PROFESSIONAL EMPLOYER ORGANIZATIONS:

WHAT ARE THEY, WHO USES THEM AND WHY SHOULD WE CARE?

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Abstract

More and more U.S. workers are counted as employees of firms that they do not actually work for. Among such workers are those who staffed by temporary help service (THS) agencies and leased employees who are on the payroll of professional employment organizations (PEOs) but work for PEOs' client firms. While several papers study firms' use of THS services, few examine firms' use of PEO services. In this article, we summarize PEOs' business practices and examine how the intensity of their use varies across industries, geographic areas, and establishment characteristics using both public and confidential data.

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Introduction

More and more U.S. workers are counted as employees of firms that they do not actually work for. Among such workers are those who staffed by temporary help service (THS) agencies and leased employees who are on the payroll of professional employment organizations (PEOs) but work for PEOs' client firms. While several papers study firms' use of THS services, few examine firms' use of PEO services.

PEOs provide various services surrounding human resource managements such as payroll processing, benefit management, regulation compliances etc. Unlike consultant firms that only provide recommendations on these human resource managements, PEOs operate in a co-employment relationship with its clients, by including the clients' workers on their own payroll. In such a relationship, PEOs become employers of record for tax and insurance purposes. PEOs exercise a certain decision making on human resource management, at the same time share legal responsibilities as co-employers. By pooling workers of its clients on its payroll, a PEO gains scale economies in performing their tasks.

The workers whose payrolls are moved to PEOs are often referred to as "leased employees" because, on paper, they belong to PEOs and are leased back to client firms (see more details in later section). Since leased employees are not accounted on clients' payroll, the payroll-based labor statistics underestimate labor used by the industries of the PEO clients. In the 2002 Census of Services, the PEO industry consisted of 4,975 establishments. It employed 1.7 million leased employees. The PEO industry achieved rapid growth through the 1990s with a growth rate of 159% from 1992 to 2002, subtracting an increasing number of workers from the payroll records of other industries.[2] This has added a concern to the payroll based labor statistics used by many statistical agencies and economists.

In this paper, we first review the history and current nature of PEO services. Next, we use publicly available data to show that the distribution of the use of PEO services is not uniform across industries or geographical areas. We then use confidential micro data from the 2002 Census of Manufactures to examine how establishment characteristics other than location and industry may

[2] While 2007 Census data were not yet available when this analysis was conducted, the Current Employment Statistics (CES) data indicates PEO share be leveled off from around 2004 and on. (For the year prior to 2003, the CES used a fixed ratio to create the THS and PEO industry payroll employment data.) A few possible reasons exist. According Dey, Houseman, and Polivka (2006), the CES's sampling frame, Quarterly Census of Employment and Wages (QCEW), somewhat underestimate leased employees in the PEO industry as several states started recording the leased employees in the client firm's industry. At the same time, the CES data could reflect stricter regulation on using PEO services. For example, the State Unemployment Taxes (SUTA) Dumping Protection Act of 2004 requires all states to enact anti-SUTA-dumping legislation thereby potentially decreasing the opportunity to use PEO services to sidestep tax rate modification procedures.

influence their use of PEO services. Our discussion on why some establishments are more likely to use PEO services than others would shed some light on the issues of labor statistics interpretation.

Dey, Houseman, and Polivka (2006) provide a review on the issues of payroll-based labor statistics. They also assess the effect of firms' use of employment services as a whole including PEO and THS, focusing on the manufacturing industry. Between 1989 and 2000, employment in manufacturing reportedly fell by 4.1%. Dey, Houseman, and Polivka (2006) shows, however, that manufacturing employment would have actually increased by 1.4% if employment services workers had been included.[3] They also estimate that the use of these employment services added .5 percentage points to the annual growth rate of labor productivity as measured by output per worker in the manufacturing sector between 1989 and 2000, equaling approximately 14% of the overall growth.[4] Houseman (2006) also shows that the multifactor productivity measure for manufacturing would also overestimate productivity growth as the data do not allow us to fully capture employment services input to manufacturing.

The existing literature (Houseman, 2006; Estavao and Lach, 1999; Segal and Sullivan, 1997) relies mostly on the data on firm's use of THS industries, partly reflecting data availability. By focusing on examining firms' use of PEOs, this article attempts to provide complementary information to the literature.

PEO History and Activities

Over the years, the PEO industry has undergone continued transformation. Beginning in the early 1980s, PEOs started out as firms that conducted payroll processing for their client firms. Payrolling involved preparing and distributing payroll checks, direct deposit of wages to bank accounts, payroll data maintenance, filing local, state and federal government paperwork, and vacation and sick leave tracking. To perform such services, the PEO grouped its client firms' workers on the PEO's own payroll and processed tasks at the same time. Such services were considered to have benefited some small and medium client firms through cost efficiencies gained from the PEO's scale of economy.

Outsourcing payroll processing to PEOs, however, caused some confusion about the employer status of the PEO versus that of the client firms (Drucker, 2002 and Greening, Barringer, and Macy, 1996). Having transferred clients' workers to the PEO's payroll, PEOs appeared as employers on paper.

[3] They use the Contingent Worker Supplements (CWS) of the Current Population Survey (CPS) and Occupational Employment Statistics (OES) programs for their estimation.
[4] The labor productivity here is calculated based on the Bureau of Labor Statistics (BLS) manufacturing output indices and the Current Employment Statistics (CES) manufacturing employment data.

Some client firms took advantage of this confusion about employer status [5] and tried to reduce their legal responsibilities as an employer (Houseman, 2001). As these practices became more prevalent, regulatory agencies and insurance companies worked to limit the confusions about the employer status by creating new regulations and policies. As a result, the PEO officially became accountable for the performance of HR responsibilities as a joint employer under contractual agreement with its client firms, in essence acting as an outsourced HR department for client firms (Klaas, McClendon, and Gainey, 2000).

As regulations surrounding human resource management have increased over time, the kind of services that PEOs provide has also expanded. Between 1980 and 2000, the number of employment laws applying to employers grew by 60% and, between 1991 and 2001, the number of lawsuits, in particular sexual harassment cases, more than doubled according to the Equal Employment Opportunity Commission (Drucker, 2002). The growth in the number of regulations and lawsuits has generated higher time and monetary costs for firms and increased the firms' liability to both their workers and enforcement agencies. Adding to the complexity of human resources, some human resource regulations have different rules and enforcement requirements based on firm size[6] and/or location.[7] In addition to the changing regulatory landscape, the increasing cost of employment-based benefits, especially healthcare (Bodenheimer, 2005), continues to add to firms' administrative costs. Reflecting these changes, PEOs began to expand their services to further support the management of their clients' workforces with such duties as ensuring compliance with regulatory issues as well as providing and administering benefits packages (Cook, 1999).

In addition to the already mentioned HR tasks, these days many PEOs offer additional HR activities to provide a more integrated overall HR management service including relocation administration, employee handbooks and background checks, physicals, and job descriptions (Gilley, Greer, and Rasheed, 2004; and Cline, 1997). Some PEOs also provide potentially high liability human resource management functions to differentiate themselves from the rest of the market. One of the more complex tasks that most firms outsource to PEOs is the administration of their retirement plans due to the complexity of the requirements for a plan to be complaint with the Employee Retirement Income Security

[5] One possible advantage was the manipulation of the experience rating modification factor for insurance premiums by basing the adjustment on the PEO's past claim history rather than that of the client firm to receive lower rates (NAIC/IAIABC, 2002). Also, a client firm might use a PEO to misrepresent its physical location to a state with lower insurance rates. Other concerns included misrepresented payrolls, misclassified occupations, as well as confusion about which firm was responsible for providing workers compensation (NAIC/IAIABC, 2002, and Houseman, 2001).

[6] Enforcement of many regulations protecting workers from discrimination and harassment vary by the number of employees such as WARN Act, Civil Rights Act of 1991, American with Disabilities Act of 1990, Uniform Guidelines on Employee Selection Procedures (1978), and the Pregnancy Discrimination Act to just name a few.

[7] As examples, state and local taxes and Workers' Compensation differ between states. Also, sometimes state requirements or benefits supersede those of Federal regulations.

Act[8] (ERISA) (Greer, Youngblood, and Gray, 1999). Some PEOs also support the administration of Employee Assistance Programs (EAPs),[9] which provide support services to client firms' workers and their family (Greer et al., 1999). Some firms outsource the responsibility of processing drug testing to PEOs to minimize confidentiality issues regarding personal employee information (Greer et al., 1999). Some firms also use the PEO to facilitate the centralization of HR functions (Greer et al., 1999).

As PEOs manage various HR and regulatory issues as joint employers, it would be instructive to summarize a typical contractual relationship between PEOs and client firms. First, to define the joint relationship, both the PEO and the client firm enter into a contract to document which firm takes on the legal and administrative responsibilities of the firm's employees (Lenz 2003: p. 10). Under this agreement, the client firm purchases the PEO's assistance by compensating the PEO an amount that covers the client's total human resource costs plus an additional service fee. Many times when a PEO agrees to administer payroll and benefits to the workers, the PEO also becomes responsible under the law for the liabilities associated with these administrative duties. Such duties include issuing workers' compensation for employees accidentally injured on the job.[10] Health and pension benefits that some PEOs offer fall under another set of state regulations (Lenz, 2003: p. 10).[11]

While a PEO plays a significant role as a joint employer as mentioned above, its role and responsibilities are limited to those regarding HR managements. The PEO does not provide daily supervision to workers for their production activities. In addition, it does not typically get involved with the recruiting process except for taking care of regulatory issues or basic functions of background checks and drug tests. Thus it would be natural to consider leased employees on the PEO's payroll as a part of work force for the production activity for the PEO's clients. The payroll-based labor statistics, however, do not take this into account, and the greater use of PEO services by an establishment or an industry would cause the underestimation of the labor used for its production. Below, we examine what types of firms use PEO services.

[8] ERISA regulates how a pension plan can be funded, vested, disclosed, and eventually, paid out to the employee.
[9] EAPs provide supporting services regarding substance abuse, work relationship issues, emotional distress, mental health concerns and other similar issues that may adversely affect an employee's work performance.
[10] Workers' compensation is considered the employee's only way *(exclusive remedy)* to receive benefits for their workplace injury, which protects the PEO and the client firm from injury-related lawsuits, except under special circumstances (Lenz, 2003: p. 25).
[11] Although not the main PEO function, the PEO reserves the right to hire, reassign and fire employees and maintains some control or direction over the joint employees with its client firm. By retaining such decision-making control, the PEO has an ability to manage its liabilities and earn protection from some lawsuits under state and federal law (Lenz, 2003: p. 10).

Cross section distribution of the use of PEO services based on publicly available data

In this section, we look at the distribution of the use of PEOs across both industry and location using publicly available data from the 1992, 1997, and 2002 Economic Censuses and County Business Patterns.

Based on the 1997 Census of Services, Table 1 shows that the intensity of use of PEO services varies across industries. Column 1 shows the number of leased employees used in each industry as reported by PEOs. Column 2 shows payroll industry employment, which does not include leased employees or THS workers.[12] Column 3 shows the share of leased employees of total workers who work on a regular basis for an industry; we divide the number of leased employees (column 1) by the sum of payroll and leased employees by industry (column1 plus column 2). The transportation industry uses leased employees most intensively. Leased employees represent 4.6% of employees working regularly for this industry. It is followed by repair services with 2.9%, educational services with 2.3%, and construction with 1.8%, while mining has a very low leased employee share with 0.2%. Column 4 shows an index that shows the intensity of the use of leased employees in each industry relative to the US average. The intensity of the use of PEO services seems to vary a lot across industries. Transportation industry uses leased employees at a rate almost twenty times that of mining. The transportation industry also represents the highest share of national total leased employees with 15.2%, as shown in the fourth column. While various reasons would explain the intensive use of leased employees in transportation industry, one factor may be a high injury rate reported by transportation industry (OSHA); the high injury rate might have made firms in that industry seek more efficient ways to insure their workers.

To see whether industry distribution of leased employees changes over time, we made a comparison between 1992 and 1997. Taking into account that the intensity of use of leased employees vary over time nationally, we compared the index as calculated in Column 4 in Table 1. While the industry categories included in the questionnaire of the 1992 Census of Services were different from that of the 1997 Census of Services, we can compare the index among the industry categories common between the questionnaires of both years. Such industries include mining, construction, manufacturing, whole sale trade, retail trade, and finance, insurance, and real estate. We found a similar pattern of the use of leased employees between these years. The index for 1992 shows that construction uses leased employees 1.6 times more intensively than the US average, where in 1997, it is 2.1 times. For

[12] Leased employees and THS workers are reported on the payroll of employment service establishments. To avoid confusion, we do not include employment service industry in Table 1.

manufacturing, the index was 0.72 for 1992 and 0.73 for 1997. For retail trade, the index was 0.48 for 1992 and 0.49 for 1997.

Next, we examine whether the intensity of the use of PEO services differs across geographic areas. Table 2 illustrates the variation across states. Column 1 shows the number of leased employees reported by PEOs located in each state. Column 2 is the total payroll employment of all private industries in each state, which is often used as state employment in economic research. Unlike industry payroll employment (column 2 in Table 1), state payroll employment number includes both leased employees and temporary workers on the payroll of THS agencies and PEOs located in each state. Column 3 shows the leased employee share of state payroll employment. Of the top 5 states with the highest percentage of leased employees, Florida comes in first with 3.6% followed by Arizona with 3.3%, Utah with 2.3%, Georgia with 2.1%, and Texas with 1.4%. One may think that these states have higher shares of industries that tend to use more PEO services. This is not necessarily the case. We evaluate this potential explanation for Florida and Arizona. First, we create the industry mix by calculating each industry's share of total employment in the US and in each state. To isolate the effect of the industry mix, we assume that the use of leased employees by industry for Florida and Arizona are the same as those of the U.S., and then take the weighted average of the U.S. shares of leased employees (column 3 of Table 1) using each industry's share in state employment as weights. Implied shares of leased employees in Florida and Arizona are similar to the US average, and not nearly as high as the numbers in column 3 of Table 2. The industry mix does not explain the high share of leased employees in Florida and Arizona. There may be some location specific variables that could further explain these states' use of PEO services.

In order to view the geographical distribution of leased employees over time, we again calculate an index dividing a state share of leased employees by the US average and compare it between 1997 and 2002.[13] We observe similar patterns of geographical distribution across years. Out of the states with data disclosed for both years, seven out of the top 10 states with the highest leased employees intensity in 1997 remain in the top 10 in 2002. Seven out of 10 of the states with the lowest leased employees intensity in 1997 remain in the bottom 10 in 2002.

Finally, we note that the patterns of distribution in the use of PEOs across industries and states are different form that of THS workers. Using the Contingent Work Supplement of the 1997 CPS, we calculate each industry's share of THS workers. Among industry using higher shares of THS workers are manufacturing (31.8%) and administrative and support services and waste management (21.3%). This contrasts with industry distribution of leased employees where transportation industry represents the

[13] A division of leased employees across states is not available in 1992.

highest share of 15.2% and manufacturing and construction industry each represent about 12%. An overview of the different geographic distribution of leased employees and THS workers is summarized in Table 3. As you can see, the list of top and bottom 10 states are quite different between leased employees and THS workers. Only 4 states appear in the top 10 and 3 in the bottom 10 for both THS workers and leased employees. The leased employees' distribution is also more diverse than that of THS workers.

Characteristics of establishments using PEO services: for a case of manufacturing plants

In this section, we summarize how the use of PEO services varies across establishments dependent on their characteristics. In particular, we use the plant level data of the 2002 Census of Manufacturers compiled by the U.S. Census Bureau. In the questionnaire, a plant is asked to answer "yes" or "no" to a question on whether it uses any leased employees, i.e. a plant that answered "yes" uses workers whose payroll is managed by a PEO. Prior to 2002, the U.S. Census Bureau only collected information about PEOs' client firms by asking PEOs about their client firms as part of the Census of Services. To obtain a more detailed picture of where PEO "employees" actually work, the U.S. Census Bureau attempted to collect information directly from the PEO users by including questions about their PEO use in the 2002 Censuses for the first time.

In this study, we examine through probit analyses which plant characteristics are associated with a plant's likelihood to use any amount of PEO services[14]. Our analyses using data from the respondents seem to reveal that some plant characteristics play important roles even after controlling for a plant's industry and location (i.e., state) specific factors. It is possible that the firm rather than the plant decides whether or not to use PEO services. Even if a firm were the decision maker, however, its decision may be made for each of its plants based on the plant's individual characteristics. In fact, based on our data, the use of PEO services varies across plants within the same firm. We explore the effect of both plant and firm-level variables. Note that a "plant" is the smallest unit for which individual inquiry is collected in most of the economic censuses in the sense that the Census creates industry or state-level data by aggregating plant-level data. Plant-level analyses inform us of other plant attributes that may help interpret such aggregate data.

In our analyses, we include various plant characteristics. One such variable is plant size measured by the log value of shipments. Larger plants seem to face more regulations; for example, the Worker Adjustment and Retraining Notification (WARN) Act applies to businesses with 100 or more employees. The federal regulation states that a firm must provide written notice of plant closings or massive layoffs,

[14] The Census also asks a question about the number of leased employees. Among plants that answered they use leased employees, many did not provide the actual number of leased employees.

defined as 50 or more employees at a single establishment, 60 days in advance. Facing more regulations, larger plants may rely on PEOs to comply with relevant regulations. On the other hand, larger plants may have more scale of economies in performing this service themselves. We include the square term of plant size to allow a quadratic relationship between plant size and the plant's probability to use PEO services.

Note that, as we mentioned above, the decision to use PEOs may be made by a firm rather than a plant. The relevant scale economies for performing the human resource management services may be at the firm-level rather than plant-level. Therefore, we examine how a firm size is associated with a plant's use of PEO services. We include the total value of manufacturing shipments of a parent firm for which each establishment is affiliated[15]. It is not appropriate to use the number of employees as a measure of plant or firm size, because the number of employees reported in the Census does not usually include leased employees and is endogenous to the plant's use of PEO services[16].

We include a dummy variable indicating newly constructed plants. It is possible that start-up plants may want to use PEOs to outsource any non-core HR activities until their businesses take off. We also include the average rate of work related injury and illnesses at 4- or 5-digit NAICS levels provided by the Occupation Safety and Health Administration (OSHA). The OSHA collects such information in order to provide reliable data to employers, policymakers, and health and safety specialists to help determine priorities of workplace safety. Establishments are asked to report all injuries and illnesses of all workers on site.

We examine the effect of firm characteristics other than firm size as well. Two additional variables are the firm's degree of diversity across locations and across industries. A firm that has plants in multiple states would face different regulations in each state. A firm producing multiple products would also have to deal with various different regulations. A diversified firm may rely on a PEO to take advantage of the PEO's scale of economies to keep up with all the regulatory updates within different states and/or industries. For a plant affiliated with a firm with at least one other plant, we measure the geographical diversification by the number of states where the firm has manufacturing plants as well as the Herfindahl Hirschman Index (HHI) based on the firm's manufacturing shipments by state. The HHI is a sum of the squared terms of each state's share; we define firm i's HHI for geographical concentration as $HHI_i^{states} \equiv \sum_{i \in A_i} share_{is}^2$, where $share_{is}$ is the share of state s in firm i's total value of

[15] The data sets we have access to in this study provide the information on the value of shipments only for manufacturing plants.
[16] Due to the high non-response rate for the number of leased employees, even in the 2002 Census, it is difficult to capture the total number of employees.

manufacturing shipments, and A_i is a set of states where firm i operates. HHI is greater when the concentration is higher. Analogously, to measure industrial diversification, we calculate the number of industries (3-digit NAICS manufacturing industries) in which the firm's plants operate and the HHI based on firm's value of shipments by each of its 3-digit NAICS manufacturing industries; we define firm i's HHI for industry concentration as $HHI_i^{industries} \equiv \sum_{i \in B_i} share_{ij}^2$, where $share_{ij}$ is the share of industry j in firm i's total value of manufacturing shipments, and B_i is a set of manufacturing industries in which firm i operates.

As Table 4 shows, our sample contains 145,534 plants that responded either reporting "yes" or "no" to the question on the use of leased employees, which is 42% of the plants with positive shipments included in the 2002 Census of Manufacturers. While the response rate of the newly added question is not high, our analyses using the data of respondents show systematic relationship between some of their characteristics and whether or not they use leased employees. Among respondents, the newly constructed plants represent 3.8% of our sample. Plants that responded to the question about their leased employee use are, on average, larger and more likely to belong to multi-plant firms than plants that did not respond to the question. Of respondent plants, the average value of shipments is 3.6 million, 32% of them are affiliated with multi-establishment firms, and 27% with firms with other manufacturing plants. For plants affiliated with firms with other manufacturing plants, the average number of states in which those firms operate is 9.8 and the average number of 3-digit NAICS manufacturing industries is 2.7, which is similar to the numbers based on the overall Census sample.

Note that it is possible that non-respondent plants, which did not check either "yes" or "no", are those who did not use leased employees. We compare characteristics between the non-respondent plants and the respondent plants answering "no" to see if they are similar. We found that those who indicated explicitly that they do not use leased employees are more similar to other respondents answering "yes" than to non-respondents. For example, the average log shipments is 8.02 for respondents answering "no", 8.7 for respondents answering "yes", but 6.1 for non-respondents. The percentage of plants affiliated with multi-plant firms is almost the same between those who answered "yes" and those who answered "no" at around 30%, but it is 20% for non-respondents. On average, non-respondents do not seem to share characteristics similar to those which indicate that they do not use leased employees. We also performed analyses where we treat non-respondents as plants that did not use leased employees, which obtain less precise coefficients than what we obtain by limiting our sample to respondents. Below we reports the results of our analyses based on the data of respondent plants.

Table 5 shows the results of the probit analyses. Columns (1), (2), and (3) show the results based on the specifications not controlling for state and industry specific effects, while columns (4), (5), and (6) show the results when controlling for these effects. From column (1), we can see that plant size on average has positive effects on a plant's use of PEO services. Our results may be capturing a statistical artifact that a plant with more workers has a higher probability to have at least one leased employee. As we mentioned above, however, larger plants seem to face more regulation, which might also lead them to rely on specialists for compliance concerns. As you see in column (4), the effect is qualitatively the same even after controlling for state and industry specific effects. Based on calculations using column (4), a one s.d. increase in plant size increases the plant's probability of using PEO services by 1.9 percentage points, which is equivalent to 40% of the actual percentage of plants using PEO services (4.7%). Note that when we include the squared term of plant size, we find that the effect of plant size might be quadratic (see columns (2) and (5)). The positive effect is smaller for larger plants possibly because of their greater scale of economies in managing regulatory compliance themselves.

Plants facing a higher potential rate of work-related injuries and illnesses are also more likely to use PEO services. Such plants may have more incentive of using PEOs as they may be able to receive better insurance premiums and healthcare benefits since a PEO can pool the injury and illness risks across all its client firms. Also, PEOs may be the employer responsible for paying workers compensation which would protect both the PEO and the client firm from lawsuits regarding the work-related injury. The magnitude of the effect is, however, small. Based on column (4), a one s.d. increase in the injury-illness rate raises a plant's probability to use PEOs only by 0.3 percentage points. We also investigated whether the effect of injury-illness rate change with plant size by including an interaction term. Based on our sample, however, we did not find statistically significant evidences.

Newly constructed plants are more likely to use PEOs than older plants. This is consistent with the view that new plants, which face various uncertainties in their business environment, may want to focus on their core activity first in order to secure their survival. The magnitude of the effect is large. Based on column (5), a new plant's probability to use PEO services is greater than others by 6 percentage points, which is equivalent to 130% of the actual percentage of plants using PEO services.

We also find that for plants affiliated with multi-establishment firms, the probability to use PEOs is slightly greater. Of those plants, the plants whose parent firms have other manufacturing plants have a much greater likelihood of using PEOs than those with no brother manufacturing plants. The difference in the likelihood is, on average, as large as 7.0 percentage points. Having multiple manufacturing plants may

make it more challenging for a firm to comply with the increased number of regulations and laws. This might have led these firms to be more likely to rely on PEO services.

Some firm-level variables are also systematically associated with a plant's use of PEOs. For plants that have at least one affiliated manufacturing plant, the overall size of the firm decreases a plant's likelihood to use PEO services. It is possible that outsourcing such services requires some sunk costs. We also include the square-term of the firm-level size to see if we find any evidence for firm-level scale economies. Based on our sample, however, the results do not support the existence of the quadratic effect of firm-size.

Finally, it seems that more diversified firms are more likely to PEO services. In columns (1), (2), (4), and (5), we report the results including the HHI variables, which represent the degree of a firm's concentration over states and over industries. As you can see, both HHIs obtain negative and significant signs in most specifications. Firms that are geographically diversified across different states are more likely to use PEO services. Such firms may rely on PEOs in order to make sure they comply with the different regulations of all the states in which they have plants. We also find the same tendency for firms with multiple industries. The coefficients, however, lose significance once we control for state and industry specific effects. In column (5), we perform the same analysis where we measure a firm's industry diversity by the number of 3-digit NAICS manufacturing industries of all of a firm's plants instead of the HHI. We find that the coefficient for the number of 3-digit NAICS manufacturing industries is positive and significant, evidence that a firm's industry diversification may matter for its decision to use PEO services.

Conclusion

Using both public and confidential data, we summarize how the intensity of use of PEO services varies across industry, geographic area, and establishment characteristics. The uneven distribution of the use of PEO services gives us an insight into how, to a varying degree, the payroll-based labor measure may be underestimated. Among the industries, transportation and repair services industries have particularly high intensities of use of PEO services. Florida and Arizona are two states with particularly high intensities of use of PEO services. In these states, 3 to 4 percent of workers are leased employees and are not accounted for on the payroll of industries for which they actually conduct work. We also found that the patterns of the use of leased employees across industries and across states are different from that of THS workers. Finally, our analyses using micro-data of manufacturing establishments seem to suggest various establishment-level characteristics are associated with establishments' use of leased employees, and thus the degree that the payroll employment number underestimates the actual number of workers. We found

that, for plants in our sample, the use of PEO services depends on the size of the establishment and of its parent firm. The use of PEO services is also greater for newly constructed plants and for plants with a potentially high of injury and illness rate. The greater diversification across industries and geographical areas of a parent firm may also increase an establishment's use of PEO services. As the use of PEO services increases over time, it would be important to incorporate leased employees in the labor statistics of establishments or industries for which they engage production activities.

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Table 1: 1997 Leased Employees by Client Industry Category

Industry	Leased emp (on PEO's payroll)† (1)	Payroll emp†† (does not include leased emp or THS workers) (2)	Leased emp share in emp working at regular basis (%) [(1)/(1+2)]×100 (3)	Index (4)	Industry share of national total leased emp (%) (5) †††
Mining	1,065	509,006	0.21	0.25	0.12
Construction	102,123	5,664,840	1.77	2.11	11.55
Manufacturing	104,415	16,888,016	0.61	0.73	11.81
Transportation	134,760	2,811,017	4.57	5.45	15.24
Utilities except for waste management	2,052	702,703	0.29	0.35	0.23
Information services	12,839	3,066,167	0.42	0.50	1.45
Wholesale trade	29,615	5,796,557	0.51	0.61	3.35
Retail trade	57,236	13,991,103	0.41	0.49	6.47
Accommodation & foodservices	77,311	9,451,226	0.81	0.97	8.75
Finance & insurance	15,593	5,835,214	0.27	0.32	1.76
Real estate & rental/leasing	16,243	1,702,420	0.95	1.13	1.84
Professional, scientific, & technical services	47,987	5,361,210	0.89	1.06	5.43
Administrative & support services including waste management	48,304	NA	NA	NA	NA
Health & social services	58,363	13,561,579	0.43	0.51	6.60
Educational services	7,565	321,073	2.30	2.74	0.86
Arts, entertainment, & recreational services	13,316	1,587,660	0.83	0.99	1.51
Personal care & laundry services	13,447	1,217,185	1.09	1.30	1.52
Repair services	38,016	1,276,389	2.89	3.45	4.30

(Source: 1997 Economic Census)

†1997 Census of Services http://www.census.gov/prod/ec97/97s56-sb.pdf): Apart from the leased employees, the PEO industry hires 11,409 management and administrative employees in the US as a whole.

††See Appendix I for definitions of number of employees on payroll by industry. Note that the table in the 1997 Census of Services does not provide NAICS code of each industry to which leased employees are allocated. We infer based on the industry title to obtain the payroll employment of a corresponding industry.

†††The column does not sum to 100 because we do not include leased employees in the agriculture, administrative and support services including waste management, and "other" industries.

Table 2: Leased Employees by State

	1997				2002
State	Leased emp (emp on PEO's payroll)† (1)	Payroll emp of all private industries: (leased emp and THS workers are included.) (2)	Leased emp share in payroll emp (%) [(1)/(2)]×100 (3)	Index: U.S.=1.00 (3)/0.84 (U.S. avg) (4)	Index: U.S.=1.00 (5)
Alabama	14,644	1,591,179	0.92	1.10	1.45
Alaska	459	188,923	0.24	0.29	0.39
Arizona	55,457	1,701,357	3.26	3.88	1.74-3.48††
Arkansas	11,894	925,498	1.29	1.54	0.12
California	67,804	11,565,015	0.59	0.70	0.52
Colorado	9,575	1,675,514	0.57	0.68	4.60
Connecticut	1,535	1,471,970	0.1	0.12	0.12
Delaware	219	348,009	0.06	0.07	0.06
DC	Undisclosed	396,328	NA	NA	0.05
Florida	197,632	5,550,307	3.56	4.24	5.31
Georgia	63,730	3,106,872	2.05	2.44	1.33
Hawaii	5,520	426,129	1.3	1.55	0.70
Idaho	848	404,670	0.21	0.25	1.71
Illinois	39,214	5,089,899	0.77	0.92	0.51
Indiana	15,497	2,487,609	0.62	0.74	0.76
Iowa	4,191	1,179,660	0.36	0.43	0.10
Kansas	Undisclosed	1,049,359	NA	NA	0.37
Kentucky	1,860	1,422,605	0.13	0.15	0.10
Louisiana	4,943	1,531,663	0.32	0.38	0.54
Maine	893	447,063	0.2	0.24	0.39
Maryland	7,595	1,906,880	0.4	0.48	0.44
Massachusetts	7,891	2,859,594	0.28	0.33	0.32
Michigan	39,021	3,844,460	1.01	1.20	1.16
Minnesota	11,085	2,195,621	0.5	0.60	0.33
Mississippi	6,135	909,746	0.67	0.80	0.57
Missouri	6,132	2,281,643	0.27	0.32	0.40
Montana	204	273,746	0.07	0.08	0.06
Nebraska	9,493	701,132	1.35	1.61	1.40
Nevada	3,415	768,708	0.44	0.52	0.68
New Hampshire	6,641	497,878	1.33	1.58	1.32
New Jersey	13,617	3,300,923	0.41	0.49	0.87
New Mexico	4,584	533,858	0.86	1.02	0.88
New York	25,000	6,895,924	0.36	0.43	0.35
North Carolina	13,186	3,167,303	0.42	0.50	0.36
North Dakota	108	242,047	0.04	0.05	.005-.002††
Ohio	22,384	4,709,180	0.48	0.57	0.57
Oklahoma	5,921	1,127,734	0.53	0.63	0.96
Oregon	12,124	1,292,579	0.94	1.12	0.43
Pennsylvania	10,072	4,840,877	0.21	0.25	0.23
Rhode Island	Undisclosed	390,914	NA	NA	.41-.81††
South Carolina	19,548	1,473,831	1.33	1.58	1.73
South Dakota	Undisclosed	279,187	NA	NA	0.02
Tennessee	19,548	2,247,944	0.87	1.04	0.81
Texas	104,533	7,250,925	1.44	1.71	1.52
Utah	18,788	824,120	2.28	2.71	2.48
Vermont	Undisclosed	232,476	NA	NA	0.01
Virginia	9,341	2,626,844	0.36	0.43	0.41
Washington	2,139	2,081,017	0.1	0.12	0.08
West Virginia	1,141	542,782	0.21	0.25	0.26
Wisconsin	4,214	2,277,849	0.18	0.21	0.14
Wyoming	Undisclosed	161,772	NA	NA	0.03
Total	884,002	105,299,123	0.84	1.00	1.00

(Source: Author's calculations based on 1997 and 2002 County Business Patterns, 1997 and 2002 Economic Census)
†Number of "leased" employees reported by PEOs located in each state; ††Due to disclosure concerns, only a range of the number of leased employees was given for these states and our calculated index range is based on the highest and lowest values of this given range.

Table 3. Comparison between geographical distribution of THS workers and leased employees

Leased Employees		THS Workers	
Top 10 (1)	Index (2)	Top 10 (3)	Index (4)
Florida	4.24	Maryland	1.62
Arizona	3.88	Arizona	1.33
Utah	2.71	California	1.27
Georgia	2.44	Michigan	1.25
Texas	1.71	Georgia	1.24
Nebraska	1.61	Texas	1.22
New Hampshire	1.58	South Carolina	1.18
South Carolina	1.58	Delaware	1.18
Hawaii	1.55	Colorado	1.12
Arkansas	1.54	Illinois	1.09
Bottom 10		Bottom 10	
Pennsylvania	0.25	Idaho	0.59
West Virginia	0.25	Iowa	0.56
Maine	0.24	Nebraska	0.54
Wisconsin	0.21	West Virginia	0.50
Kentucky	0.15	Montana	0.48
Connecticut	0.12	Mississippi	0.46
Washington	0.12	Wyoming	0.35
Montana	0.08	Hawaii	0.26
Delaware	0.07	North Dakota	0.26
North Dakota	0.05	Alaska	0.23

Source: 1997 Economic Census and 1997 County Business Patterns

Table 4. Summary statistics of variables included in this study

	Our sample 145,534 plants		All plants in the 2002 Census of Manufactures 348,295 plants	
	Mean	Sd	Mean	Sd
Plant size: log value of shipments	8.1	1.7	6.9	2.0
Injury-Illness rate (4- or 5- NAICS level)	6.8	2.7	6.7	2.7
Share of newly constructed plants	0.038		0 .072	
Share of plants affiliated w/ a firm w/ multi plants	0.32		0.19	
Share of plants affiliated w/ a firm w/ other mfg plants	0.28		0.16	
<u>Plants affiliated with firms w/ other mfg plants</u>	(40,251 plants)		(56,914 plants)	
firm size: log value of shipments of a firm's mfg plants	12.4	2.4	12.1	2.4
no. of states with a parent firm's plants	9.8	10.2	9.1	10.1
no. of NAICS 3-digit mfg of a parent firm's plants	2.7	2.4	2.6	2.3
HHI index for a firm's state concentration (in terms of value of shipments)	0.45	0.33	0.47	0.34
HHI index of a firm's mfg industries concentration (in terms of value of shipments)	0.78	0.25	0.80	0.25

(Author's calculations based on the micro census data from the 2002 Census of Manufactures)

Table 5: Probit Analysis
Dummy=1: if a plant uses any leased employees (i.e. the plant uses PEO services)

	(1)	(2)	(3)	(4)	(5)	(6)
Plant size: log value of shipments	.132*** (21.89)	.301*** (6.88)	.292*** (6.59)	.123*** (20.37)	.287*** (6.55)	.279*** (6.28)
Squared term of plant size		-.00997*** (-3.73)	-.00933*** (-3.42)		-.00970*** (-3.67)	-.00915*** (-3.38)
Injury-Illness rate (4- or 5- NAICS level)	.0147*** (4.76)	.0138*** (4.43)	.0139*** (4.45)	.0117*** (2.58)	.0103** (2.25)	.0106** (2.34)
dbirth=1 if a plant is newly constructed in 2002	.445*** (15.80)	.477*** (16.41)	.477*** (16.36)	.437*** (15.24)	.468*** (15.69)	.468*** (15.63)
dmulti=1 if a plant is affiliated with a firm w/ multiple plants	.0708** (2.54)	.0783*** (2.80)	.0747*** (2.65)	.0816*** (2.87)	.0890*** (3.12)	.0855*** (2.97)
dmulti_mfg=1 if a plant is affiliated with a firm w/ other mfg plants	.977*** (4.50)	.727*** (3.39)	.682*** (3.59)	.838*** (3.78)	.605*** (2.76)	.599*** (3.19)
dmulti_mfg × firm mfg size	-.0679*** (-4.78)	-.0503*** (-3.59)	-.0645*** (-4.43)	-.0624*** (-4.44)	-.0459*** (-3.30)	-.0583*** (-3.91)
dmulti_mfg × HHI index of a firm's state concentration (in terms of total value of sales)	-.257** (-2.12)	-.204* (-1.80)	-.207* (-1.88)	-.231** (-1.98)	-.182* (-1.66)	-.180* (-1.69)
dmulti_mfg × HHI index of a firm's mfg industries concentration (in terms of total value of sales)	-.199* (-1.67)	-.174 (-1.46)		-.138 (-1.10)	-.115 (-0.92)	
dmulti_mfg × no. of mfg ind. (NAICS 3digit) of a parent firm's plants			.0304** (2.19)			.0247* (1.73)
State dummies	No	No	No	Yes	Yes	Yes
Mfg industry (Naics 3 digit) dummies	No	No	No	Yes	Yes	Yes

Robust z statistics in brackets: errors are clustered for plants in the same firm; * significant at 10%; ** significant at 5%; *** significant at 1%
(Author's calculations based on the micro census data from the 2002 Census of Manufacturers)

Appendix I

1997 Economic Census Definitions of Number of Employees

General Definition

Paid employees consists of full-time and part-time employees, including salaried officers and executives of corporations. Included are employees on paid sick leave, paid holidays, and paid vacations; not included are proprietors and partners of unincorporated businesses. The definition of paid employees is the same as that used on IRS Form 941.

Sector-Specific Information

Construction and Manufacturing sectors - comprises all full-time and part-time employees on the payrolls of establishments who worked or received pay for any part of the pay period including the 12th of March, May, August, and November, divided by 4.

Finance and Insurance sector - includes all employees who were on the payroll during the pay period including March 12. Excludes independent (nonemployee) agents.

Information; Professional, Scientific, and Technical Services; Administrative and Support and Waste Management and Remediation Services; Educational Services; Health Care and Social Assistance; Arts, Entertainment, and Recreation; and Other Services (Except Public Administration) sectors - include all employees who were on the payroll during the pay period including March 12. Includes members of a professional service organization or association which operates under state professional corporation statutes and files a corporate Federal income tax return. Excludes employees of departments or concessions operated by other companies at the establishment.

Management of Companies and Enterprises sector - includes all employees who were on the payroll during the pay period including March 12.

Mining sector - also included are employees working for miners paid on a per ton, car, or yard basis. Excluded are employees at the mine but on the payroll of another employer (such as employees of contractors) and employees at company stores, boardinghouses, bunkhouses, and recreational centers. Also excluded are members of the Armed Forces and pensioners carried on the active rolls but not working during the period. Includes all employees who were on the payroll during the pay period including March 12.

Real Estate and Rental and Leasing sector - includes all employees who were on the payroll during the pay period including March 12. Excludes independent (nonemployee) agents.

Retail Trade and Accommodation and Foodservices sectors - includes all employees on the payroll during the pay period including March 12. Excludes employees of departments or concessions operated by other companies at the establishment.

Transportation and Warehousing sector - includes all employees who were on the payroll during the pay period including March 12.

Utilities sector - includes all employees who were on the payroll during the pay period including March 12.

Source: U.S. Census Bureau