been recognized in the literature that it is unlikely that one can observe a genuine occupation (industry) switch without any other labor market change for a worker. The PSID permits controlling occupation (industry) switches by three such labor market changes: (a) a switch of employer, (b) a switch of position with the same employer, and (c) a switch of industry (occupation). Most of the papers we are aware of used only the employer switches in order to identify true occupation and industry switches.[15] In other words, an occupation (industry) switch identified on the originally coded data is considered to be genuine if and only if it coincides with an employer switch. If a switch in the occupation (industry) code is observed but there is no switch of employer, then the switch in the occupation (industry) code is considered to be a coding error.

To test the performance of various methods for identifying genuine occupation (industry) switches, we exploit the fact that in 1976, 1977, and 1978 the PSID provides both originally and retrospectively assigned occupational codes as well as the data necessary to identify employer and position switches. We start by showing that most of the switches in the Retrospective Files are indeed accompanied by other labor market changes, whereas a much smaller fraction of the occupation (industry) switches identified in the originally coded data is. This indicates that the Retrospective Files are indeed more precise in identifying genuine occupation and industry switches. With this result, we evaluate various methods for identifying true switches by asking: what way of controlling allows us to identify a set of switches in the originally coded data that is closest to the set of switches identified in the Retrospective Files?

4.2.1. *Identifying employer and position switches.* In 1968, 1976–78, and from 1981 to 1993, the PSID asked respondents about the length of their present employment.[16] As Brown and Light (1992) point out, however, this series is often internally inconsistent and exhibits large unexplainable upward and downward swings.

To identify employer switches from the PSID using the length of employment series, we use a method, called Partition T, similar to the method that Brown and Light (1992) find acceptable. The idea behind Partition T is to identify an employer switch whenever the reported length of present employment is smaller than the time elapsed since the last interview date. Besides Partition T, again following Brown and Light (1992), we define Partition 24T that, in addition to all the switches identified by Partition T, identifies a switch in cases where the reported length of employer tenure is 24 months higher or lower than what it should have been, given the tenure reported in the previous interview and the time gap between the two interviews. In other words, we record a switch if the length of the employer tenure variable jumps up or down by "too much" from one year to the next.

[15] Exceptions are Neal (1999) and Pavan (2005), who used simultaneous occupation and industry switches.

[16] In contrast to other years, in 1968, the answer was bracketed, whereas in 1978, only those 45 years of age or younger were asked.

From 1976 to 1987, the PSID asked individuals about the length of their present position and from 1988 to 1993 about the starting month and year of their present position. This information is sufficient to identify position switches using Partition T defined similarly to the corresponding employer partition.[17,18] Finally, we construct a partition in which a position switch is identified if there were a position switch, identified using Partition T as described above, which is not a promotion. We describe the construction of these Partitions in more detail in Appendix A1.

4.2.2. *Methodology for evaluating the performance of alternative procedures identifying true occupation (industry) switches.* In 1976, 1977, and for those younger than 45 in 1978, the PSID provides data necessary to identify employer and position switches as well as both originally and retrospectively assigned 1- and 2-digit occupation and industry codes. In this section we exploit these data in order to evaluate the performance of alternative partitions used to identify employer and position switches in ascertaining genuine occupation and industry switches.

Define *Employer_i*, $i \in \{t, 24t\}$, to represent a partition in which an industry (occupation) switch identified in the originally coded data is considered to be genuine if there is a corresponding switch of employer identified by partition i. Similarly, define *Employer_i_j*, $i \in \{t, 24t\}$ and $j \in \{1d, 2d\}$, to represent a partition in which an industry (occupation) switch identified in the originally coded data is considered to be true if there is a corresponding switch of employer identified by partition i or a switch of a 1- or 2-digit occupation (industry) in the originally coded data defined by j.

Define *Position_k*, $k \in \{t, 24t\}$, to represent a partition in which an industry (occupation) switch identified in the originally coded data is considered to be true if there is a corresponding switch of employer identified by partition k or a corresponding switch of position identified by Partition T. As above, the notation *Position_k_l*, $k \in \{t, 24t\}$ and $l \in \{1d, 2d\}$ represents a partition in which an industry (occupation) switch identified in the originally coded data is considered to be genuine if there is a corresponding switch of employer identified by partition k, or a corresponding switch of position identified by Partition T, or a switch of a 1- or 2-digit occupation (industry) in the originally coded data defined by l.

Finally, define *Position* to represent a partition in which an industry (occupation) switch identified in the originally coded data is considered to be genuine if there is a corresponding switch of position identified by Partition T and this position switch was not a promotion. This way of identifying genuine job switches was advocated by Gottschalk and Moffitt (1994) and Polsky (1999).

[17] Unfortunately, we cannot use a Partition 24T as we did in the case of employer switches because the answer to the length of position question was top coded at 98 months in 1976. Due to the relaxing of this top code in 1977, Partition 24T identifies too many position switches that year.

[18] Due to the change in the survey question, there is an increase in position mobility after 1988. It is not clear which part of the position switches series is more reliable: the one before or the one after 1988. Position-related questioning by the PSID appears to be more thorough after 1988, but the series before 1988 is more comparable with the definition of a position switch that we use in evaluating the performance of various methods for identifying true occupation (industry) switches in the originally coded data.

For each of the partitions we compute the following five statistics.

Statistic 1 is the fraction of switches in the Retrospective Files that also appear as switches in the originally coded data. This statistic represents the maximum fraction of the switches identified in the Retrospective Files that is possible to identify by controlling the originally coded data by the observable labor market changes. Ideally, this statistic should be equal to 100%. This may not be the case, however, since in the originally coded data it is possible to erroneously code different occupations as being the same in two consecutive years. The probability of such a mistake declines with the number of digits in the occupation or industry classification.

Statistic 2 is the fraction of switches in the Retrospective Files that coincide with the observable labor market changes defined by the corresponding partition. Since a true occupation (industry) switch is likely to be accompanied by other labor market changes, this statistic evaluates the authenticity of the switches identified in the Retrospective Files.

Statistic 3 is the fraction of switches in the originally coded data that coincide with the observable labor market changes defined by the corresponding partition. Similarly to Statistic 2, this statistic evaluates the authenticity of the switches identified in the originally coded data. Both Statistic 2 and Statistic 3 may not reach 100% given the imperfect way in which we can identify labor market changes in the PSID. Comparisons between Statistic 2 and Statistic 3 indicate which data are more reliable—the original or the retrospectively coded.

Statistic 4 is the fraction of switches in the Retrospective Files that also appear as switches in the originally coded data controlled by a corresponding observable labor market change.

Statistic 5 is the fraction of switches in the originally coded data controlled by a corresponding observable labor market change that also appear as switches in the Retrospective Files.

The idea behind the last two statistics is as follows. Assuming that the switches identified in the Retrospective Files are genuine, we investigate what is the appropriate observable labor market change indicator that helps identify switches in the originally coded data. There are two types of mistakes that a partition should minimize. First, it should identify as many switches in the originally coded data as possible that correspond to a switch in the Retrospective Files. Second, it should identify as few switches as possible in the originally coded data that do not correspond to a switch in the Retrospective Files. Statistic 4 and Statistic 5 directly evaluate the size of these mistakes for each partition.

There is typically a trade-off between these two statistics. A partition that identifies switches with a high degree of accuracy (high Statistic 5) will identify too few switches (low Statistic 4), and vice versa. The relative importance of these two statistics depends on the relative costs of the biases caused by each error.

4.2.3. *Evaluating the performance of alternative methods for identifying true occupation (industry) switches.* In this subsection we present and discuss the values of statistics 1–5 for all the partitions defined above. For the purposes of this subsection the sample is restricted to employed white male heads of household, aged 18–64, not working for the government, and living in the continental

United States. Those who reported being self-employed or being simultaneously employed by someone else and self, being in the military, or being a farmer in any year between 1968 and 1974 are excluded from the sample altogether. For comparability purposes all the partitions are evaluated using all the observations in 1977 and observations on those younger than 45 in 1978.[19]

The results of the tests are presented in Table 8 for occupational switches and in Table 9 for industry switches. The comparison between Statistic 2 and Statistic 3 indicates that considerably more occupation (industry) switches identified in the originally coded data do not have an accompanying observable labor market change than do the switches identified in the Retrospective Files. For example, 85.06% of the 2-digit industry switches identified on the Retrospective Files have a corresponding employer switch identified by Partition T, whereas only 47.34% of the switches identified on the originally coded data do. Statistic 3 for 2-digit industries reaches its highest level of 67.82% when partition *Position_24t_2d* is used, a partition that identifies the highest number of potential labor market changes. Statistic 2 for the Retrospective Files reaches 96.67% when the same partition is used. We interpret these findings as indicating that the data contained in the Retrospective Files are more reliable than the originally coded data. From now on, we assume that all occupation and industry switches identified in the Retrospective Files are indeed genuine.

We are now in a position to directly determine the level of inaccuracy present in the originally coded data. Statistic 4 in Table 8 indicates that in the uncontrolled originally coded occupation data, 88.21% of the true 1-digit switches and 88.13% of the true 2-digit switches will be identified. Statistic 5, however, reveals that only 52.23% of the 1-digit occupation switches identified on the originally coded data are genuine. At the 2-digit level, the mistake is even bigger: only 47.07% of the identified occupation switches are true. Table 9 shows that similar results hold for the industry switches: whereas close to 90% of the true switches will be identified by using the originally coded data, approximately only half of the industry switches identified will be genuine.

To conclude the discussion of Tables 8 and 9, note that at both the 1- and 2-digit classifications, and for every partition, both Statistics 4 and 5 are considerably worse for occupations than they are for industries. This implies that the constructed occupational tenure sequences will be noisier than the corresponding industry tenure sequences. An increase in either of the two types of measurement error biases estimated returns to tenure downward.

4.3. *Robustness of Results to Alternative Methods for Identifying True Occupation (Industry) Switches.* As discussed in Section 4.2.3, the choice of a partition used to identify occupation (industry) switches has a substantial effect on the amount of noise in measured occupation (industry) tenure. However, in this section, we provide evidence that our main findings are robust to the choice of alternative partitions.

[19] The inclusion of the data in 1976 for the partitions defined in that year (the partitions that do not involve employer switches defined by a corresponding partition 24*t*) leaves the results largely unchanged.

TABLE 8

TESTS FOR IDENTIFYING GENUINE OCCUPATION SWITCHES IN THE ORIGINALLY CODED DATA

	1-Digit					2-Digit				
Partition	Statistic 1	Statistic 2	Statistic 3	Statistic 4	Statistic 5	Statistic 1	Statistic 2	Statistic 3	Statistic 4	Statistic 5
Employer_t	0.8810	0.5476	0.3938	0.5142	0.7770	0.8807	0.4954	0.3424	0.4771	0.7482
	(0.0238)	(0.0464)	(0.0414)	(0.0480)	(0.0401)	(0.0234)	(0.0481)	(0.0402)	(0.0490)	(0.0426)
Employer_t_1d	0.8804	0.6411	0.4659	0.6029	0.7683	0.8807	0.5917	0.4138	0.5642	0.7321
	(0.0239)	(0.0414)	(0.0390)	(0.0436)	(0.0376)	(0.0234)	(0.0433)	(0.0380)	(0.0447)	(0.0399)
Employer_t_2d	0.8804	0.6794	0.5227	0.6364	0.7228	0.8807	0.6422	0.4754	0.6101	0.6891
	(0.0239)	(0.0392)	(0.0368)	(0.0417)	(0.0388)	(0.0234)	(0.0405)	(0.0359)	(0.0423)	(0.0401)
Employer_24t	0.8810	0.5952	0.4533	0.5619	0.7375	0.8807	0.5506	0.4089	0.5321	0.6988
	(0.0238)	(0.0439)	(0.0394)	(0.0457)	(0.0405)	(0.0234)	(0.0454)	(0.0382)	(0.0463)	(0.0426)
Employer_24t_1d	0.8804	0.6555	0.5028	0.6172	0.7288	0.8807	0.6101	0.4581	0.5826	0.6828
	(0.0239)	(0.0406)	(0.0376)	(0.0428)	(0.0391)	(0.0234)	(0.0423)	(0.0365)	(0.0438)	(0.0413)
Employer_24t_2d	0.8804	0.6938	0.5597	0.6507	0.6904	0.8807	0.6606	0.5197	0.6284	0.6493
	(0.0239)	(0.0383)	(0.0354)	(0.0409)	(0.0396)	(0.0234)	(0.0395)	(0.0344)	(0.0413)	(0.0408)
Position	0.8798	0.6011	0.4335	0.5628	0.7518	0.8808	0.5440	0.3896	0.5285	0.7133
	(0.0256)	(0.0467)	(0.0423)	(0.0489)	(0.0426)	(0.0248)	(0.0486)	(0.0408)	(0.0494)	(0.0448)
Position_1d	0.8791	0.6813	0.4952	0.6373	0.7436	0.8808	0.6373	0.4523	0.6114	0.7108
	(0.0258)	(0.0418)	(0.0400)	(0.0446)	(0.0405)	(0.0248)	(0.0434)	(0.0386)	(0.0449)	(0.0417)
Position_2d	0.8791	0.7253	0.5587	0.6758	0.6989	0.8808	0.6943	0.5177	0.6632	0.6737
	(0.0258)	(0.0389)	(0.0374)	(0.0422)	(0.0414)	(0.0238)	(0.0398)	(0.0363)	(0.0418)	(0.0414)

(*Continued*)

TABLE 8
(CONTINUED)

Partition	1-Digit Statistic 1	1-Digit Statistic 2	1-Digit Statistic 3	1-Digit Statistic 4	1-Digit Statistic 5	2-Digit Statistic 1	2-Digit Statistic 2	2-Digit Statistic 3	2-Digit Statistic 4	2-Digit Statistic 5
Position_t	0.8863	0.8057	0.6340	0.7441	0.6916	0.8853	0.7798	0.5878	0.7294	0.6598
	(0.0232)	(0.0303)	(0.0320)	(0.0348)	(0.0369)	(0.0229)	(0.0318)	(0.0317)	(0.0352)	(0.0376)
Position_t_1d	0.8857	0.8524	0.6667	0.7857	0.6933	0.8853	0.8349	0.6244	0.7752	0.6602
	(0.0233)	(0.0265)	(0.0306)	(0.0319)	(0.0359)	(0.0229)	(0.0275)	(0.0303)	(0.0321)	(0.0364)
Position_t_2d	0.8857	0.8667	0.7059	0.8000	0.6667	0.8853	0.8532	0.6683	0.7936	0.6314
	(0.0233)	(0.0252)	(0.0287)	(0.0309)	(0.0364)	(0.0229)	(0.0259)	(0.0284)	(0.0308)	(0.0367)
Position_24t	0.8863	0.8246	0.6704	0.7630	0.6708	0.8853	0.8028	0.6220	0.7523	0.6431
	(0.0232)	(0.0288)	(0.0303)	(0.0335)	(0.0370)	(0.0229)	(0.0301)	(0.0304)	(0.0337)	(0.0374)
Position_24t_1d	0.8857	0.8524	0.6891	0.7857	0.6707	0.8853	0.8349	0.6463	0.7752	0.6377
	(0.0233)	(0.0265)	(0.0295)	(0.0319)	(0.0366)	(0.0229)	(0.0275)	(0.0294)	(0.0321)	(0.0370)
Position_24t_2d	0.8857	0.8667	0.7283	0.8000	0.6462	0.8853	0.8532	0.6902	0.7936	0.6113
	(0.0233)	(0.0252)	(0.0276)	(0.0309)	(0.0369)	(0.0229)	(0.0259)	(0.0275)	(0.0308)	(0.0371)
Original data	0.8821	...	...	0.8821	0.5223	0.8813	...	...	0.8813	0.4707
	(0.0236)			(0.0236)	(0.0365)	(0.0233)			(0.0233)	(0.0359)

NOTES: Standard errors are in parentheses. See the notes in Table 9.

TABLE 9

TESTS FOR IDENTIFYING GENUINE INDUSTRY SWITCHES IN THE ORIGINALLY CODED DATA

	1-Digit					2-Digit				
Partition	Statistic 1	Statistic 2	Statistic 3	Statistic 4	Statistic 5	Statistic 1	Statistic 2	Statistic 3	Statistic 4	Statistic 5
Employer_t	0.8978	0.8394	0.5931	0.7810	0.8843	0.9253	0.8506	0.4734	0.8103	0.8813
	(0.0273)	(0.0342)	(0.0447)	(0.0400)	(0.0309)	(0.0207)	(0.0293)	(0.0395)	(0.0330)	(0.0272)
Employer_t_1d	0.8978	0.9489	0.7157	0.8759	0.8219	0.9253	0.9425	0.6065	0.8908	0.7561
	(0.0273)	(0.0193)	(0.0373)	(0.0301)	(0.0349)	(0.0207)	(0.0182)	(0.0341)	(0.0251)	(0.0345)
Employer_t_2d	0.9160	0.9664	0.7302	0.9076	0.7826	0.9262	0.9530	0.6146	0.8993	0.6943
	(0.0266)	(0.0168)	(0.0378)	(0.0279)	(0.0397)	(0.0223)	(0.0178)	(0.0350)	(0.0260)	(0.0398)
Employer_24t	0.8978	0.8905	0.6520	0.8321	0.8571	0.9253	0.8966	0.5118	0.8563	0.8613
	(0.0273)	(0.0283)	(0.0413)	(0.0350)	(0.0328)	(0.0207)	(0.0244)	(0.0380)	(0.0287)	(0.0283)
Employer_24t_1d	0.8978	0.9489	0.7353	0.8759	0.8000	0.9253	0.9483	0.6213	0.8966	0.7429
	(0.0273)	(0.0193)	(0.0360)	(0.0301)	(0.0365)	(0.0207)	(0.0172)	(0.0335)	(0.0244)	(0.0350)
Employer_24t_2d	0.9160	0.9664	0.7460	0.9076	0.7660	0.9262	0.9597	0.6274	0.9060	0.6853
	(0.0266)	(0.0168)	(0.0367)	(0.0279)	(0.0407)	(0.0223)	(0.0164)	(0.0345)	(0.0251)	(0.0400)
Position	0.9206	0.8651	0.6243	0.8175	0.8729	0.9371	0.8679	0.4872	0.8302	0.8684
	(0.0251)	(0.0327)	(0.0446)	(0.0381)	(0.0328)	(0.0199)	(0.0288)	(0.0405)	(0.0327)	(0.0294)
Position_1d	0.9206	0.9524	0.7249	0.8968	0.8248	0.9371	0.9434	0.6122	0.8994	0.7487
	(0.0251)	(0.0194)	(0.0382)	(0.0286)	(0.0358)	(0.0199)	(0.0189)	(0.0353)	(0.0252)	(0.0363)
Position_2d	0.9358	0.9725	0.7371	0.9266	0.7829	0.9407	0.9556	0.6172	0.9111	0.6872
	(0.0243)	(0.0159)	(0.0388)	(0.0259)	(0.0410)	(0.0210)	(0.0181)	(0.0363)	(0.0257)	(0.0418)
Position_t	0.9065	0.9209	0.7184	0.8489	0.7973	0.9318	0.9205	0.5924	0.8693	0.7574
	(0.0259)	(0.0239)	(0.0370)	(0.0330)	(0.0370)	(0.0197)	(0.0213)	(0.0346)	(0.0272)	(0.0347)
Position_t_1d	0.9065	0.9568	0.7718	0.8849	0.7736	0.9318	0.9489	0.6657	0.8977	0.6960
	(0.0259)	(0.0176)	(0.0333)	(0.0288)	(0.0377)	(0.0197)	(0.0171)	(0.0313)	(0.0241)	(0.0366)

(*Continued*)

TABLE 9
(CONTINUED)

Partition	1-Digit					2-Digit				
	Statistic 1	Statistic 2	Statistic 3	Statistic 4	Statistic 5	Statistic 1	Statistic 2	Statistic 3	Statistic 4	Statistic 5
Position_t_2d	0.9250	0.9750	0.7842	0.9167	0.7383	0.9333	0.9600	0.6709	0.9067	0.6415
	(0.0250)	(0.0144)	(0.0337)	(0.0264)	(0.0419)	(0.0211)	(0.0163)	(0.0323)	(0.0249)	(0.0411)
Position_24t	0.9065	0.9496	0.7488	0.8777	0.7871	0.9318	0.9489	0.6140	0.8977	0.7524
	(0.0259)	(0.0190)	(0.0348)	(0.0297)	(0.0371)	(0.0197)	(0.0171)	(0.0336)	(0.0241)	(0.0343)
Position_24t_1d	0.9065	0.9568	0.7778	0.8849	0.7640	0.9318	0.9545	0.6725	0.9034	0.6913
	(0.0259)	(0.0176)	(0.0328)	(0.0288)	(0.0383)	(0.0197)	(0.0161)	(0.0309)	(0.0234)	(0.0366)
Position_24t_2d	0.9250	0.9750	0.7906	0.9167	0.7285	0.9333	0.9667	0.6782	0.9133	0.6372
	(0.0250)	(0.0144)	(0.0331)	(0.0264)	(0.0424)	(0.0211)	(0.0149)	(0.0319)	(0.0240)	(0.0411)
Original data	0.9000	–	–	0.9000	0.6058	0.9266	–	–	0.9266	0.4781
	(0.0267)			(0.0267)	(0.0435)	(0.0204)			(0.0204)	(0.0390)

NOTES: Standard errors are in parentheses.
Statistic 1 is the fraction of switches in the Retrospective Files that also appear as switches in the originally coded data.
Statistic 2 is the fraction of switches in the Retrospective Files that also appear as corresponding job switches.
Statistic 3 is the fraction of switches in the originally coded data that also appear as corresponding job switches.
Statistic 4 is the fraction of switches in the Retrospective Files that also appear as switches in the originally coded data controlled by a corresponding job switch.
Statistic 5 is the fraction of switches in the originally coded data controlled by a corresponding job switch that also appear as switches in the Retrospective Files.
For comparability purposes all partitions are evaluated using all the observations in 1977 and observations on those younger than 45 in 1978. See the text for definitions of the partitions.

Table 10 reports the returns to 1- and 2-digit occupation and industry tenure after 2, 5, and 8 years. The returns to occupation tenure are derived from the coefficients on occupation tenure when the econometric model (1) is estimated without including in it any of the industry tenure variables. Similarly, when addressing the question of the returns to industry tenure, the econometric model (1) is estimated without any of the occupation tenure variables. For convenience, Table 10 also reproduces Statistics 4 and 5 associated with each of the partitions.

Consider the returns to 5 years of 1-digit occupation tenure. The highest estimated returns of 9.36% are obtained when partition *Employer_t* is used for identifying occupational switches. Note that this partition exhibits the highest Statistic 5 of 77.70%. As we move to partitions with a lower Statistic 5, the estimated returns to occupation tenure decline. For example, under partition *Position_24t* (Statistic 5 of 67.08%) the estimated returns fall to 4.35%, whereas on the uncontrolled data (Statistic 5 of 52.23%) they fall to 3.16%. The returns to 5 years of 2-digit occupation tenure exhibit a similar pattern. Partition *Employer_t* again has the highest Statistic 5 of 74.82% and yields the highest estimated returns of 10.65%. As we move to partitions with a lower Statistic 5, the estimated returns to occupation tenure decline and eventually become as low as 2.90% on the uncontrolled data (Statistic 5 of 47.07%).

The same pattern holds for industry tenure. Consider the returns to 5 years of 1-digit industry tenure. The highest returns of 8.23% are observed when the partition with the highest Statistic 5 of 88.43%—partition *Employer_t*—is used.[20] Using a partition with a lower Statistic 5 results in lower estimated returns. For example, under partition *Position_24t* (Statistic 5 of 78.71%), the estimated returns fall to 3.72%, whereas on the uncontrolled data (Statistic 5 of 60.58%) they fall to 2.56%. The pattern at 2 digits is similar. Partition *Employer_t* is again characterized by

[20] Our estimates of the returns to 5 years of 1-digit industry tenure are close to those reported in Parent (2000), who uses the PSID data to estimate the returns to 1- and 3-digit industry tenure on a similar sample, over the 1981–91 period, and using a partition that is close to our partition *Employer_t*. However, although Parent estimates the returns to 3- and 1-digit industry tenure to be similar, we find that the returns to 5 years of 3-digit industry tenure fall to 4.5%. The main difference between the results is attributable to the fact that Parent (2000) starts his sample in 1981, assigning industry tenure equal to employer tenure for everybody present in the sample in that year as well as for all newcomers entering the sample in later years. This assumption creates an artificial correlation between industry and employer tenure variables, especially in the first several years of the sample, making it difficult to separate the effects on wages of employer and industry tenure. Unlike Parent (2000), we have the benefit of the availability of the newly released Retrospective Files that allow us to start following workers' industry affiliation as early as 1968. As a result, if by 1981 they have switched their industry at least once, we would know exactly their industry tenure at the start of the sample in 1981. It is possible, however, that no switch is registered during that period. This is more likely to happen for the 1-digit industry classification than for the 3-digit one, since the 3-digit industry mobility is considerably higher. Thus the 1-digit industry tenure we construct is closer to Parent's one than the 3-digit tenure. Although by construction our 1-digit industry tenure variable understates true industry tenure by more than the 3-digit one, this is not likely to cause considerable bias in the estimation of returns to industry tenure. Under the assumption that there are positive returns to industry tenure, one would expect these returns to increase at a smaller and smaller rate as tenure rises. As a result, the possible bias would be small once industry tenure becomes large enough, even if it were still smaller than the actual industry tenure.

TABLE 10

RETURNS TO OCCUPATION AND INDUSTRY TENURE, 1-DIGIT AND 2-DIGIT CLASSIFICATIONS

	1-Digit					2-Digit				
	Returns					Returns				
Partition	2 Years (1)	5 Years (2)	8 Years (3)	Stat. 4 (4)	Stat. 5 (5)	2 Years (6)	5 Years (7)	8 Years (8)	Stat. 4 (9)	Stat. 5 (10)
					Occupations					
Employer_t	0.0432*	0.0936*	0.1281*	0.5142	0.7770	0.0495*	0.1065*	0.1436*	0.4771	0.7482
	(0.0057)	(0.0127)	(0.0182)	(0.0480)	(0.0401)	(0.0059)	(0.0133)	(0.0192)	(0.0490)	(0.0426)
Employer_24t	0.0357*	0.0765*	0.1032*	0.5619	0.7375	0.0408*	0.0862*	0.1140*	0.5321	0.6988
	(0.0049)	(0.0106)	(0.0144)	(0.0457)	(0.0405)	(0.0049)	(0.0106)	(0.0144)	(0.0463)	(0.0426)
Position	0.0340*	0.0723*	0.0966*	0.5628	0.7518	0.0426*	0.0899*	0.1185*	0.5285	0.7133
	(0.0052)	(0.0113)	(0.0157)	(0.0489)	(0.0426)	(0.0056)	(0.0123)	(0.0173)	(0.0494)	(0.0448)
Position_24t	0.0218*	0.0435*	0.0539*	0.7630	0.6708	0.0231*	0.0447*	0.0530*	0.7523	0.6431
	(0.0044)	(0.0091)	(0.0119)	(0.0335)	(0.0370)	(0.0044)	(0.0091)	(0.0119)	(0.0337)	(0.0374)
Uncontrolled data	0.0168*	0.0316*	0.0365*	0.8821	0.5223	0.0163*	0.0290*	0.0302*	0.8813	0.4707
	(0.0042)	(0.0087)	(0.0112)	(0.0236)	(0.0365)	(0.0043)	(0.0087)	(0.0112)	(0.0233)	(0.0359)
					Industries					
Employer_t	0.0384*	0.0823*	0.1104*	0.7810	0.8843	0.0280*	0.0590*	0.0776*	0.8103	0.8813
	(0.0064)	(0.0141)	(0.0199)	(0.0400)	(0.0309)	(0.0064)	(0.0141)	(0.0197)	(0.0330)	(0.0272)
Employer_24t	0.0333*	0.0710*	0.0952*	0.8321	0.8571	0.0271*	0.0571*	0.0758*	0.8563	0.8613
	(0.0056)	(0.0121)	(0.0165)	(0.0350)	(0.0328)	(0.0055)	(0.0119)	(0.0162)	(0.0287)	(0.0283)
Position	0.0244*	0.0517*	0.0686*	0.8175	0.8729	0.0206*	0.0423*	0.0538*	0.8302	0.8684
	(0.0060)	(0.0130)	(0.0181)	(0.0381)	(0.0328)	(0.0061)	(0.0132)	(0.0183)	(0.0327)	(0.0294)
Position_24t	0.0192*	0.0372*	0.0436*	0.8777	0.7871	0.0179*	0.0334*	0.0370*	0.8977	0.7524
	(0.0051)	(0.0109)	(0.0146)	(0.0297)	(0.0371)	(0.0050)	(0.0105)	(0.0141)	(0.0241)	(0.0343)
Uncontrolled data	0.0139*	0.0256*	0.0282*	0.9000	0.6058	0.0094	0.0156	0.0139	0.9266	0.4781
	(0.0047)	(0.0098)	(0.0129)	(0.0267)	(0.0435)	(0.0048)	(0.0099)	(0.0130)	(0.0204)	(0.0390)

NOTES: Standard errors are in parentheses.

*Denotes statistical significance at the 5% level.

Statistics 4 and 5 are reproduced from Tables 8 and 9. Returns to occupation tenure are computed from the coefficients on occupation tenure in regression (1) in the text in which industry tenure as well as its square and cube terms are not included. Returns to industry tenure are computed from the coefficients on industry tenure in regression (1) in the text in which occupation tenure as well as its square and cube terms are not included. IV-GLS estimation procedure is used. See the text for definitions of the partitions.

the highest Statistic 5 of 88.13% and gives rise to the highest estimated returns of 5.90%. As we move to partitions with lower Statistic 5, the estimated returns to industry tenure decline and eventually become statistically insignificant on the uncontrolled data.

Taking stock of the results reported so far in this subsection, three findings stand out. First, on all the partitions there are substantial returns to occupation tenure. Second, there are returns to industry tenure when occupational experience is not present in the wage regression. Third, the observed returns to occupation tenure are higher than the returns to industry; the difference is especially pronounced at the 2-digit level. This is despite the fact that both Statistics 4 and 5 are higher for industries than for occupations. Therefore, one might expect that if there were comparable levels of noise in the occupation and industry data, we would observe an even more substantial difference in the estimated returns to occupation and industry tenure.

These results also indicate that the choice of a partition used to identify occupation (industry) switches affects the estimated returns to tenure. In particular, we find that as Statistic 5 declines, the estimated returns to tenure decline as well. That happens despite the fact that a decline in Statistic 5 is usually accompanied by an increase in Statistic 4.

We do not know whether this correlation is spurious. It is possible that partitions with higher Statistic 5, such as *Employer_t* and *Position*, simply make more economic sense. This argument relies on the assumption that most occupational switches within a firm (promotions, in particular) form purposefully designed career tracks preparing the worker for later management responsibilities. There is some scant but suggestive evidence for this in the personnel economics literature (e.g., Dohmen et al., 2003).

An alternative argument can be made as well. Suppose that wages are a strictly concave increasing function of occupational tenure: high-tenured individuals receive higher wages but experience a smaller wage growth than low-tenured individuals. The wage profile observed in the data would be different, since in the process of identifying occupational switches two types of mistakes are made. On the one hand, a switch may be identified when no true switch has actually occurred; on the other hand, a switch that has actually occurred may not be identified. Statistics 4 and 5 tell us exactly how often each of these mistakes is made when a given partition is used. Consider now two extreme partitions.

Suppose that one uses a partition that captures all true occupation switches but also sometimes assigns a switch in cases when no such switch has actually occurred. This is a partition that exhibits Statistic 4 equal to one and Statistic 5 smaller than one. The choice of such a partition implies a small error in identifying high-tenured individuals, whereas the set of individuals identified as being low-tenured contains a number of individuals who are in fact high-tenured. The returns to occupational tenure estimated on this sample would be biased downward due to the following two effects. First, the level of wages for the individuals identified as being low-tenured would be higher than the level of wages for the individuals who actually are low-tenured, whereas the level of wages for the individuals identified as being high-tenured is close to its true level. Second, although wage growth

for the high-tenured is close to its true level, the wage growth observed for the individuals identified as being low-tenured will be lower than the wage growth for the individuals who actually are low-tenured. Both of these effects will bias the estimated returns to tenure downward.

Consider now a partition that misses some genuine switches but never identifies a switch when there is no actual switch. This is a partition that exhibits Statistic 4 smaller than one and Statistic 5 equal to one. This choice of a partition implies that relatively few genuine occupation switches are identified, but the ones that are identified are identified precisely. Thus there is no error in identifying low-tenured individuals, whereas the set of individuals identified as being high-tenured contains a number of individuals who are in fact low-tenured. The level of wages for the individuals identified as being low-tenured is now close to its true level, whereas the observed level of wages for the individuals identified as being high-tenured would be lower than the level of wages for the individuals who actually are high-tenured. This will tend to bias the estimated returns to tenure downward. This bias will be reduced, however, since the higher wage growth observed for the individuals identified as being high-tenured will be higher than the wage growth for those individuals who actually are highly experienced. Overall, the returns to occupational tenure would still be biased downward, but the size of this bias is likely to be smaller than in the case of a partition that exhibits Statistic 4 equal to one and Statistic 5 smaller than one.

The partitions we study lie between these two extreme examples. It is a general result that all the partitions entail mistakes that lead to underestimating the returns to tenure. Although the argument above is less general, when it applies, the partitions with a high Statistic 5—such as partition *Employer_t* and *Position*—would underestimate them the least.

We now turn to assessing the robustness of our findings when the returns are computed from the estimates of model (1) that concurrently includes employer, occupation, and industry tenure variables. Table 11 reports the returns to 2, 5, and 8 years of employer, occupation, and industry experience for various partitions used to identify occupation and industry switches.

First, on all partitions (except for the noisy uncontrolled data) returns to occupation tenure are substantial. For example, on partition *Employer_t* the returns to occupation tenure after 5 years are 8.02% at the 1-digit level, 10.60% at the 2-digit level, and 11.97% at the 3-digit level. Note that the estimated returns to occupation tenure increase with the number of digits in the occupational classification.

Second, there is virtually no evidence of positive returns to industry tenure. Only on partitions *Employer_t* and *Employer_24t* are there returns to industry tenure, and that is observed only at the 1-digit level. Even in those cases, however, the estimated returns to occupation tenure remain higher than the returns to industry tenure. In addition, as pointed out earlier, the industry tenure variables exhibit less measurement error than the occupational ones do. The difference is particularly large precisely on partitions *Employer_t* and *Employer_24t*. Thus it is possible that the returns to industry tenure identified on these two partitions are due to industry tenure proxying for much noisier occupational tenure.

TABLE 11
RETURNS TO TENURE, IV_GLS, VARIOUS PARTITIONS

		1-Digit			2-Digit			3-Digit		
		2 Years (1)	5 Years (2)	8 Years (3)	2 Years (4)	5 Years (5)	8 Years (6)	2 Years (7)	5 Years (8)	8 Years (9)
A.	Employer_t									
	Occupation	0.0368*	0.0802*	0.1108*	0.0496*	0.1060*	0.1418*	0.0539*	0.1197*	0.1680*
		(0.0064)	(0.0139)	(0.0194)	(0.0065)	(0.0145)	(0.0204)	(0.0068)	(0.0153)	(0.0220)
	Industry	0.0212*	0.0464*	0.0634*	0.0054	0.0133	0.0204	−0.0020	−0.0064	−0.0123
		(0.0068)	(0.0146)	(0.0199)	(0.0067)	(0.0142)	(0.0191)	(0.0071)	(0.0149)	(0.0201)
	Employer	0.0022	0.0034	0.0062	−0.0003	0.0023	0.0060	0.0008	0.0019	0.0044
		(0.0093)	(0.0118)	(0.0152)	(0.0093)	(0.0124)	(0.0163)	(0.0095)	(0.0136)	(0.0182)
B.	Employer_24t									
	Occupation	0.0294*	0.0629*	0.0854*	0.0394*	0.0826*	0.1083*	0.0376*	0.0817*	0.1123*
		(0.0056)	(0.0118)	(0.0157)	(0.0056)	(0.0119)	(0.0158)	(0.0057)	(0.0120)	(0.0160)
	Industry	0.0194*	0.0424*	0.0584*	0.0079	0.0185	0.0276	0.0018	0.0032	0.0034
		(0.0063)	(0.0133)	(0.0177)	(0.0061)	(0.0127)	(0.0168)	(0.0061)	(0.0127)	(0.0167)
	Employer	0.0067	0.0126	0.0191	0.0033	0.0104	0.0175	0.0075	0.0155	0.0226
		(0.0094)	(0.0113)	(0.0143)	(0.0090)	(0.0114)	(0.0146)	(0.0089)	(0.0116)	(0.0151)
C.	Position									
	Occupation	0.0298*	0.0643*	0.0879*	0.0412*	0.0875*	0.1165*	0.0509*	0.1105*	0.1510*
		(0.0058)	(0.0125)	(0.0170)	(0.0064)	(0.0138)	(0.0189)	(0.0065)	(0.0143)	(0.0173)
	Industry	0.0096	0.0206	0.0271	0.0012	0.0023	0.0020	−0.0096	−0.0211	−0.0299
		(0.0066)	(0.0140)	(0.0188)	(0.0068)	(0.0143)	(0.0192)	(0.0069)	(0.0142)	(0.0188)
	Employer	0.0012	0.0086	0.0170	−0.0054	−0.0007	0.0052	0.0005	0.0036	0.0074
		(0.0093)	(0.0115)	(0.0147)	(0.0095)	(0.0123)	(0.0160)	(0.0094)	(0.0127)	(0.0168)

(*Continued*)

TABLE 11
(CONTINUED)

		1-Digit			2-Digit			3-Digit		
		2 Years (1)	5 Years (2)	8 Years (3)	2 Years (4)	5 Years (5)	8 Years (6)	2 Years (7)	5 Years (8)	8 Years (9)
D.	Position_24t									
	Occupation	0.0187*	0.0373*	0.0466*	0.0192*	0.0373*	0.0447*	0.0222*	0.0435*	0.0524*
		(0.0048)	(0.0098)	(0.0126)	(0.0048)	(0.0098)	(0.0126)	(0.0047)	(0.0096)	(0.0124)
	Industry	0.0099	0.0194	0.0229	0.0078	0.0144	0.0153	0.0018	0.0008	−0.0041
		(0.0055)	(0.0114)	(0.0151)	(0.0053)	(0.0110)	(0.0144)	(0.0050)	(0.0101)	(0.0131)
	Employer	0.0103	0.0241*	0.0382*	0.0079	0.0232*	0.0386*	0.0118	0.0288*	0.0454*
		(0.0089)	(0.0107)	(0.0134)	(0.0087)	(0.0107)	(0.0137)	(0.0083)	(0.0103)	(0.0133)
E.	Uncontrolled Data									
	Occupation	0.0150*	0.0284*	0.0330*	0.0141*	0.0246*	0.0248*	0.0095	0.0153	0.0132
		(0.0044)	(0.0088)	(0.0113)	(0.0044)	(0.0088)	(0.0112)	(0.0049)	(0.0094)	(0.0117)
	Industry	0.0094	0.0181	0.0212	0.0039	0.0059	0.0039	0.0042	0.0068	0.0057
		(0.0048)	(0.0098)	(0.0128)	(0.0048)	(0.0097)	(0.0126)	(0.0048)	(0.0097)	(0.0128)
	Employer	0.0165*	0.0333*	0.0490*	0.0163*	0.0338*	0.0499*	0.0185*	0.0325*	0.0457*
		(0.0085)	(0.0098)	(0.0122)	(0.0081)	(0.0096)	(0.0120)	(0.0078)	(0.0090)	(0.0113)

NOTES: Standard errors are in parentheses.
*Denotes statistical significance at the 5% level.
Returns to employer, industry, and occupation tenure are computed from the econometric model (1) in the text. IV-GLS estimation procedure is used. See the text for definitions of the partitions.

It is insightful to compare the returns to occupation and industry tenure reported in Tables 10 and 11. Take partition *Employer_t* as an example. From Table 10 we see that when version 2 of model (1) including industry and employer tenure only is estimated, the returns to 5 years of 2-digit industry tenure are 5.90%. When version 3 of model (1), including occupation and employer tenure only, is estimated, the returns to 5 years of 2-digit occupation tenure are 10.65%. However, as Table 11 reports, when we estimate the complete model including both occupation and industry tenure, the returns to occupation tenure barely change to 10.60%, whereas those to industry tenure become statistically insignificant. This observation suggests that if occupation tenure is left out of the analysis, then its effect on wages would be erroneously attributed to industry tenure.

Third, we find no returns to employer tenure on partitions *Employer_t*, *Employer_24t*, and *Position*. At the same time, under partition *Position_24t* the estimated returns to employer tenure are roughly as high as the estimated returns to occupational tenure. This partition, however, exhibits a considerably lower Statistic 5 than the former two. As our analysis in Section 4.2.3 pointed out, in such cases the observed wage–tenure profile would tend to be flat and far from the actual one. As a result, a significant fraction of the wage growth that is due to occupation (or industry) tenure is attributed to employer tenure.

Thus, the key message of this section is that on all the partitions we find sizable returns to occupation tenure that are at least as large as the returns to employer tenure and often considerably larger. We find virtually no returns to industry tenure. This evidence is once again consistent with human capital being specific to 3-digit occupations.

5. CONCLUSION

In this article we have found substantial returns to occupational tenure. Everything else being constant, 5 years of occupational tenure are associated with an increase in wages of 12%–20%. This finding is consistent with occupational specificity of human capital. Moreover, we have shown that when one takes into account occupational experience, tenure with an industry or an employer has considerably less importance in explaining the wage one receives.

Our results were first motivated by the observation in the U.S. Displaced Workers Survey that it is workers switching occupations upon job displacement who drive the finding of large earning losses of displaced workers. We then concentrated on the much richer Panel Study of Income Dynamics data and found that wages grow with occupational tenure.

We devoted considerable effort to analyzing the robustness of the results. A particular concern was the effects of alternative methods for identifying true occupation and industry switches. To do so, we have used the PSID Retrospective Occupation-Industry Supplemental Data Files that retrospectively recode the reported occupations and industries of household heads and wives for the 1968–80 period. We have argued that the methodology employed by the PSID in constructing the Retrospective Files—different from the one employed in the original coding of the occupation and industry affiliation data—minimizes the error in identifying true industry and occupation switches, a crucial step in constructing

consistent occupational and industry tenure. We have used the Retrospective Files to document that the originally coded occupation and industry affiliation data in the PSID are often incorrect, to evaluate various methods for identifying genuine occupation and industry switches, and to demonstrate that the use of raw or improperly corrected occupational or industry data may bias the results of an empirical investigation substantially. Our main findings remain robust across different methods for identifying occupation and industry switches. We have performed a number of additional robustness checks, many of which are not reported in the article due to space constraints. We are left with no doubt that occupational experience is a major determinant of earnings. Moreover, it appears considerably more important than either firm or industry tenure.

APPENDIX

A. *Variable Construction Procedures*

A1. *Identifying employer and position switches.* We identify the employer tenure information in the PSID from the responses to the following questions:

1968: "How long have you been working for your present employer?"

1969–75: "How long have you had this job?"

1976–78, 1981–83: "How long have you worked for your present employer?"

1984–87: "How many years altogether have you worked for your present employer?"

1988–93: "How many years' experience do you have altogether with your present employer?"

In some years the answers to those questions were bracketed and then the tenure was set equal to the midpoint of the interval.

We identify the position tenure information in the PSID from the responses to the following questions:

1976–83: "How long have you had your present position?"[21]

1984–93: "In what month and year did you start working in your present (position/work situation)?"

To identify employer switches from the PSID using the length of employment series in 1976–78 and 1981–93, we use a method, called Partition T, similar to the method that Brown and Light (1992) find acceptable. The details follow.

An employer switch is identified if:

1. In 1968 the reported employer tenure is less than 12 months.
2. In 1969 the reported employer tenure is reported to be between 12 and 19 months and no employer switch was identified in 1968.
3. In every year between and including 1969 and 1975 if
   (a) the reported length of job is below 12 months.
   (b) the reported length of present job is between 12 and 19 months and the person is a new entrant into the sample as head of a household.

[21] The answer to this question was top coded at 98 months in 1976.

4. In every year between and including 1970 and 1975 if the reported length of present job is between 12 and 19 months and the reported length of job in the previous year was longer than 19 months.
5. In 1976 and the reported employer tenure is less than 15 months.
6. In any year after 1976 (inclusive) if the reported length of present employment is smaller than the time elapsed since the last interview.
7. In addition, in any year after 1977 (inclusive) if

   (a) the reported length of present employment is smaller than 10 months and the time elapsed since the last interview is not known.
   (b) the reported length of present employment is between 10 and 15 months, the reported length of employment in the previous year is higher than 5 months, and the time elapsed since the last interview is not known.
   (c) the reported length of present employment is between 15 and 21 months, the reported length of employment in the previous year is higher than 11 months, and the time elapsed since the last interview is not known.
   (d) the reported length of present employment is between 10 and 15 months and the person is a new entrant into the sample as head of a household.
   (e) the reported length of present employment is between 10 and 15 months, is longer than the time elapsed since the last interview, and no employer switch could be identified in the previous year due to missing data on employer tenure in that year.
   (f) the reported length of present employment is smaller than 18 months, is longer than the time elapsed since the last interview, and no employer switch was identified in the previous year.
   (g) the reported length of present employment is longer than the time elapsed since the last interview date, an employer switch was identified in the previous year, and the difference between reported employer tenure minus the time that elapsed since the last interview and employer tenure reported in the previous year is smaller or equal to -6.

Besides Partition T, again following Brown and Light (1992), we define Partition 24T that, in addition to all the switches identified by Partition T, identifies in 1977–78 and 1981–93 a switch in the cases when the reported length of employer tenure is 24 months higher or lower than what it should have been given the tenure reported in the previous year and the time gap between the two interviews. For the purpose of defining this partition, the time gap between the two consecutive interviews is assumed to be equal to 12 months when it is not known.

We identify position switches using two partitions—Partition T and Partition 24T defined similarly to the corresponding employer partitions described above. Further, we construct a partition in which a position switch is identified if there were a position switch, identified using Partition T as described above, which is

not a promotion. We obtain information on promotions in the PSID from the responses to the following questions:

1976–78: "What happened to the job you had before—did the company fold, were you laid off, or what?"

1979–83: "What happened to the job you had before—did the company go out of business, were you laid off, promoted, were you not working, or what?"

1984–87: "What happened to that job–did the company go out of business, were you (HEAD) laid off, promoted, or what?"

The answers for these question in the 1976–87 period are:

1. Company folded/changed hands/moved out of town; employer died/went out of business
2. Strike; lockout
3. Laid off; fired
4. Quit; resigned; retired; pregnant; needed more money; just wanted a change in jobs; was self-employed before; still has previous job (in addition to the job in C6)
5. No previous job; first full-time or permanent job ever had; was not working before this
6. Promotion
7. Other—(including drafted into service or any mention of service)
8. Job was completed; seasonal work; was a temporary job

After 1987, it is no longer possible to identify whether a position switch is a promotion since the question asked changes and a promotion is no longer among the separate possible answers.

A2. *Constructing employer and position tenure.* Once employer and position switches are identified, we construct consistent tenure variables as follows. Every person who is present in the sample in 1968 or enters the sample in a later year is assigned tenure equal to his/her employer tenure in that year. Employer tenure is also set equal to the reported tenure in 1981 and for every individual in a year when an employer switch is identified. Then in 1969–78 and 1982–93 employer tenure is increased by one year if the individual does not report an employer switch next year and works more than 800 hours during that year. If the individual works at most 800 hours during that year, his/her employer tenure is not incremented. Position tenure is defined for the period 1976–93 and is constructed analogously.

A3. *Constructing occupation and industry tenure.* An uncontrolled occupation switch is identified if an individual reports an occupation different from his/her most recent previous report of an occupation. For example, an individual employed in two consecutive years would be considered as switching occupations if she reports a current occupation different from the one she reported in the previous year. If an individual is employed in the current year but was unemployed in the previous year, a switch in his occupation will be recorded if he reports a current occupation different from the one he reported when he was most recently employed. Uncontrolled industry switches are defined similarly.

Occupational and industry switches until 1980 are identified from the Retrospective Files. After 1980 we identify genuine occupational switches in the originally coded data using each of the partitions (methods) described in Section 4.2. Having identified occupation and industry switches over the whole 1969–93 period, we construct consistent occupation and industry tenure as follows. Every person who is present in the sample in 1968 or enters the sample in a later year is assigned occupation and industry tenure equal to his/her employer tenure in that year.[22] If the information on the employer tenure in that year is not available, occupation and industry tenure are set equal to the position tenure in that year. From then on, occupation (industry) tenure is increased by one year if the individual does not report an occupational (industry) switch next year, works more than 800 hours during that year, and reports being employed at the next interview. If the individual is unemployed at the next interview or works at most 800 hours during that year, his/her occupation (industry) tenure is not incremented. If an individual reports an occupation (industry) switch, his/her occupation (industry) tenure is reset to 6 months.

A4. *Constructing other variables*

Wages. As a measure of wages we use real hourly wages reported by individuals at the time of the interview. Therefore, wages are related to the occupation, industry, and firm in which the individual is employed at the time of the interview.

Overall labor market experience. Questions regarding overall labor market experience are asked of every household head in 1974, 1975, 1976, and 1985. We first adjust overall experience in 1974 to be consistent with 1975 and 1976 values where possible. Next, we use 1974 as the base year, i.e., we assume that whatever is recorded in 1974 for the existing heads or for the entrants into the sample in the first year when they appear is true. If reported experience implies that an individual started working before age of 18, we redefine it to be the number of years since the age 18 for that individual. Given these adjustments, we construct overall labor market experience by incrementing it by one year if the individual reports working more than 800 hours in that year.

Education. Education is reported in the PSID in 1968, 1975, and 1985 for existing heads of households, and every year for the new entrants into the sample only. It is kept constant between the years in which it is updated. As a result, there would be a bias toward a lower educational level. For example, if education is 10 years in 1975 and 16 in 1985, it would be reported 10 between 1975 and 1985. If the individual, however, had 16 years of education already in 1980, then for 5 years he would be counted as less educated than he actually is. To minimize this bias, we fix the education variable used in the earnings functions estimation to be equal to its 1985 value where possible. To make the education variable comparable across time, we top code its 1968 report at 17 years.

[22] This is similar to Parent (2000).

B. *Occupation and Industry Codes*

B1. *Three-digit occupation and industry codes.*

Three-Digit Occupation Classification System.[23]

PROFESSIONAL, TECHNICAL, AND KINDRED WORKERS
001 Accountants
002 Architects

Computer specialists
003 Computer programmers
004 Computer systems analysts
005 Computer specialists, not elsewhere classified

Engineers
006 Aeronautical and astronautical engineers
010 Chemical engineers
011 Civil engineers
012 Electrical and electronic engineers
013 Industrial engineers
014 Mechanical engineers
015 Metallurgical and materials engineers
020 Mining engineers
021 Petroleum engineers
022 Sales engineers
023 Engineers, not elsewhere classified
024 Farm management advisors
025 Foresters and conservationists
026 Home management advisors

Lawyers and judges
030 Judges
031 Lawyers

Librarians, archivists, and curators
032 Librarians
033 Archivists and curators

Mathematical specialists
034 Actuaries
035 Mathematicians
036 Statisticians

Life and physical scientists
042 Agricultural scientists
043 Atmospheric and space scientists
044 Biological scientists
045 Chemists
051 Geologists
052 Marine scientists
053 Physicists and astronomers
054 Life and physical scientists, not elsewhere classified
055 Operations and systems researchers and analysts
056 Personnel and labor relations workers

Physicians, dentists, and related practitioners
061 Chiropractors
062 Dentists
063 Optometrists
064 Pharmacists
065 Physicians, medical and osteopathic
071 Podiatrists
072 Veterinarians
073 Health practitioners, not elsewhere classified

Nurses, dietitians, and therapists
074 Dietitians
075 Registered nurses
076 Therapists

Health technologists and technicians
080 Clinical laboratory technologists and technicians
081 Dental hygienists
082 Health record technologists and technicians
083 Radiologic technologists and technicians
084 Therapy assistants
085 Health technologists and technicians, not elsewhere classified

[23] Source: PSID wave XIV—1981 documentation, Appendix 2: Industry and Occupation Codes.

Religious workers
086 Clergymen
090 Religious workers, not elsewhere classified

Social scientists
091 Economists
092 Political scientists
093 Psychologists
094 Sociologists
095 Urban and regional planners
096 Social scientists, not elsewhere classified

Social and recreation workers
100 Social workers
101 Recreation workers

Teachers, college and university
102 Agriculture teachers
103 Atmospheric, earth, marine, and space teachers
104 Biology teachers
105 Chemistry teachers
110 Physics teachers
111 Engineering teachers
112 Mathematics teachers
113 Health specialties teachers
114 Psychology teachers
115 Business and commerce teachers
116 Economics teachers
120 History teachers
121 Sociology teachers
122 Social science teachers, not elsewhere classified
123 Art, drama, and music teachers
124 Coaches and physical education teachers
125 Education teachers
126 English teachers
130 Foreign language teachers
131 Home economics teachers
132 Law teachers
133 Theology teachers
134 Trade, industrial, and technical teachers
135 Miscellaneous teachers, college and university
140 Teachers, college and university, subject not specified

Teachers, except college and university
141 Adult education teachers
142 Elementary school teachers
143 Prekindergarten and kindergarten teachers
144 Secondary school teachers
145 Teachers, except college and university, not elsewhere classified

Engineering and science technicians
150 Agriculture and biological technicians, except health
151 Chemical technicians
152 Draftsmen
153 Electrical and electronic engineering technicians
154 Industrial engineering technicians
155 Mechanical engineering technicians
156 Mathematical technicians
161 Surveyors
162 Engineering and science technicians, not elsewhere classified

Technicians, except health, and engineering and science
163 Airplane pilots
164 Air traffic controllers
165 Embalmers
170 Flight engineers
171 Radio operators
172 Tool programmers, numerical control
173 Technicians, not elsewhere classified
174 Vocational and educational counselors

Writers, artists, and entertainers
175 Actors
180 Athletes and kindred workers
181 Authors

182 Dancers
183 Designers
184 Editors and reporters
185 Musicians and composers
190 Painters and sculptors
191 Photographers
192 Public relations men and publicity writers
193 Radio and television announcers
194 Writers, artists, and entertainers, not elsewhere classified
195 Research workers, not specified

MANAGERS AND ADMINISTRATORS, EXCEPT FARM

201 Assessors, controllers, and treasurers; local public administration
202 Bank officers and financial managers
203 Buyers and shippers, farm products
205 Buyers, wholesale and retail trade
210 Credit men
211 Funeral directors
212 Health administrators
213 Construction inspectors, public administration
215 Inspectors, except construction, public administration
216 Managers and superintendents, building
220 Office managers, not elsewhere classified
221 Officers, pilots, and pursers; ship
222 Officials and administrators; public administration, not elsewhere classified
223 Officials of lodges, societies, and unions
224 Postmasters and mail superintendents
225 Purchasing agents and buyers, not elsewhere classified
226 Railroad conductors
230 Restaurant, cafeteria, and bar managers
231 Sales managers and department heads, retail trade
233 Sales managers, except retail trade
235 School administrators, college
240 School administrators, elementary and secondary
245 Managers and administrators, not elsewhere classified

SALES WORKERS

260 Advertising agents and salesmen
261 Auctioneers
262 Demonstrators
264 Hucksters and peddlers
265 Insurance agents, brokers, and underwriters
266 Newsboys
270 Real estate agents and brokers
271 Stock and bond salesmen
280 Salesmen and sales clerks, not elsewhere classified

Salesmen were divided into 5 categories dependent on industry. The industry codes are shown in parentheses.

281 Sales representatives, manufacturing industries (Ind. 107–399)
282 Sales representatives, wholesale trade (Ind. 017–058, 507–599)
283 Sales clerks, retail trade (Ind. 608–699 except 618, 639, 649, 667, 668, 688)
284 Salesmen, retail trade (Ind. 607, 618, 639, 649, 667, 668, 688)
285 Salesmen of services and construction (Ind. 067–078, 407–499, 707–947)

CLERICAL AND KINDRED WORKERS

301 Bank tellers
303 Billing clerks
305 Bookkeepers
310 Cashiers
311 Clerical assistants, social welfare

312 Clerical supervisors, not elsewhere classified
313 Collectors, bill and account
314 Counter clerks, except food
315 Dispatchers and starters, vehicle
320 Enumerators and interviewers
321 Estimators and investigators, not elsewhere classified
323 Expediters and production controllers
325 File clerks
326 Insurance adjusters, examiners, and investigators
330 Library attendants and assistants
331 Mail carriers, post office
332 Mail handlers, except post office
333 Messengers and office boys
334 Meter readers, utilities

Office machine operators
341 Bookkeeping and billing machine operators
342 Calculating machine operators
343 Computer and peripheral equipment operators
344 Duplicating machine operators
345 Key punch operators
350 Tabulating machine operators
355 Office machine operators, not elsewhere classified
360 Payroll and timekeeping clerks
361 Postal clerks
362 Proofreaders
363 Real estate appraisers
364 Receptionists
Secretaries
370 Secretaries, legal
371 Secretaries, medical
372 Secretaries, not elsewhere classified
374 Shipping and receiving clerks
375 Statistical clerks
376 Stenographers
381 Stock clerks and storekeepers
382 Teacher aides, except school monitors
383 Telegraph messengers
384 Telegraph operators
385 Telephone operators
390 Ticket, station, and express agents
391 Typists
392 Weighers
394 Miscellaneous clerical workers
395 Not specified clerical workers

CRAFTSMEN AND KINDRED WORKERS
401 Automobile accessories installers
402 Bakers
403 Blacksmiths
404 Boilermakers
405 Bookbinders
410 Brickmasons and stonemasons
411 Brickmasons and stonemasons, apprentices
412 Bulldozer operators
413 Cabinetmakers
415 Carpenters
416 Carpenter apprentices
420 Carpet installers
421 Cement and concrete finishers
422 Compositors and typesetters
423 Printing trades apprentices, except pressmen
424 Cranemen, derrickmen, and hoistmen
425 Decorators and window dressers
426 Dental laboratory technicians
430 Electricians
431 Electrician apprentices
433 Electric power linemen and cablemen
434 Electrotypers and stereotypers
435 Engravers, except photoengravers
436 Excavating, grading, and road machine operators, except bulldozer
440 Floor layers, except tile setters
441 Foremen, not elsewhere classified
442 Forgemen and hammermen
443 Furniture and wood finishers
444 Furriers

445 Glaziers
446 Heat treaters, annealers, and temperers
450 Inspectors, scalers, and graders; log and lumber
452 Inspectors, not elsewhere classified
453 Jewelers and watchmakers
454 Job and die setters, metal
455 Locomotive engineers
456 Locomotive firemen
461 Machinists
462 Machinist apprentices

Mechanics and repairmen
470 Air conditioning, heating, and refrigeration
471 Aircraft
472 Automobile body repairmen
473 Automobile mechanics
474 Automobile mechanic apprentices
475 Data processing machine repairmen
480 Farm implement
481 Heavy equipment mechanics, including diesel
482 Household appliance and accessory installers and mechanics
483 Loom fixers
484 Office machine
485 Radio and television
486 Railroad and car shop
491 Mechanic, except auto, apprentices
492 Miscellaneous mechanics and repairmen
495 Not specified mechanics and repairmen
501 Millers; grain, flour, and feed
502 Millwrights
503 Molders, metal
504 Molder apprentices
505 Motion picture projectionists
506 Opticians, and lens grinders and polishers
510 Painters, construction and maintenance
511 Painter apprentices
512 Paperhangers
514 Pattern and model makers, except paper
515 Photoengravers and lithographers
516 Piano and organ tuners and repairmen
520 Plasterers
521 Plasterer apprentices
522 Plumbers and pipe fitters
523 Plumber and pipe fitter apprentices
525 Power station operators
530 Pressmen and plate printers, printing
531 Pressman apprentices
533 Rollers and finishers, metal
534 Roofers and slaters
535 Sheetmetal workers and tinsmiths
536 Sheetmetal apprentices
540 Shipfitters
542 Shoe repairmen
543 Sign painters and letterers
545 Stationary engineers
546 Stone cutters and stone carvers
550 Structural metal craftsmen
551 Tailors
552 Telephone installers and repairmen
554 Telephone linemen and splicers
560 Tile setters
561 Tool and die makers
562 Tool and die maker apprentices
563 Upholsterers
571 Specified craft apprentices, not elsewhere classified
572 Not specified apprentices
575 Craftsmen and kindred workers, not elsewhere classified

ARMED FORCES
600 Members of armed forces

OPERATIVES, EXCEPT TRANSPORT
601 Asbestos and insulation workers
602 Assemblers
603 Blasters and powdermen

604 Bottling and canning operatives
605 Chainmen, rodmen, and axmen; surveying
610 Checkers, examiners, and inspectors; manufacturing
611 Clothing ironers and pressers
612 Cutting operatives, not elsewhere classified
613 Dressmakers and seamstresses, except factory
614 Drillers, earth
615 Dry wall installers and lathers
620 Dyers
621 Filers, polishers, sanders, and buffers
622 Furnacemen, smeltermen, and pourers
623 Garage workers and gas station attendants
624 Graders and sorters, manufacturing
625 Produce graders and packers, except factory and farm
626 Heaters, metal
630 Laundry and dry cleaning operatives, not elsewhere classified
631 Meat cutters and butchers, except manufacturing
633 Meat cutters and butchers, manufacturing
634 Meat wrappers, retail trade
635 Metal platers
636 Milliners
640 Mine operatives, not elsewhere classified
641 Mixing operatives
642 Oilers and greasers, except auto
643 Packers and wrappers,except meat and produce
644 Painters, manufactured articles
645 Photographic process workers

Precision machine operatives
650 Drill press operatives
651 Grinding machine operatives
652 Lathe and milling machine operatives
653 Precision machine operatives, not elsewhere classified
656 Punch and stamping press operatives
660 Riveters and fasteners
661 Sailors and deckhands
662 Sawyers
663 Sewers and stitchers
664 Shoemaking machine operatives
665 Solderers
666 Stationary firemen

Textile operatives
670 Carding, lapping, and combing operatives
671 Knitters, loopers, and toppers
672 Spinners, twisters, and winders
673 Weavers
674 Textile operatives, not elsewhere classified
680 Welders and flame-cutters
681 Winding operatives, not elsewhere classified
690 Machine operatives, miscellaneous specified
692 Machine operatives, not specified
694 Miscellaneous operatives
695 Not specified operatives

TRANSPORT EQUIPMENT OPERATIVES
701 Boatmen and canalmen
703 Bus drivers
704 Conductors and motormen, urban rail transit
705 Deliverymen and routemen
706 Fork lift and tow motor operatives
710 Motormen; mine, factory, logging camp, etc.
711 Parking attendants
712 Railroad brakemen
713 Railroad switchmen
714 Taxicab drivers and chauffeurs
715 Truck drivers

LABORERS, EXCEPT FARM
740 Animal caretakers, except farm
750 Carpenters' helpers

751 Construction laborers, except carpenters' helpers
752 Fishermen and oysterman
753 Freight and material handlers
754 Garbage collectors
755 Gardeners and groundskeepers, except farm
760 Longshoremen and stevedores
761 Lumbermen, raftsmen, and woodchoppers
762 Stock handlers
763 Teamsters
764 Vehicle washers and equipment cleaners
770 Warehousemen, not elsewhere classified
780 Miscellaneous laborers
785 Not specified laborers

FARMERS AND FARM MANAGERS
801 Farmers (owners and tenants)
802 Farm managers

FARM LABORERS AND FARM FOREMEN
821 Farm foremen
822 Farm laborers, wage workers
823 Farm laborers, unpaid family workers
824 Farm service laborers, self-employed

SERVICE WORKERS, EXCEPT PRIVATE HOUSEHOLD
Cleaning service workers
901 Chambermaids and maids, except private household
902 Cleaners and charwomen
903 Janitors and sextons

Food service workers
910 Bartenders
911 Busboys
912 Cooks, except private household
913 Dishwashers
914 Food counter and fountain workers
915 Waiters
916 Food service workers, not elsewhere classified, except private household

Health service workers
921 Dental assistants
922 Health aides, except nursing
923 Health trainees
924 Lay midwives
925 Nursing aides, orderlies, and attendants
926 Practical nurses

Personal service workers
931 Airline stewardesses
932 Attendants, recreation and amusement
933 Attendants, personal service, not elsewhere classified
934 Baggage porters and bellhops
935 Barbers
940 Boarding and lodging house keepers
941 Bootblacks
942 Child care workers, except private household
943 Elevator operators
944 Hairdressers and cosmetologists
945 Personal service apprentices
950 Housekeepers, except private household
952 School monitors
953 Ushers, recreation and amusement
954 Welfare service aides

Protective service workers
960 Crossing guards and bridge tenders
961 Firemen, fire protection
962 Guards and watchmen
963 Marshals and constables
964 Policemen and detectives
965 Sheriffs and bailiffs

PRIVATE HOUSEHOLD WORKERS
980 Child care workers, private household
981 Cooks, private household

982 Housekeepers, private household
983 Laundresses, private household
984 Maids and servants, private household

Three-Digit Industry Classification System.[24]

AGRICULTURE, FORESTRY, AND FISHERIES
017 Agricultural production
018 Agricultural services, except horticultural
019 Horticultural services
027 Forestry
028 Fisheries

MINING
047 Metal mining
048 Coal mining
049 Crude petroleum and natural gas extractions
057 Nonmetallic mining and quarrying, except fuel

CONSTRUCTION
067 General building contractors
068 General contractors, except building
069 Special trade contractors
077 Not specified construction

MANUFACTURING-Durable Goods
Lumber and wood products, except furniture
107 Logging
108 Sawmills, planning mills, and mill work
109 Miscellaneous wood products
118 Furniture and fixtures

Stone, clay, and glass products
119 Glass and glass products
127 Cement, concrete, gypsum, and plaster products
128 Structural clay products
137 Pottery and related products
138 Miscellaneous nonmetallic mineral and stone products

Metal industries
139 Blast furnaces, steel works, rolling and finishing mills
147 Other primary iron and steel industries
148 Primary aluminum industries
149 Other primary nonferrous industries
157 Cutlery, hand tools, and other hardware
158 Fabricated structural metal products
159 Screw machine products
167 Metal stamping
168 Miscellaneous fabricated metal products
169 Not specified metal industries

Machinery, except electrical
177 Engines and turbines
178 Farm machinery and equipment
179 Construction and material handling machines
187 Metalworking machinery
188 Office and accounting machines
189 Electronic computing equipment
197 Machinery, except electrical, not elsewhere classified
198 Not specified machinery

Electrical machinery, equipment, and supplies
199 Household appliances
207 Radio, T.V., and communication equipment
208 Electrical machinery, equipment, and supplies, not elsewhere classified
209 Not specified electrical machinery, equipment, and supplies

Transportation equipment
219 Motor vehicles and motor vehicle equipment
227 Aircraft and parts

[24] Source: PSID wave XIV—1981 documentation, Appendix 2: Industry and Occupation Codes.

228 Ship and boat building and repairing
229 Railroad locomotives and equipment
237 Mobile dwellings and campers
238 Cycles and miscellaneous transportation equipment

Professional and photographic equipment, and watches
239 Scientific and controlling instruments
247 Optical and health services supplies
248 Photographic equipment and supplies
249 Watches, clocks, and clockwork-operated devices
257 Not specified professional equipment
258 Ordnance
259 Miscellaneous manufacturing industries

MANUFACTURING-Nondurable Goods
Food and kindred products
268 Meat products
269 Dairy products
278 Canning and preserving fruits, vegetables, seafoods
279 Grain-mill products
287 Bakery products
288 Confectionery and related products
289 Beverage industries
297 Miscellaneous food preparation and kindred products
298 Not specified food industries
299 Tobacco manufactures

Textile mill products
307 Knitting mills
308 Dyeing and finishing textiles, except wool and knit goods
309 Floor coverings, except hard surface
317 Yarn, thread, and fabric mills
318 Miscellaneous textile mill products

Apparel and other fabricated textile products
319 Apparel and accessories
327 Miscellaneous fabricated textile products

Paper and allied products
328 Pulp, paper, and paperboard mills
329 Miscellaneous paper and pulp products
337 Paperboard containers and boxes

Printing, publishing, and allied industries
338 Newspaper publishing and printing
339 Printing, publishing, and allied industries, except newspapers

Chemicals and allied products
347 Industrial chemicals
348 Plastics, synthetics and resins, except fibers
349 Synthetic fibers
357 Drugs and medicines
358 Soaps and cosmetics
359 Paints, varnishes, and related products
367 Agricultural chemicals
368 Miscellaneous chemicals
369 Not specified chemicals and allied products

Petroleum and coal products
377 Petroleum refining
378 Miscellaneous petroleum and coal products

Rubber and miscellaneous plastic products
379 Rubber products
387 Miscellaneous plastic products

Leather and leather products
388 Tanned, curried, and finished leather
389 Footwear, except rubber
397 Leather products, except footwear

398 Not specified manufacturing industries

TRANSPORTATION, COMMUNICATIONS, AND OTHER PUBLIC UTILITIES

Transportation

407 Railroads and railway express service
408 Street railways and bus lines
409 Taxicab service
417 Trucking service
418 Warehousing and storage
419 Water transportation
427 Air transportation
428 Pipe lines, except natural gas
429 Services incidental to transportation

Communications

447 Radio broadcasting and television
448 Telephone (wire and radio)
449 Telegraph and miscellaneous communication services

Utilities and sanitary services

467 Electric light and power
468 Electric-gas utilities
469 Gas and steam supply systems
477 Water supply
478 Sanitary services
479 Other and not specified utilities

WHOLESALE AND RETAIL TRADE

Wholesale trade

507 Motor vehicles and equipment
508 Drugs, chemicals, and allied products
509 Dry goods and apparel
527 Food and related products
528 Farm products-raw materials
529 Electrical goods
537 Hardware, plumbing, and heating supplies
538 Not specified electrical and hardware products
539 Machinery equipment and supplies
557 Metals and minerals, not elsewhere classified
558 Petroleum products
559 Scrap and waste materials
567 Alcoholic beverages
568 Paper and its products
569 Lumber and construction materials
587 Wholesalers, not elsewhere classified
588 Not specified wholesale trade

Retail trade

607 Lumber and building material retailing
608 Hardware and farm equipment stores
609 Department and mail order establishments
617 Limited price variety stores
618 Vending machine operators
619 Direct selling establishments
627 Miscellaneous general merchandise stores
628 Grocery stores
629 Dairy products stores
637 Retail bakeries
638 Food stores, not elsewhere classified
639 Motor vehicle dealers
647 Tire, battery, and accessory dealers
648 Gasoline service stations
649 Miscellaneous vehicle dealers
657 Apparel and accessories stores, except shoe stores
658 Shoe stores
667 Furniture and home furnishings stores
668 Household appliances, TV, and radio stores
669 Eating and drinking places
677 Drug stores
678 Liquor stores
679 Farm and garden supply stores
687 Jewelry stores
688 Fuel and ice dealers

689 Retail florists
697 Miscellaneous retail stores
698 Not specified retail trade

FINANCE, INSURANCE, AND REAL ESTATE
707 Banking
708 Credit agencies
709 Security, commodity brokerage, and investment companies
717 Insurance
718 Real estate, including real estate, insurance, law offices

BUSINESS AND REPAIR SERVICES
727 Advertising
728 Services to dwellings and other buildings
729 Commercial research, development, and testing labs
737 Employment and temporary help agencies
738 Business management and consulting services
739 Computer programming services
747 Detective and protective services
748 Business services, not elsewhere classified
749 Automobile services, except repair
757 Automobile repair and related services
758 Electrical repair shops
759 Miscellaneous repair services

PERSONAL SERVICES
769 Private households
777 Hotels and motels
778 Lodging places, except hotels and motels
779 Laundering, cleaning, and other garment services
787 Beauty shops
788 Barber shops
789 Shoe repair shops
797 Dressmaking shops
798 Miscellaneous personal services

ENTERTAINMENT AND RECREATION SERVICES
807 Theaters and motion pictures
808 Bowling alleys, billiard and pool parlors
809 Miscellaneous entertainment and recreation services

PROFESSIONAL AND RELATED SERVICES
828 Offices of physicians
829 Offices of dentists
837 Offices of chiropractors
838 Hospitals
839 Convalescent institutions
847 Offices of health practitioners, not elsewhere classified
848 Health services, not elsewhere classified
849 Legal services
857 Elementary and secondary schools
858 Colleges and universities
859 Libraries
867 Educational services, not elsewhere classified
868 Not specified educational services
869 Museums, art galleries, and zoos
877 Religious organizations
878 Welfare services
879 Residential welfare facilities
887 Nonprofit membership organizations
888 Engineering and architectural services
889 Accounting, auditing, and bookkeeping services
897 Miscellaneous professional and related services

PUBLIC ADMINISTRATION
907 Postal service
917 Federal public administration

927 State public administration
937 Local public administration

B2. *Two-digit occupation and industry codes.*

Two-Digit Occupation Classification System.[25]

PROFESSIONAL, TECHNICAL AND KINDRED WORKERS (001–195)

10. Physicians (medical + osteopathic), Dentists (062,065)
11. Other Medical and Paramedical: chiropractors, optometrists, pharmacists, veterinarians, nurses, therapists, healers, dieticians (except medical and dental technicians, see 16) (061,063,064,071–076)
12. Accountants and Auditors (001)
13. Teachers, Primary and Secondary Schools (including NA type) (141–145)
14. Teachers, College; Social Scientists; Librarians; Archivists (032–036,091–096,102–140)
15. Architects; Chemists; Engineers; Physical and Biological Scientists (002,006–023,042–054)
16. Technicians: Airplane pilots and navigators, designers, draftsmen, foresters and conservationists, embalmers, photographers, radio operators, surveyors, technicians (medical, dental, testing, n.e.c.) (003–005,025,055,080–085,150–173,183,191)
17. Public Advisors: Clergymen, editors and reporters, farm and home management advisors, personnel and labor relations workers, public relations persons, publicity workers, religious, social and welfare workers (024,026,056,086,090,100–101,184,192)
18. Judges; Lawyers (030,031)
19. Professional, technical and kindred workers not listed above (174,175–182,185,190,193–195)

MANAGERS, OFFICIALS AND PROPRIETORS (EXCEPT FARM) (201–245)

20. Not self-employed
31. Self-employed (unincorporated businesses)

CLERICAL AND KINDRED WORKERS

40. Secretaries, stenographers, typists (370–372,376,391)
41. Other Clerical Workers: agents (n.e.c.) library assistants and attendants, bank tellers, cashiers, bill collectors, ticket, station and express agents, etc., receptionists (301–364,374–375,381–390, 392–395)

SALES WORKERS

45. Retail store salesmen and sales clerks, newsboys, hucksters, peddlers, traveling salesmen, advertising agents and salesmen, insurance agents, brokers, and salesmen, etc. (260–285)

CRAFTSMEN, FOREMEN, AND KINDRED WORKERS

50. Foremen, n.e.c. (441)
51. Other craftsmen and kindred workers (401–440,442–580)
52. Government protective service workers: firemen, police, marshals, and constables (960–965)

[25] Numbers in parentheses represent the 3-digit codes from the 1970 Census of Population.

OPERATIVES AND KINDRED WORKERS
61. Transport equipment operatives (701–715)
62. Operatives, except transport (601–695)

LABORERS
70. Unskilled laborers–nonfarm (740–785)
71. Farm laborers and foremen (821–824)

SERVICE WORKERS
73. Private household workers (980–984)
75. Other service workers: barbers, beauticians, manicurists, bartenders, boarding and lodging housekeepers, counter and fountain workers, housekeepers and stewards, waiters, cooks, midwives, practical nurses, babysitters, attendants in physicians' and dentists' offices (901–965 except 960–965 when work for local, state, or federal government)

FARMERS AND FARM MANAGERS
80. Farmers (owners and tenants) and managers (except code 71) (801–802)

MISCELLANEOUS GROUPS
55. Members of armed forces

Two-Digit Industry Classification System.[26]
11. AGRICULTURE, FORESTRY, AND FISHERIES (017–028)
21. MINING AND EXTRACTION (047–057)

MANUFACTURING DURABLES
30. Metal industries (139–169)
31. Machinery, including electrical (177–209)
32. Motor vehicles and other transportation equipment (219–238)
33. Other durables (107–138, 239–259)
34. Durables, N.A. what (267)

MANUFACTURING NONDURABLES
40. Food and kindred products (268–298)
41. Tobacco manufacturing (299)
42. Textile mill products, apparel and other fabricated textile products, shoes (307–327, 389)
43. Paper and allied products (328–337)
44. Chemical and allied products, petroleum and coal products, rubber and miscellaneous plastic products (347–387)
45. Other nondurables (388–397)
46. Nondurables, N.A. what (399)
49. Manufacturing, N.A. whether durable or nondurable (398)
51. CONSTRUCTION (067–078)
55. TRANSPORTATION (407–429)
56. COMMUNICATION (447–449)
57. OTHER PUBLIC UTILITIES (467–479)
61. RETAIL TRADE (607–698)
62. WHOLESALE TRADE (507–588)
69. TRADE, N.A. WHETHER WHOLESALE OR RETAIL (599, 699)
71. FINANCE, INSURANCE, AND REAL ESTATE (707–719)
81. REPAIR SERVICE (757–759)

[26] Numbers in parentheses represent the 3-digit codes from the 1970 Census of Population.

82. BUSINESS SERVICES (727–749)
83. PERSONAL SERVICES (769–799)
84. AMUSEMENT, RECREATION AND RELATED SERVICES (807–817)
85. PRINTING, PUBLISHING AND ALLIED SERVICES (338–339)
86. MEDICAL AND DENTAL AND HEALTH SERVICES, WHETHER PUBLIC OR PRIVATE (828–848)
87. EDUCATIONAL SERVICES, WHETHER PUBLIC OR PRIVATE (857–868)
88. PROFESSIONAL AND RELATED SERVICES OTHER THAN MEDICAL OR EDUCATIONAL (849, 869–897)
91. ARMED SERVICES (917 if occ is 600)
92. GOVERNMENT, OTHER THAN MEDICAL OR EDUCATIONAL SERVICES (927–947, 917 if occ is not 600)

B3. *One-digit occupation and industry codes.*

One-Digit Occupation Classification System.[27]

01. Professional, technical, and kindred workers (10–19)[28]
02. Managers, officials, and proprietors (20)
03. Self-employed businessmen (31)
04. Clerical and sales workers (40–45)
05. Craftsmen, foremen, and kindred workers (50–52)
06. Operatives and kindred workers (61–62)
07. Laborers and service workers, farm laborers (70–75)
08. Farmers and farm managers (80)
09. Miscellaneous (armed services, protective workers) (55)

One-Digit Industry Classification System.[28]

01. Agriculture, forestry, and fisheries (017–028)
02. Mining (047–057)
03. Construction (067–077)
04. Manufacturing (107–398)
05. Transportation, communications, and other public utilities (407–479)
06. Wholesale and retail trade (507–698)
07. Finance, insurance, and real estate (707–718)
08. Business and repair services (727–759)
09. Personal services (769–798)
10. Entertainment and recreation services (807–809)
11. Professional and related services (828–897)
12. Public administration (907–937)

[27] Numbers in parentheses represent 2-digit occupation codes, recoded by the authors based on PSID documentation.

[28] Numbers in parentheses represent the 3-digit industry codes from the 1970 Census of Population.

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