

Industry Attachment and Change Among Montana Workers, 1988-1996

Richard Barrett
Department of Economics
University of Montana
Missoula, MT 59812

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Note: This report is intended to supplement an earlier study by Richard Barrett and Thomas M. Power, *Montana Workers' Labor Market Experiences During Industrial Transition, 1988-1996*, Department of Economics, University of Montana, Missoula, MT 59812, October 1997 (May 1998 Revision). Interested readers may refer to that study for a description of the data used for this report, bibliographical references and related findings.

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1. Introduction

The following report is intended to supplement an earlier study by the author and Thomas Power, *Montana Workers' Labor Market Experiences During Industrial Transition: 1988-1996*. Based on the wage histories of over 200,000 Montana workers, that study provided an extensive description of trends in real wages and in wage inequality and mobility among Montana workers. In general, those trends entailed stagnant wage growth and increasing inequality, mirroring what was occurring in the nation as a whole.

In Montana, as elsewhere, these wage developments are widely perceived to be the result of structural change in the economy. In this view, as traditional natural resource based industries decline in importance and are replaced by trade, tourism and other services, workers are forced to give up good jobs for bad ones, with a consequent loss of wages and growth of earnings inequality. To assess the significance of structural change on the labor market, the study included an analysis of the effects on workers of job change. In particular, it focussed on the experiences of approximately 15,000 workers who successfully moved from committed, i.e. eight quarters or more, employment in one industry to committed employment in another.

This report extends the analysis of Montana workers' wage histories in a somewhat different direction. Here every wage history of at least 2 years duration is potentially included in the analysis, which seeks to answer several significant questions about how such histories unfold. These include the following:

- To what extent do workers become attached to particular industries? How long after entering covered employment does such attachment typically occur?
- What are the differences in the behavior of workers who become attached to particular industries and those who do not? What are the consequences for earnings?
- When workers do become attached to particular industries, what happens next? Do they stay in the industry or switch to a new one?
- How does the tendency to stay or switch vary by the industry to which the worker is attached? In particular, do workers in contracting industries show a greater tendency to leave? Do workers in expanding industries show a greater tendency to stay?
- What is the impact on workers' earnings of staying versus switching? How does this effect on earnings vary by the industry to which the worker is attached? How are earnings affected by the time it takes a worker to make the switch?

This report proceeds as follows. Part 2 below provides a brief description of the data and procedures used in the analysis. Part 3 contrasts the behavior of, and consequences for, workers who do and do not become attached to particular industries. For those that do become attached, part 4 describes the outcomes in a subsequent follow-up period, and part 5 details the impacts of these outcomes on earnings. Part 6 consists of a summary and conclusions.

2. Data and Procedures

Each case in the Montana wage history file contains a record, for the period 1988 to 1996 inclusive, of a worker's quarterly earnings and industry of employment in all jobs covered by unemployment insurance.¹ Only those histories lasting 8 or more quarters are examined for this report; thus workers who left covered employment less than two years after first entering are

¹ For a description of this file, see the Technical Notes in Barrett and Power.

TABLE 1
DESCRIPTION OF DATA

Work histories of at least 8 quarters	Number	Percent of total
Total	317,588	100.0
Assigned industry of employment for all quarters.	260,128	81.9
Assigned industry of employment for all quarters; begun by Q1, 1992.	253,463	79.8
8 quarter spells of continuous employment in a single industry; begun by Q1, 1992	197,501	62.2

excluded.² There are a total of 317,588 histories meeting the 8 quarter requirement, but because of delays in filing unemployment insurance reports, in only 260,128 (or 82 percent of the total) cases can industry of employment be unambiguously attributed to every job for every quarter.

In this analysis, a worker is considered to become attached to a single industry when he or she completes eight continuous quarters of employment in that industry alone³. Thus workers who stay with a single employer and industry, who change employers but continue in the same industry, or who work for more than one employer in the same industry, are all considered to be attached to that industry as soon as eight quarters have elapsed.

To describe what happens to workers after they have become attached to an industry, a twelve quarter follow-up period is specified. This period begins as soon as the eight quarter period defining attachment ends. Thus to study industry attachment and its consequences a work history of potentially 20 quarters is required. Since all the histories end after the fourth quarter of 1996, only those beginning by the first quarter of 1992 are suitable for studying attachment to an industry and its aftermath. There are 253,463 such histories in the file (79.8 percent of the total), of which 197,501 actually display industry attachment (62.2 percent of the total). Thus in examining the process of industry attachment and its consequences, this study addresses the experience of 76 percent of all Montana workers with 2 or more years in jobs in known industries covered by unemployment insurance. Table 1 shows the breakdown of sample numbers.

Except for relative wages, most of the measures employed in this report are self explanatory. Relative wages are measured here as the ratio of a worker's earnings to the average earnings of all other Montana workers in covered employment during the same period. In considering the relative wages of a worker over a period of several quarters, in some circumstances it may be appropriate to include only those quarters in which the worker actually had earnings and in others to include all quarters of the period. Both procedures are followed in all instances in this report. It should be noted that the measure of relative earnings employed here reflects how a worker is faring relative to other Montanans, not to the cost of living or to workers in other states. To the extent that the latter constitute a worker's frame of reference, it is possible that someone who is doing well relative to other Montanans would nevertheless report that his or her earnings are deteriorating. It should also be noted that because the earnings of long term workers are being compared to those of all workers (including a constantly changing pool of short timers), they should be expected to grow over time.

² To be included, the first and last quarters of covered employment in the history have to be at least 8 quarters apart; it is not necessary that there be covered employment in all the intervening quarters.

³ Since no data is available for the period prior to 1988, attachment to an industry is first confirmed in the fourth quarter of 1989. At that point, some individuals would have been working continuously in the industry of attachment for more than eight quarters, i.e. since before 1988.

TABLE 2
ATTACHMENT TO A SINGLE INDUSTRY AND MEAN VALUES OF
SELECTED WORK HISTORY DESCRIPTORS

Descriptor	Attachment to a single industry	
	Not attached	Attached
Number (workers)	36,915	223,213
Duration of work history (quarters)	25.3	29.9
Period required to establish continuous employment (quarters)	NA	5.3
Share of work history quarters not in covered employment	.15	.06
Share of work history quarters with single industry of employment	.55	.89
Share of work history quarters with multiple industries of employment	.30	.05
Mean duration of spells not in covered employment during work history (quarters)	2.25	1.29
Mean duration of spells of employment in a single industry (quarters)	3.12	16.60
Mean duration of spells of employment in multiple industries (quarters)	3.03	.85
Mean period between changes in status (quarters)	3.94	16.26
Wages, relative to all other workers in covered employment, during quarters of covered employment	.59	1.20

3. Industry Attachment: Prevalence, Characteristics and Consequences

Of the 260,128 workers for whom complete wage histories of eight or more quarters are available, 86 percent at some point became attached to a single industry. Generally speaking, this occurred early in the work history; on average, the eight quarter employment spell required to become attached to an industry began 5.3 quarters after the start of the history⁴. Thus the vast majority of Montana workers appear to enter covered employment and relatively quickly settle into work in a particular industry. However, 14 percent of workers with histories at least eight quarters long fail to establish this kind of attachment, and there are striking differences in the behavior of these two groups of workers. These differences are detailed in Table 2.

Workers who fail to become attached to a single industry have somewhat shorter work histories than workers who do become attached. They spend a little more than twice as much time during the history not employed and six times as much time working in more than one industry during a quarter. The latter can be an indication that they work more than one job or that they change employers frequently in the midst of a quarter. One indication of persistent multiple job holding is average duration of spells of continuous employment in multiple industries and indeed this figure is more than three times higher for unattached as opposed to attached workers. It remains, however, fairly short, as do spells of employment in a single industry and spells not in covered employment. This suggests that workers who fail to become attached to a single industry do so not because they spend long periods unemployed or, on the contrary, moonlighting, but because they tend to be in considerable flux. Indeed, on average they have a

⁴ This figure refers only to the 74,735 workers who entered covered employment after the first quarter of 1988, i.e. after the beginning of the study period. For workers whose first observed quarter of employment is the first quarter of 1988 (the beginning of the study period), the quarter of entry into covered employment is not known.

TABLE 3

DISTRIBUTION OF 8 QUARTER CONTINUOUS EMPLOYMENT SPELLS
AND OF 1996 TOTAL EMPLOYMENT; BY INDUSTRY

Industry	8 quarter spells		Total 1996 employment - percent
	Number	Percent	
1. Agriculture and food processing	4,305	2.0%	1.8%
2. Forest products	6,657	3.1%	3.0%
3. Mining, smelting and refining	6,796	3.2%	2.6%
4. Construction	8,459	4.0%	5.4%
5. Other manufacturing	7,115	3.4%	3.7%
6. Transportation	5,638	2.7%	2.3%
7. Travel	24,232	11.5%	10.4%
8. Public utilities	7,444	3.5%	3.2%
9. Sales	40,443	19.1%	18.7%
10. Finance, insurance and real estate	11,575	5.5%	5.7%
11. Other services	8,518	4.0%	5.6%
12. Business services	9,873	4.7%	5.6%
13. Medical services	23,639	11.2%	10.1%
14. Education	27,156	12.8%	12.6%
15. Government	19,394	9.2%	9.2%

change in employment status every year as opposed to every four and a half years for attached workers.⁵

Regardless of its characteristics, this type of instability has a cost in the form of significantly reduced relative earnings. Even discarding those quarters in which they are absent from covered employment, workers who fail to become attached to a single industry earn, over their entire work histories, about sixty percent of what other Montana workers earn in the same period. This contrasts with workers who do become attached to a single industry, who end up earning twenty percent more. There is no evidence indicating whether this pattern of instability and low earnings is voluntary or not.

There appears to be no tendency for workers to become attached disproportionately to particular industries. Table 3 shows the distribution among industries of the eight quarter continuous employment spells that define attachment as well as the distribution of total 1996 employment among the same industries. The differences in these distributions are generally small.

4. After Attachment: The Follow-up Period Outcomes

To describe what happens to workers once they have become attached to an industry, a twelve quarter follow-up period, with eight possible outcomes, is examined for each of the eight quarter continuous employment spells. Since the follow-up period begins as soon as the worker has become attached to an industry, one common outcome is that the worker remains attached to that industry for the entire follow-up period; indeed, that is true in more than half the cases. Another possibility is that the worker ends the follow-up period working in the same industry, but

⁵ A change in employment status occurs when a worker (a) changes single industry of employment, (b) goes into or out of covered employment and/or (c) goes into or out of multiple industries of employment.

TABLE 4

DESCRIPTION AND DISTRIBUTION OF FOLLOW-UP PERIOD OUTCOMES

Description	Share of all follow-up period outcomes
1. Continuous employment in same industry through 12 quarters	.52
2. Interrupted employment; in same industry in quarter 12	.12
3. Interrupted employment; in different industry in quarter 12	.10
4. Interrupted employment; multiple industries in quarter 12	.04
5. Continuous employment in same industry, ending before quarter 12	.16
6. Interrupted employment; in same industry, ending before quarter 12	.04
7. Interrupted employment; in different industry, ending before quarter 12	.03
8. Interrupted employment; in multiple industries, ending before quarter 12	.01

after some interruption.⁶ Finally, the worker may end the follow-up period working in a new industry or multiple industries. Each of these four outcomes are also possible for workers who leave covered employment before the end of the follow-up period. The distribution of the resulting eight possible outcomes is displayed in Table 4.

In general, while workers tend to retain their attachment to an industry, some changing of industry does occur. In 17 percent of the follow-up periods, the industry in which the worker is last employed differs from the one to which he or she was originally attached.⁷ But this result varies substantially across industries, as indicated in Table 5, which lists the percentage of follow-up periods in which workers change industry, by the original industry to which they were attached, as well as the overall growth of employment in these industries over the period 1988 to 1996. A striking feature of this table is the apparent lack of any relationship between the growth of an industry and the tendency of workers who are attached to it to remain so. Intuitively, it might be expected that, once attached, workers will stay in industries in which employment opportunities are expanding rapidly and leave those in which opportunities are contracting, but this appears not to be the case.⁸ Most notably, workers in the forest products and mining industries, in which employment is contracting, tend to leave these industries at a little below the average rate for all attached workers. On the other hand, workers in the rapidly growing travel, sales and services industries, with the exception of medical services, tend to leave at well above the average rate. This confirms a conclusion reached from the analysis of job changes by committed workers (Barrett and Power) that changes in the overall industrial structure of employment are not reliable guides to how individual workers move through the economy over time.

Table 6 displays the pattern of movement during the follow-up period of workers who leave the industry to which they are initially attached. There is some tendency for workers to move into rapidly growing industries; the correlation coefficient between the 1988-1996 average growth rate of an industry and the percentage of job changers working in that industry at the end of the follow-up period is .48. In general, moreover, the industry changes depicted in Table 6 occur quickly; on average workers take 2.5 quarters after leaving the industry to which they were attached to find employment in the industry in which they end the follow-up period. This gap is noticeably longer for workers leaving the travel industry (3.7 quarters) and other services (3.2 quarters); the lengths of these gaps, by industry of attachment, are listed in Table 7.

⁶ An interruption may involve working in a different or in multiple industries, leaving covered employment, or any combination of these.

⁷ This represents the combination of outcomes 3, 4, 7 and 8.

⁸ In fact, there is a slight *positive* correlation between the rate of employment growth and the percentage of workers leaving the industry (r equals .31).

TABLE 5

PERCENTAGE OF FOLLOW-UP PERIODS WITH CHANGE IN INDUSTRY
 BY FINAL WORKING QUARTER; BY INDUSTRY OF ATTACHMENT
 CONTINUOUS EMPLOYMENT SPELL

Industry of 8 quarter continuous employment spell	Percent changing industry	Employment growth, 1988-1996
1. Agriculture and food processing	18.7	-3.9
2. Forest products	13.2	-12.5
3. Mining	14.2	-8.1
4. Construction	12.8	60.5
5. Other manufacturing	21.3	35.0
6. Transportation	19.3	14.2
7. Travel	26.1	30.4
8. Public utilities	9.2	1.0
9. Sales	18.1	24.2
10. Finance	15.1	1.7
11. Other services	25.9	19.1
12. Business services	21.5	30.3
13. Medical services	15.9	26.9
14. Education	9.2	13.9
15. Government	14.3	8.1

5. Follow-up Period Outcomes and Relative Wages

Table 8 shows, for all follow-up periods, the percentage change in relative wages between the follow-up period and the 8 quarter continuous employment spell defining attachment, by follow-up period outcome⁹. As expected, regardless of outcome, the relative wages of workers who remain in covered employment throughout the follow-up period rise. If relative wages are calculated only for those quarters of the follow-up period in which workers are actually in covered employment, the increase is smallest for workers who stay in the same industry, greater for workers who change industry and greatest for those who end the follow-up period in multiple industries.¹⁰ For workers who leave covered employment before the end of the follow-up period, relative wages usually fall; why this should happen is unclear. It is possible that falling relative wages are the reason that workers leave covered employment; that workers leaving covered employment do so incrementally, reducing their work time in the process; or that workers are employed during only a fraction of their last quarter. Whatever its cause, this decline is greatest for workers who maintain their attachment to a single industry and much smaller for workers who change industry prior to leaving covered employment; for those whose last quarter of covered employment is in multiple industries, relative earnings rise slightly. Thus it appears that while

⁹ A positive value associated with any particular outcome in Table 8 indicates that over time workers with that outcome are moving up with respect to, but not necessarily earning more than, all other Montana workers; it does not necessarily mean that they are gaining with respect to prices or wages elsewhere in the country.

¹⁰ Working in multiple industries during a quarter can reflect either an industry change during the quarter or holding more than one job at the same time. The large impact on relative earnings of moving into multiple job holding presumably results from the latter effect.

TABLE 7

MEAN LENGTH OF THE GAP BETWEEN LEAVING INDUSTRY OF ATTACHMENT AND BEGINNING EMPLOYMENT IN FINAL INDUSTRY OF FOLLOW-UP PERIOD; BY INDUSTRY OF ATTACHMENT

Industry of continuous employment spell	Mean length of gap (quarters)
1. Agric. and food proc.	2.7
2. Forest products	2.2
3. Mining	2.0
4. Construction	2.5
5. Other manufacturing	2.5
6. Transportation	2.8
7. Travel	3.7
8. Public utilities	1.6
9. Sales	2.6
10. Finance	2.2
11. Other services	3.2
12. Business services	2.7
13. Medical services	2.2
14. Education	1.8
15. Government	1.8
All industries	2.5

TABLE 8

PERCENT CHANGE IN RELATIVE WAGES DURING FOLLOW-UP PERIOD; BY TYPE OF FOLLOW-UP OUTCOME

Outcome	Percent change in relative wages	
	All quarters of follow-up period	Quarters of follow-up period in covered employment
Continuous employment in same industry through 12 quarters	14.3	14.3
Interrupted employment; in same industry in quarter 12	5.2	16.0
Interrupted employment; in different industry in quarter 12	10.8	22.4
Interrupted employment; multiple industries in quarter 12	24.9	30.9
Continuous employment in same industry, ending before quarter 12	-14.8	-14.7
Interrupted employment; in same industry, ending before quarter 12	-27.2	-8.6
Interrupted employment; in different industry, ending before quarter 12	-17.2	-1.6
Interrupted employment; in multiple industries, ending before quarter 12	5.3	14.4

becoming attached to a single industry is advantageous for workers (and, indeed, most workers appear to establish and maintain such attachments), detaching and changing industry is even more so for those workers who do it. That detaching raises relative wages, and that the tendency to detach from particular industries is apparently unrelated to how fast they are growing, suggest that industry change is mainly a voluntary strategy on the part of workers intended to improve

TABLE 9

PERCENT CHANGE IN RELATIVE WAGES DURING FOLLOW-UP PERIOD; BY INDUSTRY
OF ATTACHMENT; FOR WORKERS NOT CHANGING INDUSTRY VS. WORKERS
CHANGING INDUSTRY

Industry of attachment	Relative wages during attachment period	Percent change in relative wages					
		All quarters of follow-up period			Quarters of follow-up period in covered employment		
		Not changing	Changing	Difference	Not changing	Changing	Difference
1. Agric. and food proc.	1.14	-0.2	-1.4	1.2	2.1	9.7	-7.6
2. Forest products	1.56	0.4	-19.5	19.8	2.3	-9.7	12.0
3. Mining	2.18	-1.6	-15.9	14.3	-0.3	-9.2	9.0
4. Construction	1.41	3.8	-6.7	10.5	7.3	2.7	4.6
5. Other manufacturing	1.22	5.2	-6.5	11.7	7.1	2.9	4.2
6. Transportation	1.37	-0.6	-3.5	2.9	2.0	5.7	-3.7
7. Travel	.61	7.0	27.7	-20.7	11.8	43.1	-31.4
8. Public utilities	1.91	1.9	-7.7	9.6	3.2	-0.8	4.0
9. Sales	1.09	6.4	9.5	-3.2	9.0	21.4	-12.4
10. Finance	1.33	5.7	-0.2	5.9	7.6	9.2	-1.6
11. Other services	.75	2.9	8.8	-5.9	5.2	18.5	-13.3
12. Business services	1.41	5.5	11.3	-5.7	8.5	21.2	-12.7
13. Medical services	1.29	6.8	2.2	4.6	8.6	9.4	-0.8
14. Education	1.22	11.4	22.3	-10.9	13.7	34.0	-20.3
15. Government	1.13	4.6	15.2	-10.6	5.9	24.3	-18.4
All industries	1.20	5.7	9.3	-3.6	8.2	20.1	-12.0

their relative earnings. This conclusion, however, is not applicable to all industry changes. Workers detaching from some industries fare far worse than those who do not.

Table 9 shows, by industry of attachment, the percent change in relative wages during the follow-up period of workers who do or, alternatively do not, leave the industry to which they are originally attached. In this table, the columns labeled "Difference" indicates the amount by which the growth of real wages for workers who remain attached exceeds (or, in the case of a negative value, falls short of) that of workers who leave. The differences in these values among industries are large and quite striking. Workers leaving forest products, mining, construction, other manufacturing and public utilities lose ground relative to their counterparts who stay in these industries; indeed, those leaving forest products, mining and public utilities lose ground to all Montana workers. For all other industries, workers who detach gain relative both to those who do not and to all other workers. This is most evident in the travel industry, where the impact of leaving the industry is extremely high. The column in Table 9 labeled "Relative wages during the attachment period" shows what workers in each industry earned, relative to all Montana workers, during the eight quarters in which they established their attachment to particular industries; these earnings constitute the "starting point" for the changes in relative wages detailed in the rest of the table. Not surprisingly, workers who lost ground by changing industries were initially attached to industries with high relative wages; workers who gained by changing industries were initially attached to low wage industries.

To some degree, the pattern of rewards and penalties for remaining attached to various industries revealed in Table 9 can account for the likelihood of industry change described in Table

TABLE 10

PERCENT CHANGE IN RELATIVE WAGES DURING THE FOLLOWUP PERIOD;
BY THE LENGTH OF THE GAP BETWEEN LEAVING INDUSTRY OF ATTACHMENT AND
BEGINNING EMPLOYMENT IN FINAL INDUSTRY OF FOLLOW-UP PERIOD

Gap	Percent change in relative wages	
	All quarters of the follow-up period	Quarters of the follow-up period in covered employment
0	15.0	15.0
1	13.5	17.3
2	11.8	16.6
3	9.3	16.3
4	3.3	12.1
6	0.4	11.0
7	-6.2	5.8
8	-7.7	6.2
9	-11.6	3.0
10	-16.6	-4.2
11	-30.0	-17.8

5; the relatively large number of workers who detach from the travel industry, for example, are no doubt in part responding to the prospect of enhanced earnings from do so.¹¹

The impact on relative wage growth of changing industry is also influenced by the speed with which the change is made. In general, the shorter the time spent in transition from one job to another, the greater the relative wage gains. This is illustrated in Table 10, which shows relative wage gains as a function of the number of quarters elapsed between detaching from one industry and beginning employment in the final industry of the follow-up period.

6. Conclusions

The principal conclusions to be drawn from this analysis are that

- 86 percent of workers in covered employment in Montana become attached to a single industry at least once in their work histories. Typically, this attachment occurs in a little over a year after entering covered employment and, in most cases, persists throughout a three year follow-up period.
- Workers who fail to become attached to a single industry display substantial instability in their employment status, and while they are working tend to earn much less than other Montana workers.
- 17 percent of the workers who become attached to an industry over a two year period are detached from it three years later and have changed industry.
- The pattern of detachment and job change is not well predicted by industry growth rates. To some degree, workers detach more readily from high growth than from low growth industries. They are also somewhat more likely to move into high growth industries when they change.

¹¹ The correlation coefficient between the percentage of attached workers who leave an industry during the follow-up period (Table 5) and the difference in relative wage gains between staying in and leaving the industry (Table 9) is -.44.

- On average, detaching from an industry has a positive impact on relative wage growth, indicating that workers actively seek to change industry in order to enhance their earnings. There are, however, significant exceptions: workers leaving forest products, mining, construction, other manufacturing and public utilities lose significant ground compared to those who maintain their attachment to these industries.
- The longer workers take to change jobs, the slower the growth of their wages.
- The relationship between structural change in the economy and changing job opportunities is a complex one. To some degree, as the economy is transformed, workers are “pushed” out of good, high paying jobs and into less desirable ones. At the same time, many workers appear to be “pulled” from one industry, even one in which employment is growing rapidly, and into another by the prospect of higher earnings. The latter pattern predominates, at least as far as the mean wage gains associated with industry change are concerned.