Acquisitions, labour turnover and wages

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Abstract

In this paper we investigate the consequences of foreign and domestic acquisitions for the employees in these plants. The analysis is based on the idea that from a management perspective an ownership change can be viewed as a possibility to improve the match between management and the plant and resulting from this also between the labour force and the plant. We look for evidence of a poor match between workers and the plant before acquisitions, indications of an ongoing restructuring process and signs of an improved match after acquisitions both for workers that stay and that leave acquired plants. For this analysis we use a comprehensive panel of matched employer-employee data of Norwegian manufacturing firms for the period 1996-2007.

Keywords:

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1 Introduction

Mergers and acquisitions and other types of ownership change of firms have become commonplace occurrences in everyday business life. One the one hand, ownership changes are often perceived by the media, the general public and by the affected employees as a potential threat to wages and jobs. On the other hand, much of the academic literature views ownership change as a way to improve the allocation of resources towards more efficient firms and owners (Jovanovic and Rousseau, 2008), either by improving the match between the firm and its plants (e.g. (Lucas, 1978; Lichtenberg and Siegel, 1987; Maksimovic and Phillips, 2002; Maksimovic et al., 2011), or by improving the match between the firm and its employees (Siegel and Simons, 2010).[1] Put differently, this view of ownership change basically suggests that takeovers are attractive to those "who believe that they can manage the company more efficiently" (Manne, 1965, p. 113).

With this starting point, we would expect that new owners shortly after ownership change attempt to implement some of the envisaged changes that possibly motivated the takeover in the first place.[2] In particular, the idea that ownership change is an opportunity to improve the match between the firm and its employees, implies that we should observe more than "normal" employee turnover around acquisitions. These changes could result in a marked change in the composition and remuneration of employees within the plant. Thus, owner-

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[1]When it comes to which plants a firm chooses to keep after mergers, Maksimovic et al. (2011), using data on US mergers, find that a merger is followed by a period of restructuring where firms retain assets that they have a comparative advantage in operating and sell assets where this is not the case. The authors argue that this is consistent with an improved match between the firm and its plants. In our analysis we will focus on plants that experience only one ownership change. Given that we observe the plant for some years after ownership change without the plant being sold off, this could be interpreted as evidence that the new owners have comparative advantage in running the plant.

[2]Other motives for ownership change than the potential to increase efficiency have been raised in the literature. Managers may use mergers and acquisitions to fulfill their desire to maximize firm size (Jensen, 1986) or to build empires (e.g. Baumol (1959) and Mueller (1969)). As argued by Maksimovic et al. (2011) such motives should imply less restructuring following ownership change than if the ownership change is seen as an opportunity to improve efficiency. We also conjecture a limited amount of restructuring following ownership change when the primary motivation for ownership change is to save taxes or to increase market power.

ship change could be a threat to the jobs or wages of some employees, while representing new opportunities for others. Although an extensive empirical literature on the the effect of foreign acquisitions on individual wages exist, this literature provides limited insight into details of how the composition of firm's workforce change after ownership change. In addition, very little evidence on other individual level outcomes following ownership change using comprehensive employer-employee data exist. In this paper, we use comprehensive matched employer-employee data from Norwegian manufacturing for the period 1996-2007 in order to study individual level outcomes following ownership change. We contribute to the literature by looking at several different sets of individual outcomes following ownership change. We study the probability of hires and separations around ownership change, and also look at the extent of new managers and the hiring of foreign employees from the home country of the new owner. Concerning wages, we study wages and wage growth for stayers, leavers and new hires in acquired plants. In addition, we also study what happens to employees that are separated from their plants shortly after ownership change.

The existing empirical literature on the effect of ownership change using matched employer-employee data is limited, and focuses primarily on wage effects for stayers in the acquired firms (ref). Further, most of these studies look only at foreign acquisitions of domestic firms. There are several reasons why the extent of restructuring in a plant could differ depending on whether the new owners are of home country or foreign origin. The OLI-theory of Dunning (1981) emphasize the superiority of multinationals because of ownership advantages. This could lead to more change in technology or management practices following ownership change to new foreign owners, larger productivity improvements and larger changes in the desired composition of workers. Larch and Lechthaler (2011) argue that MNEs are better positioned to improve the match between the acquired plant and its workforce because MNEs have easier access to both a domestic and foreign pool of workers. In Helpman et al. (2010), firms with higher productivity screen more intensively in the labour market and therefore

3

end up with a workforce with higher average ability than do low productivity firms.[3] Based on these considerations, we find it important to distinguish between foreign and domestic ownership changes in our analysis.

Most of the existing empirical studies using matched employer-employee data focus on the effects of foreign acquisitions on wages, e.g. see Martins (2004) Heyman et al. (2007) Heyman et al. (2011), Csengodi et al. (2008) Almeida (2007).[4] When using individual wage data the evidence is more mixed than when looking at plant level average wages. While plant level studies typically find that foreign acquisitions increase wages, matched employer-employee data give rise to findings of more limited wage effects. (Heyman et al., 2007) even find a negative wage effect from foreign acquisitions in Sweden. There is some evidence that different groups of workers are affected differently by foreign acquisitions. Huttunen (2007) finds that the positive wage effect of foreign acquisitions increase with the level of education of the employees, while Heyman et al. (2011) find that a positive wage effect in Sweden is concentrated to CEOs and other managers, while the wages of other groups are either not affected or negatively affected by acquisitions.[5] There is little evidence on the change in the composition of employees in plants after ownership change. Huttunen (2007) finds some evidence of a change in the skill composition via a reduction of the share of skilled employees after foreign acquisitions in Finland, Almeida (2007) finds no evidence of change in the composition of human capital following foreign acquisitions in Portugal. Even less evidence on leavers and new hires. Based on an analysis of US manufacturing plants, Lichtenberg and Siegel (1990a) conclude that job losses after mergers are largely confined to central office staff. Heyman et al. (2011) document the extent of turnover for different groups of workers after

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[3]Helpman et al. (2010) combine international trade models with heterogeneous firms ala Melitz (2003) with search and matching frictions. In the model, high productivity is associated with exporting, but the extensive evidence showing that MNEs are more productive than domestic firms (see Navaretti et al. (2004)) indicates that the mechanism in the model could also apply to MNEs.

[4]Almeida (2007) use matched employer-employee data for Portugal, but aggregate wages and worker characteristics to the firm level.

[5]Huttunen (2007) uses average wages for different skill groups, and not individual wage data.

ownership change, but do not compare this to average or regular turnover at other times/in plants not subject to ownership change, thus little is known about who looses their jobs after ownership change. Csengodi et al. (2008) finds that the share of workers that are new to a plant increases substantially during a takeover year, this combined with a reduction in the total workforce indicates a substantial change in the composition of workers within the plant. Pesola (2009) studies job separations following both foreign and domestic acquisitions and also studies where workers who are separated from their plants following ownership change end up. She finds that changes following domestic and foreign acquisitions indicate similar types of restructuring, but that the extent of restructuring is somewhat larger after foreign acquisitions. She does not look at the new hires following acquisitions.

A quick preview of our findings suggest ...(to be completed).

In what follows, we present our data sources and definitions in section 2. In section 3 we briefly review some of the existing evidence on effects of ownership change using plant or firm level data. In addition, this section presents descriptives on various plant level variables that could indicate evidence of restructuring in our data. A novel feature of our descriptives is that we also present evidence on changes in trade status around ownership change. The plant level evidence presented in section 3 provides limited insight into how individual employees are affected by the restructuring following ownership change, therefore, in section 4 we move to matched employer-employee data and study turnover and changes in the composition of the workforce following ownership change. In section 5 we look at wages and wage growth for workers in the acquired plants, looking both at the stayers and the new hires after acquisition. Section 6 looks at what happens to employees who are separated from their plants after ownership change. A brief summary and conclusions can be found in section 7.

2 Data and Definitions

2.1 Data sources and cleaning

In our analysis we use four different annual data bases for the years 1996-2007, all of which are censuses that can be linked to each other by firm or plant identifiers. All the data sources are administered by Statistics Norway. Our first starting point is the Norwegian Manufacturing Statistics, which is collected at the plant level. We then link our second data source, the administrative files containing the whole population of residents aged 16-74, to the plant level data. The administrative files contain, among other things, information on age, gender, identification of current employer, weekly work-hours, annual earnings and detailed education codes. Weekly work-hours are recorded as a categorical variable in four groups, with the longest work-hours being 30 hours or more per week. Our intention is to restrict the analysis to full-time workers, we therefore restrict our sample in the following way. After matching workers to the plants in the Manufacturing statistics, we drop workers who never work full-time and workers earning less than the 10th percentile 80% or more of their years in a manufacturing plant. We then keep only plants that employ at least two remaining full-time workers each year.

In order to reduce the possible mistakes from discrepancies between the plant identification numbers in the manufacturing statistics and individual data, we drop plants with large differences between the number of matched workers and the number of employees as recorded in the manufacturing statistics (more than 400). We also drop plants where the change in the number of employees from one year to the next is very different depending on whether we calculate this according to the number of matched individuals or according to the information about the number of employees in the manufacturing statistics (more than 300).

The third data source we use is the SIFON register, which is a register of foreign ownership interests in Norwegian firms. This register provides information about shares of firm assets/stocks that are owned by foreign owners. The SIFON register is linked to the plants in the manufacturing panel using firm level identifiers. In order to focus on domestic plants experiencing ownership change and a comparison to domestic plants that never experience ownership change, we drop plants that are always foreign owned, and foreign divestures. In addition we drop the few remaining plants with multiple ownership changes. In presenting our findings on firm and plant level outcomes after acquisitions, our comparison group is always firms that do not experience ownership change, if ownership changes occur because the new owners see a potential for applying their comparative advantage to improve the target, we expect to see more evidence of restructuring following an ownership change than in plants that do not experiencing ownership change.

In the plant sample we are left with after the cleaning procedures mentioned above, we have 10 950 different plants giving 85 000 plant-year observations over the sample period from 1996 to 2007. These plants employ in total over the period almost 370 000 different workers giving rise to more than 2,1 million worker-year observations. The firms in the panel account for on average over the period 72% of total manufacturing employment and 73% of total manufacturing production over the sample period.[6]

As a fourth data source we use firm level customs data in order to get information on total export and imports at the firm level per year. We also calculate the number of export and import destinations per firm, and the number of commodities (defined at the 3 digit sitc level) imported and exported per firm-year.

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[6]For both employment and production there is a gradual increase in the share of manufacturing that is contained in our sample, this is related to requiring plants to be observed a minimum number of years, which means that we drop more plants in the beginning of our sample period; i.e. the plants that exit in 1996-1998.

2.2 Definitions

With the information in the SIFON register we define a plant as foreign owned if the ownership share of the largest foreign owner is above 50%. Other definitions are possible, but this is the strictest definition. Our definition of a foreign acquisition occurring in year t is thus that the largest foreign ownership share is above 50% in year t, but was below this threshold in year $t-1$.

As a potential comparison group we are also interested in plants that experience ownership change from one Norwegian owner to a different Norwegian owner. In order to identify these changes in our data set, we make use of the plant and firm identifiers in the manufacturing statistics. While the plant identifiers are connected to a specific location with production in a specific industry, the firm identifier is related to the legal owner (firm). Thus, the plant identifier does not change as long as the production is within the same industry and in the same location, while the firm identifier may change if the plant gets a new owner. Thus we identify a domestic ownership change for a plant in year t if the plant does not have the same firm identifier in year t and year $t-1$, and that the firm id of the plant in year t did own other plants in year t-1. We add this second condition that the new firm id actually existed in the manufacturing statistics in t-1 to rule out pure restructuring of names of firms. Further, the plant must not be defined as foreign owned in either year t or t-1. In earlier work we also identified domestic plants that were taken over by Norwegian multinationals (Balsvik and Haller, 2010). During our sample period we are able to identify less than 20 such cases and we therefore drop these plants from our analysis.A handful of papers are able to identify domestic multinationals in their studies of ownership change, e.g Heyman et al. (2007), Bandick and Görg (2010), Balsvik and Haller (2010) and Criscuolo and Martin (2009). A general conclusion from these studies is that domestic and foreign MNE characteristics are much more similar than the characteristics of foreign and domestic firms, and also that the impact on firm performance are rather similar when an MNE acquires a local firm,

8

irrespective of the nationality of the acquirer. The linked employer-employee data allow us to identify the workers that are new to a plant and those leaving a plant each year. We define a worker as new to a plant (ie an accession) if the worker is observed in plant j in year t, but was not observed in this plant in t-1. We define a worker as a leaver (ie a separation) from plant j in year t if we observe the worker in plant j in year t, but the worker is not observed in plant j in year t+1.

2.3   Descriptive statistics

Table 1 provides descriptive statistics on all plants in our sample, and for those plants that experience ownership change. Overall there are around 7,000 plants in the sample in each year with an average of 25-29 employees amounting to 180,000-205,000 employees per year (columns 2-4). Column 5-7 of table 1 shows, respectively, for each year the number of domestic acquisitions, the average employment in these acquired plants and the total number of employees working in the acquired plants. Columns 8-10 provide the same information for those plants subject to foreign acquisitions. In total we have 244 plants that at some point during our sample period are subject to a domestic ownership change and 743 plants subject to foreign acquisition. The number of employees affected by ownership changes as they are employed in an acquired plant in the year of acquisition varies from year to year, for foreign acquisitions the number of affected employees range between 1,500 and 6,200.

Table 2 provides a description of worker characteristics in the sample and by type of acquisition. The average wage over the period was around 300,000 NOK. Employees in plants ever subject to a domestic acquisition earn on average less than the average, while employees in plants ever subject to a foreign acquisition earn above average. The same pattern is observable also for low-, medium- and high-skilled workers.[7] The share of low-

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[7]Skill-levels are defined by years of education: low-skilled workers have less than 10 years of education, medium-skilled workers have 10-13 years of education and high-skilled workers have 13 or more years of education, i.e. a college degree.

Table 1: Plants and workers involved in ownership change, by year

| | All plants | | | Domestic acquisitions | | | Foreign acquisitions | | |
| | No. | Employment | | No. | Employment | | No. | Employment | |
Year		Mean	Total		Mean	Total		Mean	Total
1996	6687	28	189271	.	.	.	.	.	.
1997	6862	29	197693	14	53	744	28	53	1486
1998	7190	28	204299	18	31	554	69	91	6248
1999	7058	29	201628	14	75	1043	89	66	5866
2000	7217	27	196692	19	26	502	102	58	5907
2001	7151	27	195400	33	28	931	89	55	4874
2002	7164	26	189298	17	31	525	55	43	2382
2003	7139	25	181755	16	39	631	65	57	3685
2004	7148	25	179189	13	26	342	41	38	1572
2005	7183	25	180169	23	17	398	38	43	1628
2006	7222	26	186741	52	86	4451	101	50	5020
2007	7080	27	189773	25	33	821	66	47	3125

skilled workers is somewhat higher than average in plants subject to domestic acquisitions and somewhat lower than average in plants subject to foreign acquisitions. For medium-skilled workers there is not much variation between acquisition plants and the sample as a whole. However, there are higher (lower) shares of high-skilled employees in plants subject to foreign (domestic) acquisitions than in the sample as a whole. There are higher than average shares of females in plants subject to domestic acquisitions but lower than average shares in plants subject to foreign acquisitions. There is little variation in terms of experience and worker age across acquisition and non-acquisition plants.

3 Firm level evidence on restructuring

A large number of empirical studies document various aspects of the potential restructuring that takes place after ownership change.[8] With firm level administrative data sources it is difficult to observe if the new owners implement substantial changes in technology, manage-

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[8]Studies differ with respect to how they define and identify ownership changes, this depends to a large extent on the data sources used.

Table 2: Descriptive statistics on worker panel

	All workers		Domestic acq		Foreign acq	
	mean	sd	mean	sd	mean	sd
avg. wage (NOK)	300,560	277,019	278,129	117,579	316,670	295,300
avg. wage - low skill	261,968	204,633	245,217	80,919	274,137	378,047
avg. wage - med skill	296,167	162,824	281,326	96,857	308,716	217,106
avg. wage - high skill	422,832	562,510	386,487	203,857	432,940	235,410
Share - low skill	0.40	0.49	0.43	0.50	0.37	0.48
Share - med skill	0.46	0.50	0.45	0.50	0.46	0.50
Share - high skill	0.14	0.35	0.12	0.32	0.17	0.37
Share - females	0.22	0.41	0.27	0.44	0.19	0.39
Experience	22.98	12.35	23.13	12.53	22.83	12.11
Age	40.87	11.69	40.91	11.81	40.88	11.40
Obs	2,130,910		100,699		423,051	

Note: Statistics on domestic and foreign acquisitions are for workers in plants ever subject to an acquisition.

ment practices or the composition of the workforce, and researchers are most often limited to observing what happens to productivity, employment, average wages and skill composition.[9]

We use our four data sources to construct several variables for plant and firm level outcomes that could provide some indication of restructuring taking place around ownership change. For each 3 digit industry-year cell we calculate the average of outcome x for plants never subject to acquisitions. For the plants that are subject to ownership change, we subtract the industry-year mean from the plant level outcome of x, generating a deviation-from-mean variable. We then regress the deviation-from-mean variable on dummy variables indicating whether the observation is 3 or more years prior to ownership change, 2 years prior to ownership change, etc, until 3 years or more after ownership change. The coefficients on the dummies are plotted in figures 1-3.

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[9]The finance literature contains extensive empirical evidence finding that takeovers create value for the target and bidder shareholders combined, see Martynova and Renneboog (2008) for a survey. Evidence of an increase in stock market values provides little information on the actual restructuring that takes place after ownership change. Shleifer and Summers (1988) argue that an increases in stock market value need not be due to efficiency gains, but rather that a (hostile) takeover is a way to redistribute wealth from existing stakeholders to new shareholders.

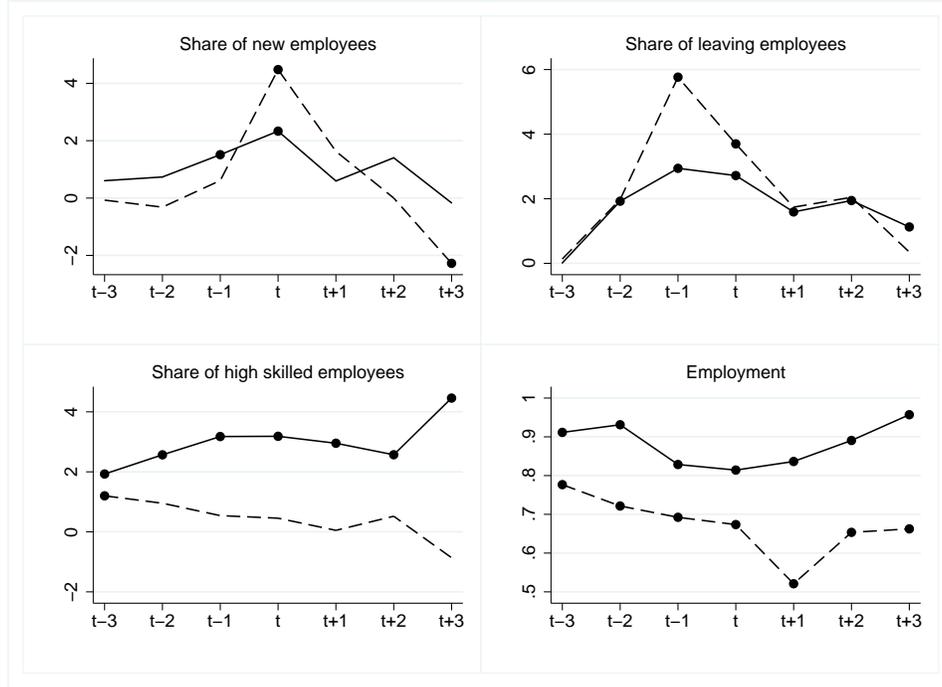Figure 1: Turnover, skill composition and employment around acquisitions

Figure 1 shows the development in the share of new hires, separations and share of high skilled workers as well as total employment in years around ownership change for plants experiencing foreign (solid line) and domestic (dashed line) ownership change in year t. The reference of industry-year means for plants not subject to acquisitions are represented by the horizontal line at zero. Dots represent outcomes that are significantly different from zero at the 95% level of confidence. Thus, the upper panels of figure 1 shows evidence of excess turnover around the time of ownership change. Both plants that are acquired by domestic and foreign owners have significantly higher shares of new employees in the year of ownership change than the average hiring rate in the same industry and year. Domestic acquisitions have on average 4 percentage point higher shares of new employees than plants not subject to acquisitions, the similar figure in the year of foreign acquisitions is 2 percentage points higher than the industry-year mean. Domestic acquisitions also have a significant below-average

hiring rate 3 years after acquisitions. From two year before the acquisitions, plants also have higher separation rates than normal. The tendency of excess separation rates seems to start even before the ownership change occurs.[10] In line with our findings, Csengodi et al. (2008) document that the share of employees that are newly hired in a firm is more than twice as large as "normal" during a foreign takeover year in Hungary.

Also, according to figure 1, the share of skilled employees increases following foreign acquisitions, increasing from about 2 to 4 percentage points above average, while the skill share in domestic acquisitions are not affected and do not significantly differ from average. In line with our findings, Bandick and Karpathy (2011) find that employment of skilled labor increases more than employment of less-skilled labor after foreign acquisitions in Sweden, and Csengodi et al. (2008) find that the excess hiring in the year of foreign acquisition in Hungary is accompanied by a marked increase in the share of high skilled workers. Almeida (2007) finds no effect on skill composition in acquired firms in Portugal, while Huttunen (2007) finds that foreign acquisition has a negative effect on the share of highly educated workers in Finnish manufacturing plants.

Finally, figure 1 also confirms the "cherry picking" of large acquisition targets that is typically found in the empirical literature on foreign acquisitions, showing that this also applies, but to a lesser extent, to acquisitions by new domestic owners. Turning to the development in total employment around acquisitions, successful restructuring following an ownership change could imply both a reduction or and increase in overall employment. On the one hand, Siegel and Simons (2010) argue and find using data from Sweden that employment is likely to be reduced due to badly matched employees being separated form acquired plants.[11] On the other hand, if substantial restructuring strengthen the competitiveness and

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[10]We do not have the exact timing of ownership change in our data, and we suspect that it is more likely for the data to err on the side of recording ownership change after it occurred rather than before. This means that in some cases t-1 could well be the year of ownership change.

[11]Bandick and Görg (2010) and Bandick and Karpathy (2011), also using Swedish data, find evidence of increased employment for some types of foreign acquisitions. While Conyon et al. (2002a), and Gugler and Yurtoglu (2004) find evidence for the UK and Europe that is consistent with the argument of Siegel and

performance of the acquired firms, this may involve higher employment, as found by Arnold and Javorcik (2009) for Indonesia. From figure 1 plants subject to foreign acquisitions seem to increase their employment from the year of acquisition to 3 years after from around 80% larger than industry-year mean to almost double the industry-year mean. After a substantial dip in employment one year after domestic acquisitions, also these plants are able to increase employment thereafter. The existing literature on employment effects of acquisitions focus primarily on what happens after ownership change, but figure 1 also documents a reduction in employment relative to industry year mean in the period leading up to ownership change.

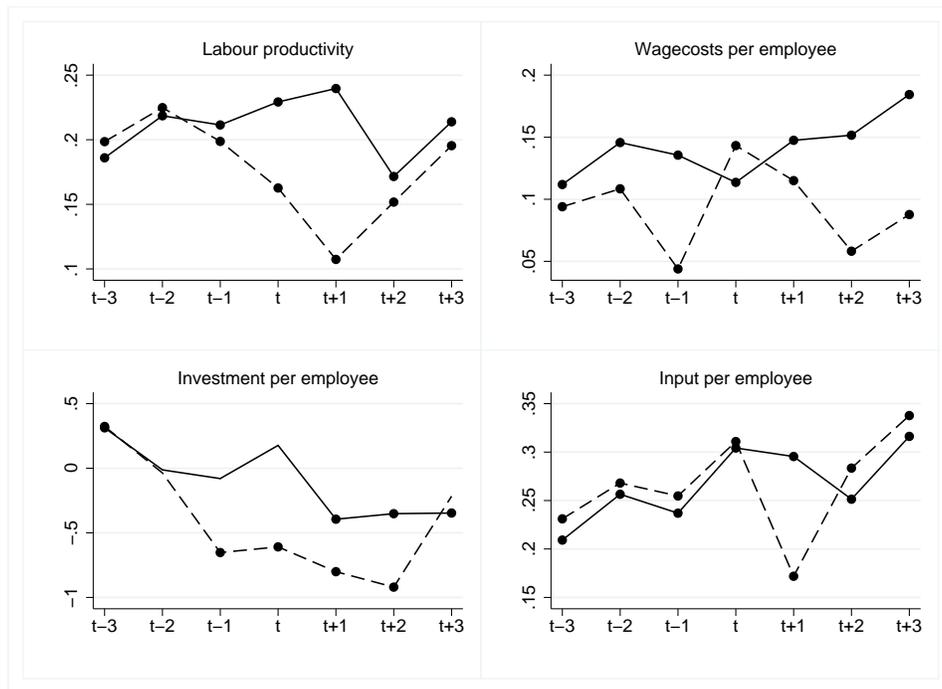Figure 2: Productivity, wages and input use around acquisitions

Figure 2 depicts the development in output, wage costs, investment and the use of intermediate inputs, all normalized per employee. Labour productivity, wages and intermediate

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input use are all substantially above average in plants subject to ownership change. Intermediate input use per employee seems to increase from before to after ownership change of both types. Plant level average wages increase after foreign acquisitions, but this could well be explained by the increase in the share of high skilled workers shown in figure 1. Since the evidence on wages using plant level data is not able to disentangle wage increases from changes in the composition of the workforce, we discuss the evidence on wages in section 5 where we use matched employer-employee data. Somewhat surprisingly, investment per employee is actually below average after both foreign and domestic ownership changes. Thus it could seem that ownership changes in Norway may not be accompanied by substantial technology upgrading that requires large capital investments.

Turning to labour productivity the first panel of figure 2 does not show a clear change in productivity from three years before to three years after ownership change. In the case of successful restructuring, one would expect productivity to increase. Increased productivity after acquisitions are found by McGuckin and Nguyen (1995), Lichtenberg and Siegel (1987), Harris et al. (2005) and Siegel and Simons (2010). These studies do not distinguish between foreign and domestic ownership changes, and do not attempt to account for possible selection bias of acquisition targets. A common methodology used to analyse the causal effect of ownership change is a combination of propensity score matching and difference-in-differences techniques, see for example Arnold and Javorcik (2009), Girma and Görg (2007) and Karpaty (2007) who all finding positive effects on productivity from foreign acquisitions, using data from Indonesia, the UK and Sweden, respectively. The evidence on the causal effect of foreign acquisitions on plant level productivity is mixed, Benfratello and Sembenelli (2006) find no effect on productivity following foreign acquisitions in Italy, while Harris and Robinson (2002) even find a slight decline in productivity in data for the UK, which could indicate difficulties associated with assimilating the established plants into the new organization, or

that it takes time to implement changes successfully into an acquired plant.[12] Studies that compare the impact of foreign and domestic acquisitions of domestic firms, typically find that performance seems to improve more after foreign than after domestic ownership change, see (Balsvik and Haller, 2010; Bertrand and Zitouna, 2008; Gioia and Thomsen, 2004; Hanley and Zervos, 2007; Fukao et al., 2006; Conyon et al., 2002b).

Figure 3: Firm level trade patterns around acquisitions
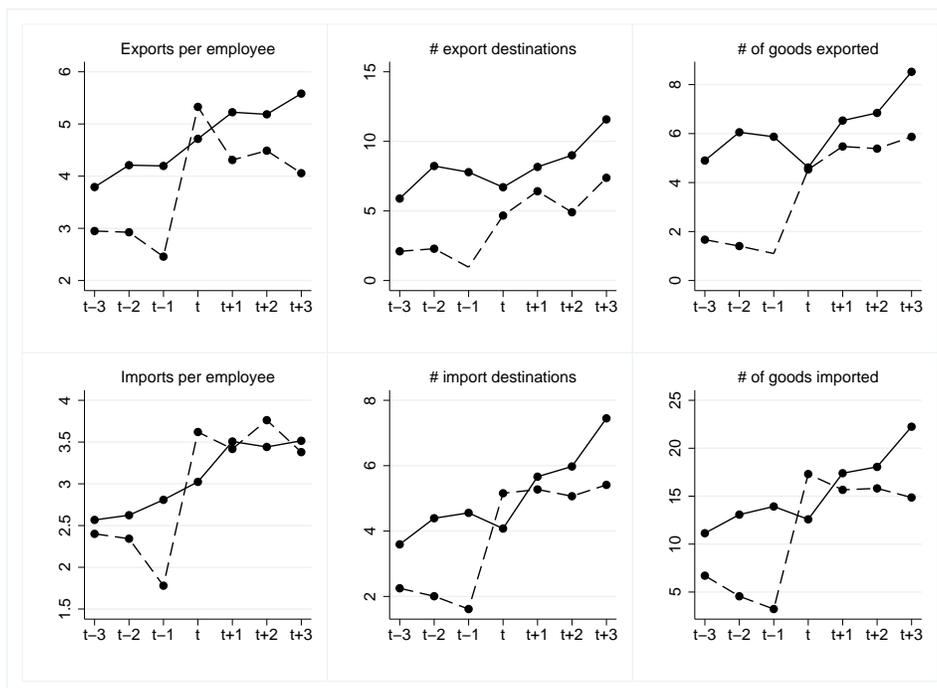
A further aspect of restructuring that could accompany ownership change is that the new owners could integrate the acquired plant into its existing global network of buyers and suppliers, and therefore could affect the international trade pattern of the target plant. Figure 3 shows firm level data on exports and imports per employee, the number of destination countries for imports and exports, and the number of products imported and exported.[13] Here

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[12]Hanley and Zervos (2007) also find a post-acquisition dip in labour productivity in their study of UK takeovers.

[13]The customs data is at the firm level, thus we do not have plant level information about international trade.

16

we see a clear picture that plants subject to foreign acquisitions are more global than average and than plants subject to domestic acquisitions, even before ownership change. Both types of ownership change makes the acquired plants part of firms with more external trade than their previous owners. The study by Arnold and Javorcik (2009) is one of very few studies that provide evidence on this aspect of ownership change, they find that in Indonesia foreign ownership change increases exports and imports.

4   Turnover and changes in employee composition

The descriptive evidence shown in figure 1 clearly indicates that some type of restructuring of the workforce takes place in plants that experience ownership change. In this section we study this in more detail by estimating individual fixed effects conditional logit regressions for the probability of being hired or separated from a plant. We introduce dummy variables for the years around ownership change in order to investigate if years close to ownership change is associated with different probabilities of being hired to or separated from a plant.

Earlier papers have examined the effects of acquisitions on labour turnover and employee composition. Siegel and Simons (2010) use linked employer-employee data for Sweden for the period 1985-1998. They document that there is a higher share of workers leaving the firm after acquisition, they also provide evidence that after acquisition there is a higher share of workers with more experience and a higher share of college-educated workers. Davis et al. (2011) show that there is higher job creation and higher job destruction with a small net negative effect on overall employment after private equity buyouts using a firm- and establishment-level dataset for the US between 1980 and 2005. Pesola (2009) uses matched employer-employee data for Finland for the period 1996-2002. She shows that the probability of separations is higher after domestic and foreign acquisitions to employers outside the business sector. The job separation hazard is higher for university-educated employees

Table 3: Probability of leaving the plant next year: Individual FE

	All	lowskill	medskill	highskill
for acq$_{\leq t-3}$	-.040 (.004)**	-.041 (.007)**	-.038 (.006)**	-.040 (.010)**
for acq$_{t-2}$	-.040 (.004)**	-.042 (.007)**	-.035 (.006)**	-.040 (.010)**
for acq$_{t-1}$	-.069 (.004)**	-.064 (.007)**	-.078 (.006)**	-.055 (.010)**
for acq$_t$	-.053 (.004)**	-.052 (.008)**	-.059 (.006)**	-.036 (.010)**
for acq$_{t+1}$	-.034 (.005)**	-.032 (.008)**	-.040 (.007)**	-.023 (.011)*
for acq$_{t+2}$	-.022 (.005)**	-.014 (.009)	-.028 (.007)**	-.024 (.012)*
for acq$_{\geq t+3}$	-.032 (.004)**	-.017 (.008)*	-.040 (.006)**	-.027 (.011)*
dom acq$_{\leq t-3}$	-.082 (.006)**	-.086 (.010)**	-.076 (.009)**	-.095 (.018)**
dom acq$_{t-2}$	-.041 (.007)**	-.041 (.011)**	-.033 (.011)**	-.068 (.020)**
dom acq$_{t-1}$	-.053 (.007)**	-.076 (.011)**	-.064 (.011)**	.064 (.024)**
dom acq$_t$	-.007 (.008)	-.008 (.012)	-.007 (.012)	.013 (.025)
dom acq$_{t+1}$	-.060 (.008)**	-.061 (.012)**	-.048 (.013)**	-.124 (.022)**
dom acq$_{t+2}$	-.058 (.009)**	-.058 (.014)**	-.037 (.014)**	-.119 (.024)**
dom acq$_{\geq t+3}$	-.063 (.009)**	-.059 (.014)**	-.037 (.014)**	-.160 (.022)**
N	1159710	445128	517370	155876
LogL	-534298	-196797.1	-245058.1	-74370.45

Note: Regressions include worker age, years of education, tenure, tenure^2, the share of high-skilled workers in the plant, the share of medium-skilled workers in the plant, log employment, an exporter, year and industry dummies. **, *, (*) indicate significance at 1, 5, 10%.

following domestic acquisitions, in foreign acquisitions there is no significant variation by type of employee.

To be completed ...

Table 4: Prob of being new to the plant this year: Individual FE

	All	lowskill	medskill	highskill
for acq$_{\leq t-3}$	.016 (.003)**	.006 (.006)	.022 (.005)**	.008 (.008)
for acq$_{t-2}$	.031 (.004)**	.027 (.007)**	.036 (.006)**	.026 (.010)**
for acq$_{t-1}$	.022 (.004)**	.028 (.007)**	.026 (.005)**	-.004 (.009)
for acq$_t$	.001 (.003)	.008 (.007)	.000 (.005)	-.021 (.009)*
for acq$_{t+1}$	-.020 (.003)**	-.006 (.007)	-.028 (.005)**	-.033 (.009)**
for acq$_{t+2}$	.003 (.004)	.010 (.007)	.013 (.005)*	-.033 (.009)**
for acq$_{\geq t+3}$	.006 (.003)*	.020 (.006)**	.008 (.005)$^{(*)}$	-.034 (.008)**
dom acq$_{\leq t-3}$	.017 (.005)**	.018 (.009)*	.023 (.008)**	.010 (.016)
dom acq$_{t-2}$	.012 (.006)*	.006 (.010)	.032 (.010)**	-.024 (.020)
dom acq$_{t-1}$	-.003 (.006)	-.001 (.010)	.014 (.009)	-.057 (.017)**
dom acq$_t$	.097 (.007)**	.099 (.011)**	.106 (.010)**	.106 (.020)**
dom acq$_{t+1}$	.045 (.006)**	.029 (.009)**	.030 (.009)**	.134 (.019)**
dom acq$_{t+2}$	-.028 (.007)**	-.026 (.011)*	-.015 (.011)	-.073 (.019)**
dom acq$_{\geq t+3}$	-.035 (.007)**	-.011 (.011)	-.040 (.010)**	-.083 (.017)**
N	1101783	365448	505161	173578
LogL	-393607.3	-130777.5	-181971.2	-62729.1

Note: Regressions include worker age, years of education, tenure, tenure^2, the share of high-skilled workers in the plant, the share of medium-skilled workers in the plant, log employment, an exporter, year and industry dummies. **, *, $^{(*)}$ indicate significance at 1, 5, 10%.

5 Wage effects for stayers and new hires

As regards wages the Shleifer and Summers (1988) argument discussed above would suggest a negative effect on the wage level of firms if reducing extra-marginal wage payments are revoked. However, as Conyon et al. (2004, p. 851) state "if wages are set in non-competitive environments then ownership change may also affect both the structure of the industry and the bargaining strength of the firm and workers." Markusen (1995) stresses the need for skill-upgrading due to the technology transfer associated with foreign acquisitions. A number of further reasons as to why foreign-owned firms pay higher wages have been discussed in the literature: to prevent technology spillovers through labour mobility (Fosfuri et al., 2001; Glass and Saggi, 1998); rent sharing (this also applies to highly profitable domestic acquirers (Budd et al., 2005); compensation for higher labour demand volatility (Fabbri et al., 2003) or a higher closure rate (Bernard and Sjöholm, 2003).

A number of papers have established that even after controlling for firm- and individual-specific effects foreign-owned firms pay higher wages, e.g. Martins (2004); Almeida (2007) for Portugal and Heyman et al. (2007) for Sweden. Siegel and Simons (2010) find that employees in plants subject to mergers and acquisitions earn higher wages than comparable employees in plants not subject to M&A from two years before the acquisition to the year of acquisition. They also find that wages decrease from before to after acquisition. Looking at the effects of foreign acquisitions on wages Csengodi et al. (2008) estimate a positive wage premium after foreign takeovers from the year of acquisition in a sample of Hungarian employees for the period 1992-2001; this premium is not present before acquisition and increases in subsequent years. They argue that this provides evidence in favour of rent-sharing by foreign firms rather than a technology transfer explanation. They are unable to rule out that the increase in the wage premium is due to a slowly changing composition of the workforce, however. Hijzen et al. (2010) compare the effects of foreign acquisitions in a cross-country comparison

of datasets with information on firms and employees. They find that wages increase after acquisitions in Germany, Portugal and Brazil but not in the UK.

Two papers analyse the effects of acquisitions on the wages of different skill groups. Huttunen (2007) finds wages to increase from the second year after a foreign acquisition in Finnish matched employer-employee data for the period 1988-2001. The effects are stronger effects for workers with low education and university graduates. Heyman et al. (2011) examine the the effects of acquisitions on different groups of employees using matched employer-employee data for Sweden for the period 1996-2000. Their analysis shows that wages increase for managers and CEOs after acquisition by domestic or foreign multinationals, whereas the wages for medium and low-skilled/educated employees decrease. They also find that workers that high- and medium-educated workers that are newly hired after foreign acquisition and those leaving acquired plants earn higher wages compared to workers in non-acquisition plants. Another focus in this literature is on workers who move to foreign-owned plants. For Germany (Andrews et al., 2009), Norway (Balsvik, 2011), Germany, Portugal, the UK and Brazil (Hijzen et al., 2010) they all find that workers which move from a domestic to a foreign-owned plant earn higher wages than comparable stayers in their original plant. Martins (2011) confirms this for Portugal, but also shows that these workers earn lower wages compared to similar employees that are already employed in foreign-owned plants.

Table 5: Wage levels around acquisitions: OLS

	All	Stay	New	Leave
for acq$_{\leq t-3}$	.014 (.001)**	.013 (.001)**	-.106 (.003)**	-.056 (.004)**
for acq$_{t-2}$	.011 (.002)**	.004 (.002)$^{(*)}$	-.075 (.006)**	-.037 (.006)**
for acq$_{t-1}$	.016 (.002)**	.011 (.002)**	-.093 (.005)**	-.010 (.006)$^{(*)}$
for acq$_{t}$	.010 (.002)**	.004 (.002)*	-.117 (.006)**	-.037 (.006)**
for acq$_{t+1}$	.007 (.002)**	.000 (.002)	-.123 (.007)**	-.019 (.006)**
for acq$_{t+2}$	.002 (.002)	-.002 (.002)	-.108 (.008)**	-.046 (.007)**
for acq$_{\geq t+3}$	-.006 (.001)**	-.002 (.001)$^{(*)}$	-.140 (.004)**	-.036 (.004)**
dom acq$_{\leq t-3}$	-.039 (.002)**	-.044 (.002)**	-.197 (.006)**	-.153 (.007)**
dom acq$_{t-2}$	-.017 (.004)**	-.024 (.004)**	-.130 (.011)**	-.080 (.011)**
dom acq$_{t-1}$	-.004 (.003)	-.023 (.004)**	-.094 (.011)**	-.059 (.011)**
dom acq$_{t}$	-.010 (.003)**	-.018 (.004)**	-.114 (.009)**	-.049 (.009)**
dom acq$_{t+1}$	-.020 (.004)**	-.037 (.005)**	-.092 (.011)**	-.051 (.013)**
dom acq$_{t+2}$	-.036 (.005)**	-.044 (.005)**	-.153 (.018)**	-.063 (.013)**
dom acq$_{\geq t+3}$	-.033 (.003)**	-.031 (.004)**	-.213 (.014)**	-.073 (.010)**
new in noacq			-.148 (.001)**	
leave from noacq				-.069 (.001)**
N	1806265	1056854	1806265	1806265
R^2	.32	.32	.33	.33

Note: Regressions include worker age, years of education, tenure, tenure^2, the share of high-skilled workers in the plant, the share of medium-skilled workers in the plant, log employment and an exporter dummy, year, industry and region dummies. **, *, $^{(*)}$ indicate significance at 1, 5, 10%.

Table 6: Wage levels around acquisitions: Worker FE

	All	Stay	New	Leave
for acq$_{\leq t-3}$	.009 (.003)**	.001 (.004)	-.112 (.003)**	-.053 (.004)**
for acq$_{t-2}$	.002 (.003)	-.009 (.004)*	-.089 (.005)**	-.032 (.006)**
for acq$_{t-1}$	.007 (.003)**	-.004 (.004)	-.108 (.005)**	-.017 (.006)**
for acq$_t$	.003 (.003)	-.008 (.004)*	-.131 (.006)**	-.035 (.006)**
for acq$_{t+1}$	.002 (.003)	-.011 (.004)**	-.126 (.007)**	-.020 (.006)**
for acq$_{t+2}$	-.003 (.003)	-.017 (.004)**	-.112 (.007)**	-.030 (.006)**
for acq$_{\geq t+3}$	.005 (.003)$^{(*)}$	-.006 (.004)	-.100 (.005)**	-.024 (.004)**
dom acq$_{\leq t-3}$	-.013 (.004)**	-.018 (.006)**	-.171 (.006)**	-.084 (.007)**
dom acq$_{t-2}$	.004 (.004)	.003 (.006)	-.089 (.010)**	-.039 (.010)**
dom acq$_{t-1}$	.007 (.004)$^{(*)}$	.003 (.006)	-.069 (.012)**	-.020 (.010)$^{(*)}$
dom acq$_t$	.005 (.004)	.006 (.006)	-.067 (.008)**	-.053 (.009)**
dom acq$_{t+1}$	.005 (.004)	-.002 (.007)	-.058 (.009)**	-.033 (.013)**
dom acq$_{t+2}$	-.005 (.005)	-.010 (.006)	-.114 (.016)**	-.019 (.011)$^{(*)}$
dom acq$_{\geq t+3}$	.004 (.005)	.008 (.007)	-.121 (.014)**	-.023 (.009)*
new in noacq			-.132 (.001)**	
leave from noacq				-.043 (.001)**
N	1806265	1056854	1806265	1806265
R^2	.15	.14	.17	.15

Note: Regressions include worker age, years of education, tenure, tenure^2, the share of high-skilled workers in the plant, the share of medium-skilled workers in the plant, log employment and an exporter dummy, year, industry and region dummies. **, *, $^{(*)}$ indicate significance at 1, 5, 10%.

Table 7: Wage growth over the past 2 years around acquisitions

	All	Stay	New	Leave	Left
for acq$_{\leq t-3}$	-.004 (.001)**	-.005 (.001)**	.004 (.002)	-.006 (.002)**	.003 (.002)
for acq$_{t-2}$	.003 (.001)**	.001 (.001)	.008 (.004)*	-.004 (.003)	-.007 (.003)*
for acq$_{t-1}$	.001 (.001)	.001 (.001)	-.002 (.003)	-.002 (.002)	-.006 (.004)
for acq$_t$	-.001 (.001)	-.000 (.001)	-.006 (.004)	-.008 (.002)**	-.008 (.004)*
for acq$_{t+1}$	-.002 (.001)**	-.004 (.001)**	-.004 (.004)	.006 (.002)**	-.014 (.005)**
for acq$_{t+2}$	-.005 (.001)**	-.007 (.001)**	-.007 (.004)$^{(*)}$	-.009 (.002)**	.000 (.005)
for acq$_{\geq t+3}$	.003 (.000)**	.002 (.000)**	.004 (.003)	-.003 (.001)*	-.006 (.004)$^{(*)}$
dom acq$_{\leq t-3}$	.006 (.001)**	.006 (.001)**	.020 (.004)**	.001 (.002)	.011 (.003)**
dom acq$_{t-2}$	.008 (.001)**	.010 (.001)**	-.008 (.007)	-.012 (.004)**	-.008 (.005)$^{(*)}$
dom acq$_{t-1}$	.002 (.001)	.006 (.002)**	-.007 (.008)	.001 (.004)	-.010 (.006)$^{(*)}$
dom acq$_t$	-.002 (.001)	.001 (.001)	-.004 (.004)	-.009 (.004)*	.008 (.008)
dom acq$_{t+1}$	.005 (.002)**	.002 (.002)	.004 (.006)	.003 (.005)	.020 (.010)*
dom acq$_{t+2}$	-.006 (.002)**	-.006 (.002)**	-.010 (.010)	.003 (.005)	.009 (.010)
dom acq$_{\geq t+3}$	.001 (.001)	.004 (.001)**	-.009 (.007)	-.001 (.003)	-.008 (.010)
new in noacq			.006 (.001)**		
leave in noacq				-.007 (.000)**	
left in noacq					.001 (.001)$^{(*)}$
R^2	.04	.05	.04	.04	.04
N	1013569	722786	1013569	1013569	1013569

Note: OLS Regressions include worker age, years of education, tenure, tenure^2, the share of high-skilled workers in the plant, the share of medium-skilled workers in the plant, log employment and an exporter dummy, year, industry and region dummies. **, *, $^{(*)}$ indicate significance at 1, 5, 10%.

6 Destinations and wage effects for separated workers

In table 8 we show the numbers and shares of workers employed in a firm in year t according to where these workers are found two years later. On average around 70% of workers are still employed in the same plant 2 years ahead, but in plants subject to domestic acquisitions this share is lower, at 63%. In the first col first row the average yearly number of workers in plants never subject to ownership change and that are in the same plant 2 years later. Further down in the same first col we see how many of the workers who move between t and t+2 depending on their destination: other plant of same firm, other firm in manufacturing, not working. The second and third colum shows similar numbers for workers in firms subject to foreign and domestic ownership change respectively, given that the ownership change occurs in t+1. The numbers of main interest are that for firms not acq and foreign acq, a similar share of workers stay in the same firm from t to t+2 while a smaller share are stayers in plants subject to dom acquisitions (63.8%). The flip side of this is that a larger share of workers in plants subject to dom acq are moving out of manufacturing or out of work than in plants not subject to acq or plants subj to for acq.

The table 9 has 4 col, the first two concerning for acq and the last two relevant for dom acq. Col 2 and 4 contains average annual values of numbers of workers, while col 1 and 3 contains these as shares of total employment (average over yearly values) in the respective groups of plants. Again the table concerns how many of the workers in t we find in the same plant in t+2 and in other destinations in t+2 if they moved. The upper part of the table looks at this given that the acquisition occurs in t+3, thus this is mobility before acq. Also here we see that a lower share of workers are found in the same plant prior to acq for plants going to be acquired by other domestic owners than those subject to foreign takeovers. The lower half of the table contains similar numbers as above, only this time the condition is that the ownership change occurred in t-1, henc this shows average mobility patterns after the acquisitions. In this case the differences between the plants subject to for and dom acq

are rather small, there is still a larger share of stayers in the plants subject to foreign acq, than dom acq: 70 vs 68%

Table 8: Worker reallocations from manufacturing plants: Mean of annual values 1996-2005

| Employment location at time T+2 | Mean number of workers at time T in | | |
	Plants never changing ownership	Plants with foreign acq in T+1	Plants with domestic acq in T+1
Same plant	94801	2950	751
Other plant same firm	1102	25	1
Other plant in merged firm	0	68	53
Other manufacturing plant	11361	317	123
Non manufacturing	11630	347	135
Not working	14689	425	128
	Share of workers at time T		
Same plant	70.6	72.4	63.1
Other plant same firm	0.8	0.7	0.1
Other plant in merged firm	0.0	1.8	4.6
Other manufacturing plant	8.4	7.7	11.5
Non manufacturing	8.6	8.4	12.3
Not working	10.9	10.0	12.2

7 Discussion and Conclusions

To be completed..

Table 9: Worker reallocations before and after acquisitions: Mean of annual values 1996-2005

	Change between time t-3 and t-1 for workers whose plant experiences a			
	foreign acq at time t		domestic acq at time t	
Employment location at time t-1	share	N	share	N
Same plant	72.2	2434	66.2	719
Other plant same firm	1.9	56	0.2	4
Other plant in merged firm	3.2	108	6.5	61
Other manufacturing plant	8.0	264	13.7	117
Non manufacturing	7.3	263	8.6	81
Not working	9.8	331	10.6	107
	Change between time t+1 and t+3 for workers whose plant experiences a			
	foreign acq at time t		domestic acq at time t	
Same plant	70.2	2905	68.7	524
Other plant same firm	0.1	4	0.1	1
Other plant in merged firm	0.7	27	1.6	13
Other manufacturing plant	8.1	323	8.0	63
Non manufacturing	8.9	376	9.5	72
Not working	11.5	495	11.7	94

Table 10: Multinomial logits on worker location 2 years later

	oth plant in sample	oth plant outs sample	outs manuf	not work	no record
for acq$_{t-2}$	0.004 (0.022)	-0.061 (0.035)$^{(*)}$	0.060 (0.019)**	-0.004 (0.018)	0.090 (0.059)
for acq$_{t-1}$	-0.339 (0.025)**	0.254 (0.029)**	0.026 (0.019)	-0.020 (0.018)	0.032 (0.059)
for acq$_t$	-0.294 (0.025)**	0.170 (0.032)**	0.102 (0.019)**	0.017 (0.018)	-0.033 (0.064)
for acq$_{t+1}$	-0.325 (0.028)**	0.437 (0.032)**	0.173 (0.020)**	0.134 (0.018)**	-0.060 (0.069)
for acq$_{t+2}$	-0.186 (0.028)**	0.703 (0.031)**	0.130 (0.022)**	0.055 (0.020)**	-0.027 (0.073)
dom acq$_{t-2}$	-0.164 (0.042)**	0.143 (0.067)*	-0.024 (0.036)	-0.036 (0.032)	-0.182 (0.128)
dom acq$_{t-1}$	0.094 (0.038)*	0.279 (0.058)**	0.246 (0.032)**	0.014 (0.032)	-0.166 (0.129)
dom acq$_t$	0.094 (0.047)*	0.287 (0.072)**	0.418 (0.038)**	0.128 (0.038)**	-0.111 (0.150)
dom acq$_{t+1}$	0.061 (0.052)	0.328 (0.083)**	0.077 (0.047)$^{(*)}$	0.013 (0.042)	-0.367 (0.182)*
dom acq$_{t+2}$	-0.126 (0.060)*	-0.099 (0.114)	0.053 (0.051)	0.108 (0.045)*	-0.602 (0.221)**
Pseudo-R^2			0.108		
LogL			-1585331		
Obs			1804272		

Note: Results relative to staying in same plant. Regressions include worker age, years of education, tenure, tenure^2, a female dummy, the share of high-skilled workers in the plant, the share of medium-skilled workers in the plant, log employment, exporter, importer, year and industry dummies. **, *, $^{(*)}$ indicate significance at 1, 5, 10%.

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