Internal Labor Markets and Diversification Strategies in Financial Services

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Abstract

This paper assesses the fit between firm-level Internal Labor Markets (ILMs) and firm diversification in the U.S. financial services sector. The sector comprises a number of related sub-industries and recent deregulation has allowed firms to construct increasingly diversified portfolios of activities across these sub-industries. Recent deregulation, particularly in banking, has also loosened geographic restrictions on firm activities. Drawing on the "resource-based view" of firm strategy, we hypothesize that firms with stronger ILMs are more likely to diversify. We find support for this view in analysis of data from the Longitudinal Household-Employer Dynamics program matched to the Longitudinal Business Database. Firms with lower net turnover, lower wage dispersion, and greater opportunities for workers inside the firm tend to be those that diversify more subsequently.

Introduction

The theoretical perspective that has come to be known as the resource-based view of the firm suggests that sustainable competitive advantage often originates inside the firm, and that strategy at the firm level is therefore driven by firm-specific resources and capabilities. Human resources hold a prominent position in these resource-based theories of the firm. To date, however, few empirical studies have assessed the role human resources plays in driving firm strategies, largely because large-sample data on firm-level human resources are difficult to come by.

In this paper, we take advantage of the development of new Census Bureau data sets developed out of the Longitudinal Employer-Household Dynamics (LEHD) Program[1] and the Center of Economic Studies to explore the linkages between firm-level human resources and one aspect of firm strategy: diversification. The resource-based view of the firm suggests that diversification arises as firms attempt to leverage non-tradable firm-specific resources, among them human resources. We explore this possibility by examining recent diversification activity in the relatively newly deregulated American financial services industry to investigate whether characteristics of firms' internal labor markets influence their subsequent diversification activities**.**

A Resource-Based View of Diversification

What sparks firm diversification, and why do diversified firms exist? Studies of diversification have long been a mainstay of economics as well as strategic management research (Montgomery, 1994; Ramanujam and Varadarajan, 1989; Hoskisson and Hitt, 1990). Economic theory generally assumes that firms are organized with a single product

[1] The Census Bureau, the National Science Foundation, the Sloan Foundation and the National Institute on Aging generously supported the creation of the LEHD data bases as part of a social science database infrastructure initiative.

focus and face a homogeneous factor market (Scherer, 1980). Based on those assumptions, a market power view (Edwards, 1955) of diversification emphasizes the benefits a firm may reap at the expense of its competitors and customers. More skeptical views offered by agency theorists emphasize the benefits that diversification offers to firm managers themselves, often at the expense of its shareholders (Jensen, 1986; Shleifer and Vishny, 1989).

The resource-based view of the firm (Barney, 1991; Penrose, 1959; Wernerfelt, 1984) suggests a different perspective, emphasizing firm resources and capabilities as the principle basis for strategy, including diversification activity. The resource-based view begins with the idea that firms are heterogeneous with respect to resources and capabilities that are not perfectly mobile across firms (Teece, Pisano and Shuen, 1997; Barney, 1991, 1986; Montgomery, 1994; Amit and Shoemaker, 1993; Hoskisson and Hitt, 1990; Teece, 1982; Penrose, 1959). Resources are stocks of available factors that are owned or controlled by the firm, including physical, intangible, and financial resources (Chatterjee & Wernerfelt, 1991). Firm capabilities refer to a firm's capacity to deploy resources, usually in combination, using organizational processes, to affect a desired end (Amit et al., 1993).

In order for firm-specific resources and capabilities to generate competitive advantage, they must be valuable, relatively rare, and relatively inimitable or immobile (Barney, 1986; 1991), enabling the firm to earn rents. The effectiveness of firm strategies depends on the utilization and exploitation of existing resources (Dierickx & Cool, 1989; Wernerfelt, 1984; Teece, 1980; Penrose, 1959). To the extent that firms have pools of underused resources, these create unique, firm-specific opportunities for exploitation

(Chandler, 1990; Teece, 1980; Penrose 1959; Mahoney and Pandian, 1992; Montgomery, 1994).

Diversification is one such strategy for exploiting existing firm-specific resources: firm diversification can be understood as a process through which managers first identify resources that are unique to their firm, and then decide in which markets those resources can earn the highest rents (Teece, Pisano, and Shuen 1997). Some firm resources are 'indivisible' (Penrose, 1959) and therefore 'sticky' (Teece, Pisano, and Shuen, 1997), and, particularly if they are intangible, difficult or impossible to trade in the market. Firms with these kinds of resources may seek to deploy them in product markets through diversification.

Diversification and Human Resources

One general extension of the resource-based view of the firm is that intangible resources, such as knowledge, are more likely to produce a sustainable competitive advantage than tangible resources (Hitt, Bierman, Shimizu, & Kochhar, 2001; Teece, Pisano, & Shuen, 1997), because other firms will find it more difficult to imitate firm-specific processes associated with value creation (Lippman & Rumelt, 1982; Nelson and Winter 1982; Dierickx et al., 1989). Foremost among intangible resources are human resources: the accumulated skills of the firm's employees in the context of the firm's practices for organizing work.

The resource-based view suggests that human resources have implications for diversification strategy (Penrose 1959; Teece 1982; Montgomery and Hariharan 1991; Lei, Hitt and Bettis 1996). Most firm knowledge and other intangible resources reside in

firm employees (Hitt et al. 2001). Firms can be expected to exploit these resources. To the extent that it serves to leverage firm resources in other market segments (Wernerfelt, 1984), diversification has the potential to move a firm toward more extensive utilization of its human resources. This is especially true where human resources create knowledge and information, which from a perspective internal to the firm are quasi-public goods that can be exploited at close to zero marginal cost.

Despite their potential salience, previous studies have not directly assessed the extent to which human resources affect diversification strategies. As Farjoun (1994: p.187) noted, "empirical studies have primarily focused on R&D and advertising or other 'tangible' assets, essentially avoiding the simple observation that business organizations ultimately consist of people." For example, Chatterjee and Wernerfelt (1991) considered R&D and advertising intensity in predicting the types of market firms choose to enter, while Schoenecken and Cooper (1998) showed that R&D and marketing activities influence entry timing. Because they can be leveraged at low marginal cost, R&D and marketing capabilities are found to generate diversified expansion (Montgomery and Hariharan 1991).

The paucity of empirical research on human resources can be ascribed primarily to difficulties in measurement, particularly in measuring human capital (Steffy and Maurer 1988; Ichniowski, Shaw and Prennushi 1997). There are some hints that human resources matter. Studies of law firms indicated linkages between firm strategy and leverage of human resources (Sherer 1995) and between leverage and firm performance (Hitt et al. 2001). And Farjoun (1994) showed empirically that diversification across

industries was more likely where the industries had related "human resource profiles," or clusters of occupations.

In this study we are able to take advantage of newly available data from the Census Bureau to extend our understanding of the relationship between human resources and diversification. LEHD data enable us to construct firm-level measures of human resources for a large sample of firms. These data allow us to investigate empirically the connections between firm resources – specifically, human resources – and subsequent diversification activity of firms.

Deregulation and Diversification: Financial Services

Our study is set in the U.S. financial services sector. This sector is an especially good venue for examination of the effects of human resources on diversification. Until recently, regulation constrained firms from a full range of diversification activity; many of these regulatory constraints disappeared over the course of the 1990s. This meant that firms developed human resources over a period in which diversification activity was limited; the relaxation of those limits therefore provides us with an opportunity to assess the extent to which human resources are associated with subsequent diversification activity.

U.S. firms were long prevented from engaging in activities across sub-sectors of financial services, primarily by regulation associated with the Glass-Steagall Act of 1933. The Gramm-Leach-Bliley Act of 1999 formally removed a large set of regulatory restrictions on banks by explicitly permitting financial "holding companies" (and their subsidiary firms) to participate in brokerage activities, underwriting, and the provision of

financial advice.[2] This deregulation occurred to some extent after the fact; U.S. banks had been expanding their business beyond lending and deposits and toward provision of a broader set of financial services for years prior to the passage of Gramm-Leach-Bliley. In fact, deregulation began in earnest in the late 1980s, when the Federal Reserve Board began allowing commercial banks to enter the investment banking industry – first allowing commercial banks to underwrite corporate bonds in 1989, for example (Gande, Puri, and Saunders, 1999), so that by the early 1990s commercial banks began to gain a meaningful share of the investment banking market.

Cross-sectoral activity represents one mode of diversification in financial services. A second mode is geographic. While in some sectors (such as brokerage and insurance firms) firms have operated on a national scale for some time, this was not true in other sectors, particularly in the banking industry, where various kinds of regulation restricted geographic diversification. Prior to 1970, for example, branch banking even within state boundaries was somewhat limited, and all states prohibited interstate branching.[3]

Over the following two decades, restrictions on intrastate and interstate branching gradually eased. Intrastate deregulation first allowed holding companies to own multiple banks, then allowed these holding companies to integrate these banks as members of a single branch system. In 1975, Maine provided the first opportunities for interstate banking, by allowing holding companies from other states to acquire banks in Maine. Over the 1980s, many states established arrangements in which their banks could be bought by banks from either selected states or all other states. In 1994, Congress passed

[2] See Fay (2000) for a discussion of Gramm-Leach-Bliley.
[3] See Kroszner and Strahan (1999) for a more complete discussion of the timing and effects of the geographic deregulation of banking.

the Riegle-Neal Interstate Banking and Branching Efficiency Act, allowing full interstate banking, and by 1997 all states but Texas and Montana (each of which passed legislation opting out of Riegle-Neal) permitted complete interstate banking.

Deregulation was accompanied by mergers and acquisitions. Over the late 1980s and 1990s, large firms acquired smaller ones, expanding their reach across both geography and scope of activities. The overall sweep of deregulation in the 1990s allowed firms to operate nationally and across many financial sectors for the first time in several decades. To take one example: in 1998 Citicorp anticipated Gramm-Leach-Bliley by merging with Travelers Group, itself the result of acquisitions and mergers of such businesses as the investment banks Salomon Inc., Smith Barney, and Drexel Burnham Lambert, Travelers Life and Annuity in insurance, the property and casualty divisions of Aetna, and the retail brokerage and asset management operations of Shearson Lehman. By 2004, Citigroup had credit card customers in every U.S. state and its expansive branch banking network served retail customers in 22 states.

Diversification, and Human Resources in Internal Labor Markets

The deregulation wave of the 1980s and 1990s opened up previously non-existent opportunities for diversification. The mergers, acquisitions, and greenfield growth that produced these increasingly diversified firms reflect firms' searches for new customers and enhanced market power. But this begs the question: which firms were likely to diversify?

Our framework suggests that firm resources could play an important role in determining diversification strategy. Specifically, we have suggested that firms with

greater intangible assets in the form of human resources are more likely than others to seek to leverage these assets through diversification. These intangible assets include firm-specific skills. As Montgomery and Wernerfelt (1988) noted, sources of value that are not firm-specific are insufficient to allow firms to enter industries where more specialized factors are required. While general skills can create value, these values do not sustain competitive advantage or create valuable resources that yield economic rents, because they are freely tradeable. Tradeability thus has clear implications for diversification strategy: the value of nontradeable assets, or resources, cannot be realized in factor markets. In order to tap their rent earning potential, owners of such assets must deploy them in product markets (Dierickx and Cool, 1989). Similarly, Montgomery and Wernerfelt (1988) note, following Williamson (1985), that standard theory suggests that value arising from firm-specific skills will be deployed internally, and that such circumstances should be associated with diversification.

We suggest that firms whose human resources reflect greater levels of firm-specific skills and capabilities are more likely to diversify. For two reasons, these firms are likely to be those with robust internal labor markets (ILMs). First, internal labor markets encourage the development of firm-specific skills. Firm-specific skills are especially important because they are more likely than general skills to be associated with the slack resources that diversification seeks to exploit. Second, firms with strong internal labor markets are more likely to have valuable human-resource derived intangible resources and capabilities beyond the skills of the workers themselves: team-level, unit-level, and organizational knowledge, and accumulated social capital (Cappelli, 2004). This reasoning leads us to hypothesize that firms with stronger ILMs are more

likely to diversify subsequently. Such diversification may take two forms: operating in a more extended geographic range and offering services in more sub-sectors of financial services.

Data sources

The Longitudinal Business Database (LBD)

We draw our diversification measures in the industry from the LBD, for which a detailed description is available in Jarmin and Miranda (2002). A few points about its construction are useful here. The LBD is created by linking data from annual business register files. The Census Bureau's business register, the Standard Statistical Establishment List (SSEL), is a continuously updated database of basic information about all employer business establishments in the U.S., and the Center for Economic Studies maintains annual snapshot SSEL files from 1975 onward. Currently, the LBD contains very good longitudinal linkages for all employer business establishments in the U.S. from 1975 to 2000. These linkages provide an exact measure of establishment age for all establishments born after 1975. The LBD contains basic information on establishment employment, payroll, location, industrial classification and firm affiliation. The LBD contains numeric establishment identifiers that allow it to easily be matched to other Census Bureau establishment level datasets that contain more detailed survey based information. The LBD also contains numeric firm identifiers that allow researchers to aggregate the establishment level data up to the company level. We make use of this approach in this paper.

The Longitudinal Employer-Household Dynamics (LEHD) Program

We also exploit new Census Bureau data from the LEHD Program. The LEHD Program integrates information from state unemployment insurance data and Census Bureau economic and demographic data in a manner that permits the construction of longitudinal information on workforce composition at the firm level. This Program represents a substantial investment made by the Census Bureau in order to permit direct linking of its demographic surveys (household-based instruments) with its economic censuses and surveys (business and business unit-based surveys).

The unemployment insurance (UI) wage records are discussed elsewhere (see Burgess, Lane and Stevens, 2000). Every state in the U.S., through its Employment Security Agency, collects quarterly employment and earnings information to manage its unemployment compensation program. These data enable us to construct quarterly longitudinal information on employees. The advantages of UI wage record data are numerous. The data are frequent, longitudinal, and potentially universal. The sample size is generous and reporting for many data items is more accurate than survey based data. The advantage of having a universe as opposed to a sample is that movements of individuals to different employers and their consequences for earnings can be tracked. It is also possible to construct longitudinal data using the employer as the unit of analysis.

Perhaps the main drawback of the UI wage record data is the lack of even the most basic demographic information on workers (Burgess, Lane and Stevens 2000). Links to Census Bureau data overcome this for two reasons. First, individual wage records can be integrated with administrative data at the Census Bureau containing information such as date of birth, place of birth, and gender for almost all the workers in the data. Second, LEHD staff have exploited the longitudinal and universal nature of the

dataset to develop measures of workforce quality using the methodology described in detail in Abowd, Creecy and Kramarz (2002) and in Abowd, Lengermann and McKinney (2003).

The LEHD Program now houses data from more than thirty states.[4] In this paper, however, our attention to the role of internal labor markets in accounting for the evolution of diversification in the financial services in the 1990s requires extensive LEHD data from the early 1990s. We have data on all establishments and all firms in the financial services sector (defined precisely below) in the LBD from 1992 through 2000. We also have LEHD data on all establishments and all firms in the financial services sector for three large selected states. The crosswalk between these files is based on a common business-level identifier and the match rate between these files is extremely high.

Diversification in Financial Services

We investigate geographic and industry diversification in the U.S. financial services industry. We focus on financial services because of the unique opportunities that deregulation of the industry presented in the 1990s. The deregulation of the industry acts as a form of a natural experiment during our sample period – that is, financial services firms saw the opportunity set change dramatically in response to regulatory changes that can for our purposes be viewed as exogenous. Our analysis explores which firms changed their diversification in response to this deregulation as a function of the ILM structure of the firm.

[4] See http://lehd.dsd.census.gov/led/00/index.html for more information.

Table 1 lists the 4-digit 1987 SIC codes we used to identify establishments in financial services, and in both the LBD and LEHD data we can measure activity at the establishment-level. Our analysis of diversification, however, is conducted at the firm-level, and thus we aggregate our establishment activity to construct firm measures. The Census Bureau maintains firm corporate structure of all establishments in the U.S. using a definition of operational control, giving a common identifier to any establishment under the operational control of a parent firm. In what follows, we exploit this rich characterization of the corporate structure to determine financial services firms - all the financial services establishments under a common firm identifier. Put differently, we focus on only the financial services components of firms.[5] We define a financial services firm as a firm-year observation comprising establishments in any of the 4-digit SIC industries listed in Table 1, in the firm in that year. We create diversification measures for these financial services firms based on LBD data for the period 1992-2000 (though our analysis of diversification will focus on the period 1997-2000).

Table 2 shows counts of single- and multi-unit financial services firms (hereafter firms) for the U.S. over the period 1992-2000, drawn from the LBD data for all 50 states plus the District of Columbia. The number of single-unit firms grew by over 20% during this period, even as the number of multi-unit firms in financial services dropped by more than 10% in the same time frame. The drop in multi-unit firms is attributable to the substantial pace of consolidation activity between medium- and large-sized firms in the

[5] Note that large firms that are not thought of primarily as financial services firms (for example, auto companies) may have substantial financial services components. We have examined the diversification measures using all components of the firms (including the non-financial services components) and we obtain similar basic patterns. However, given that the deregulation in the financial services industry primarily impacted the financial services components of firms, we focus on the financial services components only.

industry. Table 3 shows establishment counts over the same period, indicating that the number of establishments in both single- and multi-unit firms grew over the period, with slightly higher growth among the establishments that did not belong to multi-unit firms. Table 4 shows that the relatively small share of multi-unit firms in the sector account for the vast share of sector activity: over 80% of both employment and payroll are represented by multi-unit firms.

We create five different diversification measures: three simple measure of overall diversification, and two measures of relatedness in diversification. The simpler measures are equal to one minus a basic Herfindahl index: industry diversification *(ind_div)*; county diversification *(county_div)*; and state diversification *(state_div)*. We also use weighting to account for the role of larger establishments in diversification activity. LBD data for payroll are quite reliable and thus we prefer payroll-weighting to employment-weighting. We construct all measures using payroll weights (in the aggregate, employment and payroll, as Table 4 suggests, represent roughly similar shares of activity).

We illustrate the construction of the measure for industry diversification. We calculate total payroll (pay_{it}) for firm *i* in year *t*, the total payroll (pay_{jit}) for establishments (*e*) operating in industry *j* in firm *i* in year *t*, and the payroll share (s_{jit})for establishments operating in industry *j* in firm *i* in year *t*.

$$pay_{it} = \sum_{e \in i} pay_{eit} \qquad pay_{jit} = \sum_{e \in i \cap e \in j} pay_{eit} \qquad s_{jit} = \frac{pay_{jit}}{pay_{it}}$$

We use these measures to create basic Herfindahl indices (in this case, payroll-industry) for firm *i* in year *t*.

$$H_{it}^{industry} = \sum_{j \in i} \left(s_{jit}\right)^2$$

From this measure we create our index, *ind_div*, for firm *i* in year *t*.[6]

$$ind\_div_{it} = 1 - H_{it}^{industry}$$

County and state diversification are calculated similarly.

We also calculate measures of relatedness in diversification, using distance-based diversification indices weighted by payroll. We call these measures *geog_dist_div* for geographic diversification and *ind_dist_div* for industry diversification. For these measures, we also begin by calculating payroll and payroll shares. With respect to geography, we then proceed to identify the "core" county (*c*) of firm *i* in year *t*. The "core" county is defined as the county with the highest payroll share in firm *i* in year *t*. From here, we create the following diversification index:

$$H_{it}^{county} = \sum_{e \in i} (1/d_{ce})\left(s_{eit}\right)^2$$

where d_{ce} is 1 + the distance from the center of the county where establishment *e* is located and the "core" county *c*. This enables the construction of the variable *geog_dist_div* for firm *i* in year *t*.

$$geog\_dist\_div_{it} = 1 - H_{it}^{county}$$

For our "distance"-based diversification index weighted by payroll for industry, we also calculate total payroll (pay_{it}) and payroll share. We then proceed to identify the

[6] Our measurement approach to diversification follows in the spirit of Gollop and Monahan (1991) both for the basic measures and the distance-relatedness measures of diversification.

"core" industry (*j*) of firm *i* in year *t*. The "core" industry is defined as the industry with the highest payroll share in firm *i* in year *t*. From here, we create the diversification index

$$H_{it}^{industry} = \sum_{e \in i} (1/d_{je})(s_{eit})^2$$

where $d_{je} = 1$ if firm *i* operates only in one 4-digit industry, 2 if establishment *e* operates in the same 3-digit industry as the firm "core" industry *j*, 3 if establishment *e* operates in the same 2-digit industry as the firm "core" industry *j*, and 4 otherwise. This enables the creation of the *ind_dist_div* diversification index for firm *i* in year *t*:

$$ind\_dist\_div_{it} = 1 - H_{it}^{industry}$$

All diversification measures are bounded in the interval [0,1] and are equal to 0 for single-unit and other completely non-diversified firms.

Figure 1 shows the annual mean of all five firm-level diversification measures weighted by the total payroll of the firm for multi-unit firms (Table 5 shows the data for each measure for key years in this period in more detail). Average diversification levels of the firms in each of our five indices show modest growth for the period 1992-2000, consistent with the stylized facts for the sector. Firm-level geographic diversification, whether measured at the county or the state level, and industry diversification, are highest at the end of the period. Firms also appear to be decreasing the extent to which their activities are related; the distance indices by geography and by industry are also higher at the end of the period.

Our analytical strategy will be to focus on changes in firm diversification for the period 1997-2000, enabling us to use data on the characteristics of firms' internal labor markets from the period preceding this window. Moreover, our focus on 1997-2000

implies that we are examining changes from perspective pre- and post-passage of the Gramm-Leach-Bliley Act. We earlier noted that some aspects of deregulation, and considerable diversification activity, clearly pre-date the Act. Figures 1 and 2, however, show that over the 1997-2000 period the trends in the industry continue to point toward increasingly diversified organizations, operating over increasingly distant geographies and across somewhat less related industries.

The composition of our sample of firms changes over time as a result of entry and exit activity. From our sample, we define long-term continuing firms as firms that appear in the sample for every year from 1992-2000. There are 79,840 single-unit and 10,192 multi-unit long-term continuer financial services firms. Figure 2 displays all five firm-level diversification measures weighted by the total payroll of the firm for long-term continuer multi-unit firms. Over the period we are studying, the long-term continuers in the sample show greater increases in diversification levels by the various measures, a fact that is also consistent with our account of existing firms' pursuit of increasingly diversified activities in the 1990s (again, see Table 5 for more detail).

While the mean level of diversification in financial services increased by any measure over our period, firms did not follow identical strategies. Perhaps not surprisingly, most firms experience little change in their diversification levels over the period. Our sample is, however, characterized by considerable heterogeneity in strategies even over the relatively short time window we have chosen, and includes not only firms with varying levels of diversifications, but firms that decreased as well as increased their range of activities both geographically and sectorally. Examination of plots of diversification measures for both 1997 and 2000 helps to make this clearer, as shown in Figure 3.

We can further consider firm diversification strategies by decomposing changes in the various measures of diversification, separating the roles of continuers from changes generated by firm entry and exit. Let the aggregate weighted average of firm-level index be given by:

$$D_t = \sum_i \theta_{it} D_{it}$$

where D_t is the share-weighted average diversification index, D_{it} is the diversification index for firm i, and θ_{it} is the share of firm i. Consider the following decomposition:

$$\Delta D_t = \sum_{i \in C} \theta_{it-1} \Delta D_{it} + \sum_{i \in C} (D_{it} - D_{t-1}) \Delta \theta_{it} + \sum_{i \in C} \Delta D_{it} \Delta \theta_{it}$$

$$+ \sum_{i \in N} \theta_{it} (D_{it} - D_{t-1}) - \sum_{i \in X} \theta_{it-1} (D_{it-1} - D_{t-1})$$

The sets *C*, *N*, and *X* respectively represent the set of continuing firms, entering firms, and exiting firms. This decomposition involves four terms: a within-firm effect, a between-firm effect, a cross effect, and a net entry effect. We define firm entry and exit in terms of changes in the firm identification code, and as such, a firm that is acquired will result in an "exit" of a firm. In what follows, since our firm-level diversification measures are based upon using payroll as a measure of activity, we use firm shares of total industry payroll as weights in the aggregation and decomposition.

Decomposition of changes in our measures for the period 1997-2000 clearly reveals that the increase in diversification levels over this period is generated by continuing firms. Figure 4a shows that most of the activity in our sample takes place in continuing firms, but that entry and exit are substantial. Of the firms in the 1997 sample, about 20% (by payroll weight) exit over the period, while entrants in the 1997-2000 period account for only about 10% of the payroll weight in 2000. As Figure 4b shows, continuing firms increased their diversification levels over this period, while net entry

actually generated a decline, and activity among continuers was especially prominent for diversification across state boundaries.

The decline attributable to net entry reflects mainly the fact that entrants to the industry tend not to be diversified (consistent with the resource-based view, these firms have few specific resources to leverage). While firms that exit are less diversified than the firms that continue, entrants are even less diversified than exiters, so the impact of net entry is negative. We find it striking that continuing businesses exhibit a pronounced increase in diversification over the 1997-2000 period. Figure 4c provides a fuller characterization of the dynamics of continuing firms by showing all of the components of the above decomposition. We find that the within terms (changes at the firm level weighted by initial shares) and especially the between terms (changes in the shares weighted by initial diversification) are both positive for all measures. Thus, the contribution of continuers arises both because the average continuing firm exhibited an increase in diversification and also because the firms that were already highly diversified in 1997 increased their share of activity.

Human Resources in Internal Labor Markets

Basic concepts and measurement

In this section we turn our attention from basic facts on diversification to our measures of human resources in internal labor markets. The LEHD data do not permit us to observe firm practices directly; rather, we have indicators of internal labor market outcomes that result from internal firm processes and practices. The LEHD data allow us to construct a number of indicators of the strength of firm-level internal labor markets

and thus of firm resources. Each of these measures can be thought of as an outcome of ILMs, and likely to be associated with the resources that diversification seeks to exploit. We focus on three indicators of internal labor markets derived from the LEHD data: firm-level "churning" (worker turnover rates in excess of net changes); the extent to which wage-tenure profiles at firms slope upward; and the dispersion of wages within firms. We construct these measures initially at the establishment-level and then aggregate the measures to the firm level using appropriate employment weights.

First, consider the role of worker turnover in this context. The sorts of firm-specific skills that can be leveraged through diversification are likely to be acquired on the job, in firms that have relatively low worker turnover (Fairris, 2004). Moreover, it has long been argued that low quit rates are one feature of firms with strong internal labor markets (Doeringer and Piore, 1971). In this paper we look specifically at worker "churning." We measure worker churning at the establishment-level as:

$$\frac{\left(Accessions + Separations - \left|\Delta Employment\right|\right)}{Average\_Employment(t, t-1)}$$

This measure captures the component of worker turnover or reallocation that is in excess of that needed to accommodate any net changes in the number of workers in the business. We have this measure on a quarterly frequency for every establishment, and aggregate it to an annual firm level by taking appropriate employment-weighted averages. We expect that firms with high mean rates of worker churning (*chr*) are less likely to accumulate firm-specific skills over time. Firms with relatively low churn rates, in contrast, are more likely to develop the sorts of skills that can be leveraged through diversification.

A second important aspect of internal labor markets is that they comprise opportunities to advance inside the firm. Such advancement is also conducive to the development of resources that can be leveraged through diversification. We do not have specific measures of advancement through job ladders, often seen as a key feature of internal labor markets (Pfeffer and Cohen, 1984**),** but the LEHD data allow us to construct a proxy for these kinds of opportunities through the identification of wage-tenure profiles inside the firm. Workers in firms with relatively strong internal labor markets are likely to have wage-tenure profiles that slope more sharply upward within the firm, as they are rewarded for seniority with higher-ranking and better-paying jobs.

Our second indicator of the strength of the firm's internal labor market is the mean growth of workers' wages over their period of employment. The LEHD data allow us to construct a profile of the "within-job-wage-growth" (*wjwg*) for each establishment in the firm. We focus on the five year period preceding 1997, taking the mean wage gains of all newly hired workers who begin spells of employment during the period 1992-1996, inclusive, and who have tenure for five or more years. In other words, our measure *wjwg* gives the average firm wage-tenure profile, built from the first five years of individual workers' tenure at the firm conditional on tenure lasting for at least five years.

A third feature of many internal labor markets is wage compression. Firms with strong internal labor markets are likely to feature less dispersion of wages across workers with similar jobs and skill levels. In internal labor markets, wages are set in part by bureaucratic rules and may not perfectly reflect forces in the external market. Such rules may reflect norms of equity, or arise for reasons of administrative convenience. Freeman (1982), for example, shows that unionized firms are more likely to feature wage compression for observationally equal workers, and unionization is also associated with

the existence of strong internal labor markets (Kalleberg et al. 1996). Pfeffer and Langton (1993) show that wage compression is positively related to cooperation among workers. Such cooperation provides opportunities to build individual-specific skills, and has further effects because firm knowledge is embedded not simply in individuals' skills, but in "routines" (Nelson and Winter, 1992) and in relationships between individuals (Kogut and Zander, 1992). Routines and social capital are not transferred easily to other organizations; firms with valuable capabilities in these areas may seek to leverage them through diversification. Our measure of within-firm wage dispersion (*diff*) is the ratio of earnings of the worker at the 90^{th} percentile in the firm to that of the worker at the 10^{th} percentiles (expressed in logarithmic form).

The effects of these different aspects of internal labor markets on subsequent diversification may also be complementary. For example, if a relatively small number of workers stay with the firm long enough to accumulate skills, the effects of steep wage profiles may be less than if most workers tend to remain at the firm. Thus high rates of turnover (or our measure, churning) may tend to dampen the effects of high levels of wage growth. Similar reasoning applies to wage dispersion. We suggested that low levels of wage dispersion, particularly controlling for human capital, are more likely to be associated with skill development and accumulation of social capital that can be leveraged through diversification. This relationship should be stronger in firms with relatively low rates of turnover. Finally, we also expect the relationship between wage dispersion and steep wage profiles to be complementary. We expect that the negative effects of wage dispersion should be dampened by steeper wage profiles. That is, dispersion in firms where individuals have the opportunity to make wage gains should not have the same kinds of negative effects on skill accumulation, cooperation, and social

capital as would dispersion in firms in which individuals do not have these kinds of opportunities.

Our approach will be to use measures of these indicators, constructed at the level of the firm, to predict subsequent firm-level diversification activity. The underlying premise here is that internal labor markets in financial service firms developed over time, perhaps in part as human resources strategies consciously chosen, in part as responses to institutional pressures, and in part due to idiosyncratic factors (which may have in turn induced firms to adopt alternative human resource practices). While we clearly recognize that firm-level differences in our indicators of ILMs are driven by many possible factors and inherently endogenous, our empirical strategy is to take advantage of the changes in the regulatory environment to identify the impact of ILMs on diversification. That is, in the 1990s deregulation and technological changes provided new opportunities to firms. The open question is not whether or why financial services diversified on average but rather, which firms increased diversification. Our working hypothesis is that the firms with well-established ILMs were in a better position to take advantage of these new opportunities, and thus we use the 1992-1996 outcomes of ILM processes at the firm level to predict changes in firm-level diversification activity in the 1997-2000 period. It is, of course, the case that deregulation and diversification began prior to 1997, but our approach is designed to relate changes from t to $t+k$ based upon initial conditions in period t.

We use another set of variables to control for other firm characteristics, both those related to general features of the firm, and those related to human resources. Firm size (*lnsize*) is measured by the average employment (in logs) of the firm (restricted, as noted

above, to the financial services establishments of that firm) from 1992-96.[7] Firm *growth* is measured by average quarterly employment growth over the period 1992-96 and firm age (*firmage1997*) is measured by the age in years of the oldest establishment in the firm as of 1997. Because longitudinal firm linkages are currently under development, exact measures of firm age are not yet available on the LBD. However, other work at CES (Becker et. al. 2004 and Davis et. al. 2004) has shown that using the age of the oldest establishment owned by a firm is a very good approximation. We control for the "home" state of each firm: our LEHD data are taken from three large states and we include dummy variables indicating which of the three states employs the largest share of employees. We also control for the chief sub-industry in which in each firm operates, including dummy variables for the 4-digit industries listed in Table 1 which take on a value of "1" for the sub-industry employing the largest share of the firm's workers, and a value of "0" otherwise. We control for these features of our firms since each might plausibly be related both to internal labor market characteristics and to diversification.

The LEHD data also allow us to control for other demographic features of sample firms' workforces. We control for the share of female workers, *shr_fem*, taken from the LEHD data. We also control for the firm's employment of high-skilled workers by including a measure for the share of high-skill workers, *shr_high*, derived from the LEHD data, and based upon the measures of workforce quality developed by Abowd et. al. (2003). The workforce quality measures are based upon a statistical decomposition of the wage for a worker into a person effect, a firm effect and time varying person characteristics including general labor market experience. The person effect is the

[7] In this draft, figures in Tables 7 and 8 refer to employment only in the three LEHD states. Estimates in the regression models reported in Tables 9, 10, and 11 refer to national employment levels. Subsequent drafts will use the national figures in all tables.

portable component of a worker's wage and as such is a good summary measure of the general skills of a worker (and indeed studies have show that it is highly correlated with direct measures of skills such as education). Using this person effect, we construct summary measures of the skill distribution of the firm based upon the fraction of workers the firm has in the quintiles of the person effect distribution (where the quintile thresholds are based upon all workers in the financial services sector).

All of these measures of workforce quality and workforce composition are controls that help in the interpretation of the ILM measures. Our measure of within firm wage dispersion, for example, might be thought to reflect differences in the mix of workers at the firm. Controlling for workforce composition implies we are capturing the variation across firms in our ILM measures holding these composition measures constant. In effect, we are able to examine internal labor market effects controlling for general skills; this is consistent with our theoretical argument that rests on the effects of firm-specific skills and cooperation.

We construct these measures for all establishments, and aggregate them to the firm level for all establishments in the three large states for which we have these measures for the 1992-96 period. While we have constructed these measures for all firms, in what follows much of the analysis focuses on financial services firms that have at least five employees (cumulatively) in our three states. While we have found that our empirical results are robust to the inclusion of all firms, many of our measures (e.g., churning, dispersion) are inherently noisy for very small firms (e.g., a firm with one worker).

In matching our ILM firm-level measures from the LEHD to the LBD diversification measures, we focus on firms that have at least one establishment in our

LEHD states. However, it should be emphasized that the diversification measures we use for these firms are the national diversification measures. We are thus using the ILM measures from these three states, derived from the observed dynamics of workers and firms for the period 1992-1996, as proxies for the ILM behavior for the entire national firm.[8]

Basic Facts about ILMs

There is substantial heterogeneity across firms in the measures we have chosen to represent outcomes of ILMs. Figure 5 reports scatter plots of the churning measure, the within firm wage tenure profiles, and within firm wage dispersion. There is evidence for heterogeneity of each measure. For churning, there is substantial mass from very low rates up to a rate of 0.5 (a fifty percent turnover rate abstracting from net growth is very large). There is substantial mass of wage-tenure profiles from slightly negative to more than 20 percent, and there is substantial mass in the 90-10 log differential from just above zero to more than 400 log points.

We first ask whether our measures are likely to characterize consistent aspects of firm strategy and human resource policies. If these indicators vary considerably from year to year, they are likely to be poor representations of internal labor markets or the development of specific skills and capabilities. If, on the other hand, the measures are reasonably stable over the period, then it is more likely that they are capturing some firm-level approach to human resources. The scatter plots demonstrate that there is substantial persistence in each of the measures, suggesting that the variation we have detected

[8] In future drafts, we plan on examining the behavior of those firms that have most of their activity in our three states as a robustness check. However, even in this case, the national diversification of the firm is clearly the issue of interest.

reflects part of the firm's long run approach to human resources. Because the variables indicate relatively consistent aspects of firm-level internal labor markets, we reduce the complexity of our analysis by constructing new variables for each indicator by taking the annual mean level of each of our measures for the period 1992-1996. Variable names and their definitions are summarized in Table 6.

Tables 7 and 8 report summary statistics for our sample on both weighted and unweighted bases, as well as correlations between the variables. In what follows, we focus on analysis on a weighted basis. For our three key ILM measures, the weighted statistics show an average churning rate of around 9 percent, an average within firm wage tenure profile over the first five years of tenure of 9 log points, and an average within firm wage differential of 160 log points. Consistent with the scatter plots in Figure 5, the reported standard deviations show substantial variation. It is also worth noting that the average firm has about 63 workers in the unweighted sample but the employment-weighted average is over 3000. Thus, the average worker in the financial services sector works at a very large firm even though the average firm is relatively small.

Tables 7 and 8 also show that many of our control variables are strongly correlated. In the analysis to follow, we control only for gender composition and workforce quality, but here we also show the correlations with more basic measures such as the share of high wage workers. The latter is highly correlated with the share of high skill workers and inversely correlated with the share of low skill workers and the share of female workers. These correlations in controls suggest caution in interpreting the effects of any single control variable in subsequent multivariate models.

We also find that several of our control variables are associated with our internal labor market indicators: wage profiles are steeper in firms with lower shares of female workers, and steeper in firms with relatively more workers with high levels of human capital. Wage dispersion is also positively correlated with the share of high-human capital workers. Churning is higher in firms that employ smaller shares of high-human capital workers. Churning is also negatively associated with net growth; that is, growing firms tend to have lower churn rates.

The relationships between the internal labor market variables suggest that the three indicators do not represent a single construct. Churning and wage dispersion are positively correlated; that is, firms with higher turnover rates tend to be those with greater wage dispersion. But firms with relatively steep wage profiles also tend to have slightly higher rates of churn, and considerably more wage dispersion. This is not necessarily surprising: Fairris (2004), for example, shows that quit rates are actually increased by internal opportunities in circumstances where workers compete for such opportunities rather than having them awarded on the basis of seniority. Seniority-based opportunities, on the other hand, may be more characteristic of the ideal-type labor markets described by Doeringer and Piore (1971) featuring lower levels of wage dispersion.

Thus our indicators represent different aspects of internal labor markets, and are not necessarily associated with one another in practice. The data do not support an interpretation in which we would combine these indicators into a single scale representing the overall effects of a strong internal labor market. Instead, we investigate whether each indicator may have its own effects on the development of firm-level resources that lend themselves to leveraging through diversification. We then turn to a

consideration of complementarity which focuses on the effects of internal labor markets rather than on the adoption of practices.

Analysis

Our analytical strategy is to estimate OLS equations with the changes between 1997 and 2000 in the various measures of diversification as dependent variables. As independent variables, we use the constructed five-year means of our internal labor market and control variables. Recall that these means are estimated for the years 1992-1996, fully preceding any subsequent changes in diversification levels. We weight observations by payroll in all estimated models.

Table 9 reports results from a control model, before estimation of the variables of interest. (For simplicity we do not report the state and industry dummies.) Examining the overall fit of these models shows clearly that most of the change in diversification levels over the period is attributable to factors we have not measured**.** The goodness of fit is somewhat similar for each of the measures; cross-industry diversification has a considerably worse fit, and state diversification a somewhat better fit; the other three are roughly similar. The overall explanatory power of the models is reasonable for firm level cross sectional regressions, especially given that the dependent variables are changes in the measure of interest.

As we have noted, there are high correlations amongst the controls so we interpret the results in Table 9 with some caution. We chose to operationalize age by dividing the sample into four cohorts; this provided a better fit than a linear specification. "Middle-aged" firms (11-20 years old) are more likely to have positive changes in county-level

and industry-level diversification over the period; other effects of age are insignificant. Firm size (as measured by number of workers) is negatively associated with changes in diversification levels by any of our measures. This result may indicate some inertia associated with large firms; it is also true that larger firms are more diversified and thus start from a higher baseline level in 1997 so we may be capturing a catch-up effect.[9]

Results for average growth rate are mixed. Firms that grew extensively in the period 1992-1996 tend to increase their diversification levels as indicated by distance measures, but growth in this earlier period is actually negatively related to the unweighted changes across state boundaries. It is possible that firms that experienced growth during the earlier period may already have begun to diversify before 1997 and that subsequent changes indicate further expansion into the areas that were entered in the earlier period.

Holding other factors fixed, the share of "high human capital" workers is negatively associated with changes in diversification levels for three out of the five measures. This is not inconsistent with our theoretical perspective, which suggests that human resources are likely to be leveraged through diversification where they carry firm-specific value that cannot be realized in other ways. This human capital indicator is a measure of general skills, and thus firms may not have opportunities to exploit such skills through diversification. Interestingly, we find that, again holding other factors fixed, a higher share of female workers is associated with a greater increase in diversification. We offer no ready interpretation of this latter finding; we included this measure of

[9] We have also estimated models using other specifications for firm size (including groupings and more complex non-linear functions). Some alternatives result in slightly improved fit. The basic findings both with respect to our study variables and with respect to the negative effect of size are robust.

workforce composition as a control variable. The impact here, however, is large enough that this finding is worthy of more investigation.[10]

In Table 10 we present results for models which include the control variables and our main variables of interest. Results for the internal labor market variables are consistent with our hypothesized relationships, and F-tests suggest that the three indicators contribute to the fit of each of the five models. Results for the control variables are relatively stable in comparison to Table 9 (there are some changes in the estimates for age effects, suggesting relationships between internal labor markets and firm age).

Table 10 shows that each of the three measures of internal labor market strength is significantly associated with changes in each of the diversification indices, and the relationships are in the expected direction. Churning, our measure of net turnover, is negatively associated with changes in diversification by all five measures; four of these are statistically significant. More extensive wage differentials are also negatively associated with subsequent diversification, and the effects are statistically significant with respect to all five of our diversification measures. And steepness of wage profiles is positively associated with changes in diversification in each of the five models.

In terms of the magnitudes of the effects, the effects we have detected are important but account for a relatively small fraction of the variation in the distribution of changes in diversification. For each of our diversification change measures, a one standard deviation change is about 0.15. The coefficient estimates from Table 10 and the summary statistics from Tables 7 and 8 imply that a one standard deviation change in

[10] For example, the share of female workers may be a proxy for diversification in activities on other dimensions (e.g., more likely to have part time workers, more likely to be in an urban area).

churning (of about .05) produces a change in the various dispersion change measures that ranges from about one-seventh of a standard deviation (for county-level geographic diversification) to about four percent of a standard deviation (for distance-weighted industry-level diversification). Analogously, increasing the wage dispersion in a firm by one standard deviation (about .48) results in an increase in diversification growth that is between one-tenth (distance-weighted industry diversification) and one-fourth (unweighted industry diversification) of a standard deviation. Finally, a one standard deviation change in within-job wage growth (about .04) is linked to a change in diversification that ranges between one-fifth (county geographic diversification) and one-tenth (state geographic diversification) of a standard deviation. Again, while much of the variation remains unexplained, accounting for as much as a quarter of the standard deviation of the variation we are seeking to explain suggests that the effects we have captured are important.

One interesting question is the role of distance or relatedness in this context. The pattern of coefficients in Table 10 for county-based diversification changes shows that the diversification measure that weights by distance yields slightly smaller effects for wage-tenure profiles and churning than does the measure that does not weight by distance. The effects of wage compression are slightly larger. For the industry based measure, weighting the diversification measure for distance/relatedness yields a larger effect for churning; one that is statistically significant. The effects of wage-tenure profiles are only slightly larger; the effects of wage compression, smaller. Overall, the patterns

are similar enough that it is difficult to argue that the results hinge on weighting by distance or relatedness.[11]

The results in Table 10 are consistent with our resource-based view of diversification. Firms with low turnover, relative wage compression, and steep within-firm wage profiles are likely to have the sorts of firm-specific resources that can be leveraged through diversification. The results are especially interesting in light of the results in Tables 7 and 8, which showed that steep wage profiles are actually associated with higher levels of churning and more wage dispersion inside the firm. The results suggest that each of the three measures may indicate the development of firm-specific resources in internal labor markets, though firms that develop resources through worker retention and wage compression may not tend to be the same firms that have steep wage profiles. One possibility is that there may be two kinds of paths to the development of firm-level human resource capabilities: one that focuses on rewarding worker loyalty and cooperation; and a second which focuses on tournament-like structures that encourage worker effort (Lazear and Rosen, 1981).

Next we turn our attention to possible complementarities between internal labor market indicators. Here our analytical strategy follows that of MacDuffie (1995), who argued that multiplicative interactions are one way to estimate complementary effects of different aspects of human resource and production practices. We form interaction terms between each pair of internal labor market indicators. Before doing so, we subtract the mean value of each of the three indicators from each score, "centering" the variables. This procedure reduces multicollinearity without altering the structural relationships

[11] In future drafts, we plan to pursue empirical exercises that will help us disentangle the role of diversification and distance/relatedness. The current results should be viewed primarily as a robustness check on alternative measures of diversification.

among the variables, and allows straightforward interpretations of main effects in the same models that include interactions (Jaccard, Turisi, and Wan 1990).

Results for interactions are displayed in Table 11. We estimated both models which added individual interaction terms to each of the models in Table 10, and models in which we entered all three terms simultaneously. In Table 11 we report only the estimates for the models including all three interaction terms. Results for models which added only one term at a time (available on request) were substantially similar. The effects of churning and wage profiles appear to depend on one another, and the interaction, as expected, is negative and significant for four of the five measures of change diversification (the exception is unweighted industry diversification). Churning and wage compression have complementary effects in the expected direction in three of the five models. The results least consistent with our expectations are those for the interaction between wage profiles and wage compression; while two of the five models suggest complementarity in the expected direction, two do not show statistically significant relationships, and one (for state diversification) has the opposite sign from the one we hypothesized. Overall, the results in Table 11 provide some support for our conjecture that internal labor market indicators would have complementary effects on changes in diversification.

Discussion, Future Directions, and Conclusions

We find that continuing firms in the financial services industries have substantially increased diversification in the latter half of the 1990s. This increase in diversification is on both industrial and geographic dimensions. The increased

diversification is not surprising given the changes in the regulations faced by financial services firms on both of these dimensions.

Our analysis sought to identify characteristics of firms that increased diversification the most. We find substantial heterogeneity in the distribution of changes in diversification, suggesting that features of firms would help to account for this variation. We have hypothesized that internal labor markets help firms to develop resources that can be exploited through diversification, and thus serve as a potential factor that would explain the variation. We test this hypothesis by using outcomes of internal labor market processes for the first half of the 1990s to help predict which firms increased diversification the most in the second half of the 1990s.

We find strong evidence in favor of this resource based view of diversification. Firms with strong internal labor markets as evidenced by steep wage-tenure profiles, low churning of workers and low within firm dispersion of wages increased diversification substantially more than their counterparts without these features. While we explain a relatively small fraction of the overall variation in the distribution of changes in diversification, our results are economically important, robust and statistically significant.

We find mixed evidence with respect to the complementary effects of our three indicators of ILMs. The various aspects of strong internal labor markets do not necessarily "bundle" together to reflect a coherent package or system of practices. Wage profiles, turnover rates, and wage compression exist somewhat independently of one another. Yet our evidence does suggest that the impact of each of these different aspects of internal labor markets on subsequent diversification strategies depends in part on the other aspects; nine of the fifteen interactions we examined empirically were significant and ran in the direction our theory suggested.

The findings suggest investigation of a second set of questions regarding the mode of diversification. Firms may increase their levels of diversification (whether geographic or sectoral) via two processes. They may diversify through acquisition of firms already operating in desired geographies or sectors. Alternatively, they may diversify through greenfield expansion: opening offices and branches in new geographies, or creating service offerings across sectors in which they previously did not. It seems possible that strong ILMs will be especially associated with greenfield expansion. While some existing resources must be deployed in order to integrate and manage acquisitions, more slack resources are required for pure entry into new markets.

Future analyses should also investigate factors that have the potential to moderate the above relationships. We looked at complementarity between aspects of ILMs. But there may be other relationships that also matter. For example, relationships between strong ILMs and diversification may be stronger where human resources are relatively more valuable. Thus ILMs for higher-skilled workers may be more closely associated with diversification strategies and directions than will ILMs for lower-skilled workers. Second, these relationships may vary with firm size. Firms are likely to be heterogeneous with respect not only to human resources but to other kinds of valuable resources. These slack resources may vary directly with firm size: larger firms are more likely to have slack resources that they can exploit through diversification. It is possible that the existence of other slack resources can strengthen the relationships between ILMs and diversification strategy: where firms have valuable, specific human resources and other slack resources, firms are especially likely to choose diversification as a means for appropriating the value of those resources.

References

Abowd, J. M., R.H. Creecy and F. Kramarz. (2002). "Computing person and firm effects using linked longitudinal employer-employee data." LEHD Technical Paper 2002-6. (April).

Abowd, J.M., P. Lengermann, and K. McKinney (2003). "The measurement of human capital in the U.S. economy." LEHD Technical Paper 2002-9. (August).

Amit, R. and J. H. P. Schoemaker (1993). "Strategic Assets and Organizational Rent." *Strategic Management Journal* **14**: 33-46

Barney, J. (1986). "Strategic Factor Markets: Expectations, Luck, and Business Strategy." *Management Science* **32**(10): 1231-1241

Barney, J. (1991). "Firm Resources and Sustained Competitive Advantage." *Journal of Management* **17**: 99-120.

Becker, Randy, John Haltiwanger, Ron Jarmin, Shawn Klimek, and Dan Wilson (2004). "Micro and Macro Data Integration: The Case of Capital." Working Paper.

Burgess, S., J. Lane, and D. Stevens (2000). "Job Flows, Worker Flows and Churning." *Journal of Labor Economics* **18** (3), pp. 473-502.

Cappelli, P. (2004). "Why Do Employers Retain At-Risk Workers? The Role of Social Capital." *Industrial Relations* **43**(2): 421-447.

Chandler, A. D. (1990). *Scale and Scope : The Dynamics of Industrial Capitalism*. Cambridge, MA, Harvard University Press.

Chatterjee, S. and B. Wernerfelt (1991). "The Link Between Resources and Type of Diversification: Theory and Evidence." *Strategic Management Journal* **12**: 33-48.

Davis, Steven J., John Haltiwanger, Ron Jarmin, Javier Miranda, Alfred Nucci, and Kristin Sandusky (2004). "The Dynamics of Young Businesses." Working Paper.

Dierickx, I. and K. Cool (1989). "Asset Stock Accumulation and Sustainability of Competitive Advantage." *Management Science* **35**: 1504-1511.

Doeringer, P., and M. Piore (1971). *Internal Labor Markets and Manpower Analysis*. Lexington, Mass.: D.C. Heath.

Edwards, C. D. (1955). Conglomerate Bigness as a Source of Power. *Business Concentration and Price Policy*. Princeton, Princeton University Press.

Fairris, D. (2004). "Internal Labor Markets and Worker Quits." *Industrial Relations* 43(3): 573-594

Farjoun, M. (1994). "Beyond Industry Boundaries: Human Expertise, Diversification and Resource-related Industry Groups." *Organization Science* **5**(2): 185-199.

Fay, S. (2000). "Recent Activity Resulting from the Gramm-Leach-Bliley Act," *New England Banking Trends* 24 (Summer): 1-8.

Freeman, R. B. (1982). "Union Wage Practices and Wage Dispersion within Establishments," *Industrial and Labor Relations Review* 36(1): 3-21.

Gande, A., M. Puri and A. Saunders (1999). "Bank Entry, Competition, and the Market for Corporate Securities Underwriting." *Journal of Financial Economics* **54**(2): 165-195.

Gollop, F., and J. Monahan ((1991), "A Generalized Index of Diversification: Trends in U.S. Manufacturing." Review of Economics and Statistics, 73(2): 318-330.

Hitt, M. A., L. Bierman, K. Shimizu and R. Kochhar (2001). "Direct and Moderating Effects of Human Capital on Strategy and Performance in Professional Service Firms: A Resources-Based Perspective." *Academy of Management Journal* **44**(1): 13-28.

Hoskisson, R. E. and M. A. Hitt (1990). "Antecedents and Performance Outcomes of Diversification: A Review and Critique of Theoretical Perspectives." *Journal of Management* **16**(2): 461-509.

Ichniowski, C., K. Shaw and G. Prennushi (1997). "The Effects of Human Resource Management Practices on Productivity: A Study of Steel Finishing Lines." *American Economic Review* **87**(3): 291-313.

Jaccard, J., R. Turrisi, and C. K. Wan (1990). *Interaction Effects in Multiple Regression*. Newbury Park, CA: Sage.

Jarmin, Ron S. and Javier Miranda (2002). "The Longitudinal Business Database." Center for Economic Studies, U.S. Bureau of the Census, Working Paper, Working Paper No.CES-WP-02-17.

Jensen, M. C. (1986). "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers." *American Economic Review* **76**(2): 323-29.

Kogut, B. and U. Zander (1992). "Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology." *Organization Science* **3**(3): 383-397.

Kroszner, R. S. and P. E. Strahan (1999). "What drives deregulation? Economics and politics of the relaxation of bank branching restrictions." *Quarterly Journal of Economics*. **114**(4): 1437-1467.

Lazear, E. and S. Rosen (1981). "Rank-Order Tournaments as Optimum Labor Contracts," *Journal of Political Economy* **89** (5), 841-864.

Lei, D., M. A. Hitt and R. Bettis (1996). "Dynamic Core Competences Through Meta-Learning and Strategic Context." *Journal of Management* **22**(4): 549-569.

Lippman, S. and R. P. Rumelt (1982). "Uncertain Imitability: An Analysis of Interfirm Difference in Efficiency Under Competition." *Bell Journal of Economics*: 418-438.

MacDuffie, J.P. (1995). "Human Resource Bundles and Manufacturing Performance: Organizational Logic and Flexible Production Systems in the World Auto Industry." *Industrial and Labor Relations Review* **48**(2): 197-221.

Mahoney, J. T. and R. Pandian (1992). "The Resource-Based View Within the Conversation of Strategic Management." *Strategic Management Journal* **13**(4): 1992.

Montgomery, C. A. (1994). "Corporate Diversification." *Journal of Economic Perspectives* **8**(3): 163-178.

Montgomery, C. A. and S. Hariharan (1991). "Diversified Expansion by Large Established Firms." *Journal of Economic Behavior and Organization* **15**: 71-89.

Montgomery, C. A. and B. Wernerfelt (1988). "Diversification, Ricardian Rents, and Tobin's q." *RAND Journal of Economics* **19**(4): 623-632.

Nelson, R. and S. Winter (1992). *The Evolutionary Theory of Economic Change*. Cambridge, MA: Belknap Press of Harvard University Press.

Penrose, E. T. (1959). *The Theory of the Growth of the Firm*. Oxford, Oxford University Press.

Pfeffer, J., and N. Langton (1993). "The Effect of Wage Dispersion on Satisfaction, Productivity, and Working Collaboratively: Evidence from College and University Faculty," *Administrative Science Quarterly* 38 (3): pp. 382-407.

Pfeffer, J., and Y. Cohen (1984). "Determinants of Internal Labor Markets in Organizations," *Administrative Science Quarterly* 29 (4): pp. 550-72.

Ramanujam, V. and P. Varadarajan (1989). "Research on Corporate Diversification: A Synthesis." *Strategic Management Journal* **10**(6): 523-551.

Scherer, F. M. (1980). *Industrial Market Structure and Economic Performance*. Chicago, IL, Rand McNally College Publishing Co

Schoenecker, T. S. and A. C. Cooper (1998). "The Role of Firm Resources and Organizational Attributes in Determining Entry Timing: A Cross-Industry Study." *Strategic Management Journal* **19**: 1127-1143.

Sherer, P. D. (1995). “Leveraging Human Assets in Law Firms: Human Capital Structures and Organizational Capabilities.” *Industrial and Labor Relations Review* **48**(4): 671-691

Shleifer, A. and R. W. Vishny (1991). “Takeovers in the '60s and the '80s: Evidence and Implications.” *Strategic Management Journal* **12**(Winter Special): 51-59.

Steffy, B. D. and S. D. Maurer (1988). “Conceptualizing and Measuring the Economic Effectiveness of Human Resource Activities.” *Academy of Management Review* **13**(2): 271-286.

Teece, D. J. (1980). “Economics of Scope and the Scope of the Enterprise.” *Journal of Economic Behavior and Organization* **1**: 223-247.

Teece, D. J. (1982). “Towards an Economic Theory of the Multiproduct Firm.” *Journal of Economic Behavior and Organization* **3**: 39-61.

Teece, D. J., G. Pisano and A. Shuen (1997). “Dynamic Capabilities and Strategic Management.” *Strategic Management Journal* **18**(7): 509-533.

Wernerfelt, B. (1984). “A Resource-based View of the Firm.” S*trategic Management Journal* **5**: 171-80.

Williamson, O. E. (1985). *The Economic Institutions of Capitalism*. New York, Free Press.

Table 1. SIC codes in financial services

1987 SIC Code	Description
6021	National Commercial Banks
6022	State Commercial Banks
6029	Commercial Banks NEC
6035	Savings Institutions (Fed)
6036	Savings Inst (Not Fed)
6061	Credit Unions (Fed)
6062	Credit Unions (Not Fed)
6081	Branches of Foreign Banks
6099	Functions Related to Deposit Banking
6111	Federal Credit Agencies
6141	Personal Credit Inst
6153	Short Term Business Credit Inst
6159	Miscellaneous Business Credit
6162	Mortgage Bankers & Loan Correspondents
6163	Loan Brokers
6211	Security Brokers and Dealers
6221	Commodity Contracts Brokers and Dealers
6231	Security and Commodity Exchanges
6282	Investment Advice
6289	Securities Exchange Services
6311	Life Insurance
6321	Accident and Health Insurance
6324	Hospital & Medical Service Plans
6331	Fire Marine and Casualty Insurance
6351	Surety Insurance
6361	Title Insurance
6371	Pension, Health and Welfare Funds
6399	Insurance Carriers
6411	Insurance Agents, Brokers, and Service
6712	Offices of Bank Holding Companies

Table 2. Single- and multi-unit firm counts, 1992-2000

Year	Single Units		Multi-Units		Total
	Number of Firms	Percent of Total	Number of Firms	Percent of Total	
1992	157,959	90.3	17,059	9.7	175,018
1993	163,575	90.9	16,471	9.1	180,046
1994	166,126	91.4	15,698	8.6	181,824
1995	164,606	91.7	14,984	8.3	179,590
1996	169,070	92.6	13,577	7.4	182,647
1997	181,277	91.6	16,684	8.4	197,961
1998	188,965	92.1	16,258	7.9	205,223
1999	193,377	92.6	15,530	7.4	208,907
2000	195,645	92.9	14,881	7.1	210,526
Total	**1,580,600**	**91.8**	**141,142**	**8.2**	**1,721,742**

Source: Authors' calculations on the LBD.

Table 3. Single- and multi-unit establishment counts, 1992-2000

Year	Single Units		Multi-Units		Total
	Number of Establishments	Percent of Total	Number of Establishments	Percent of Total	
1992	157,959	46.6	180,713	53.4	338,672
1993	163,575	48.3	175,345	51.7	338,920
1994	166,126	47.7	182,072	52.3	348,198
1995	164,606	47.2	184,452	52.8	349,058
1996	169,070	47.8	184,299	52.2	353,369
1997	181,277	47.6	199,253	52.4	380,530
1998	188,965	48.8	198,534	51.2	387,499
1999	193,377	48.4	206,200	51.6	399,577
2000	195,645	48.8	204,887	51.2	400,532
Total	**1,580,600**	**47.9**	**1,715,755**	**52.1**	**3,296,355**

Source: Authors' calculations on the LBD.

Table 4. Percent of payroll and employment represented by single- and multi-unit firms, 1992-2000

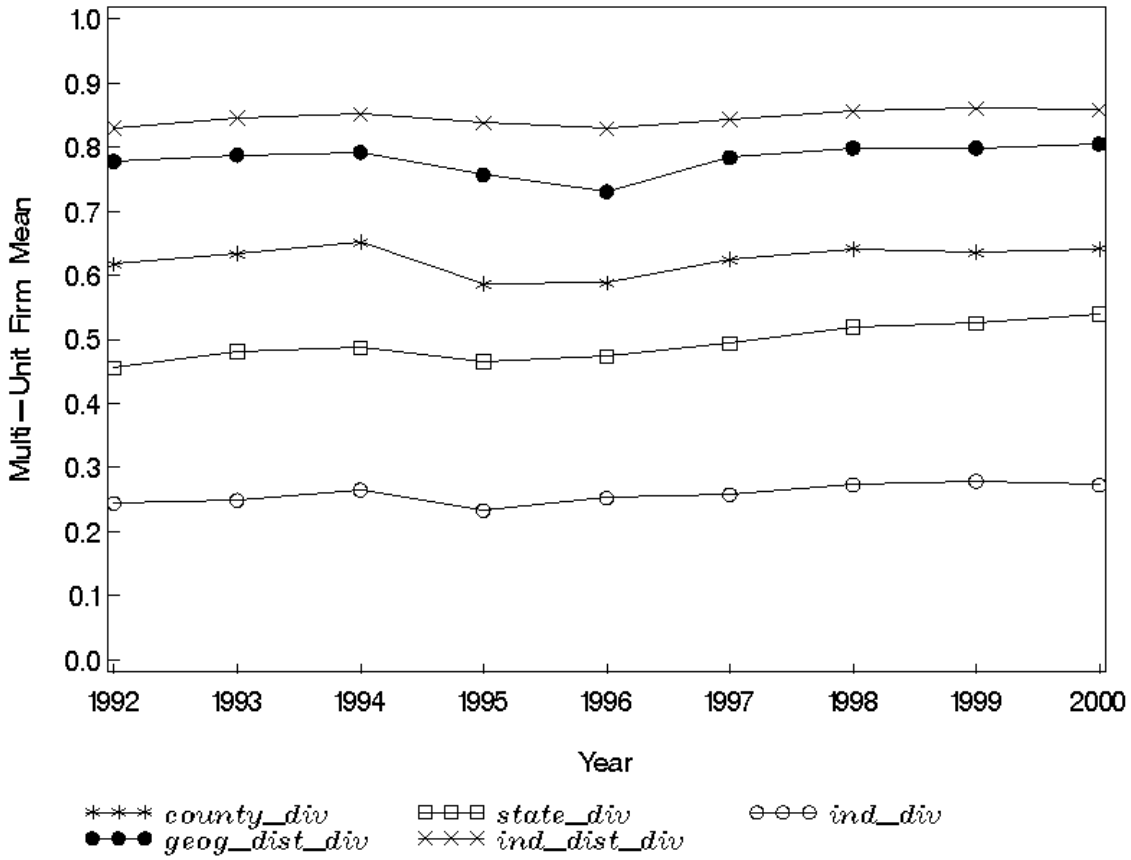
Year	Single Units		Multi-Units	
	Percent of Total Payroll	**Percent of Total Employment**	**Percent of Total Payroll**	**Percent of Total Employment**
1992	13.90	15.09	86.10	84.91
1993	16.17	16.92	83.83	83.08
1994	13.64	16.97	86.36	83.03
1995	13.41	17.02	86.59	82.98
1996	14.97	18.19	85.03	81.81
1997	15.09	17.03	84.91	82.97
1998	16.80	18.73	83.20	81.27
1999	16.03	18.84	83.97	81.16
2000	15.56	19.05	84.44	80.95
All Years	**15.16**	**17.58**	**84.84**	**82.42**

Source: Authors' calculations on the LBD.

Table 5. Mean of firm diversification measures weighted by total firm payroll, selected years, 1992-2000

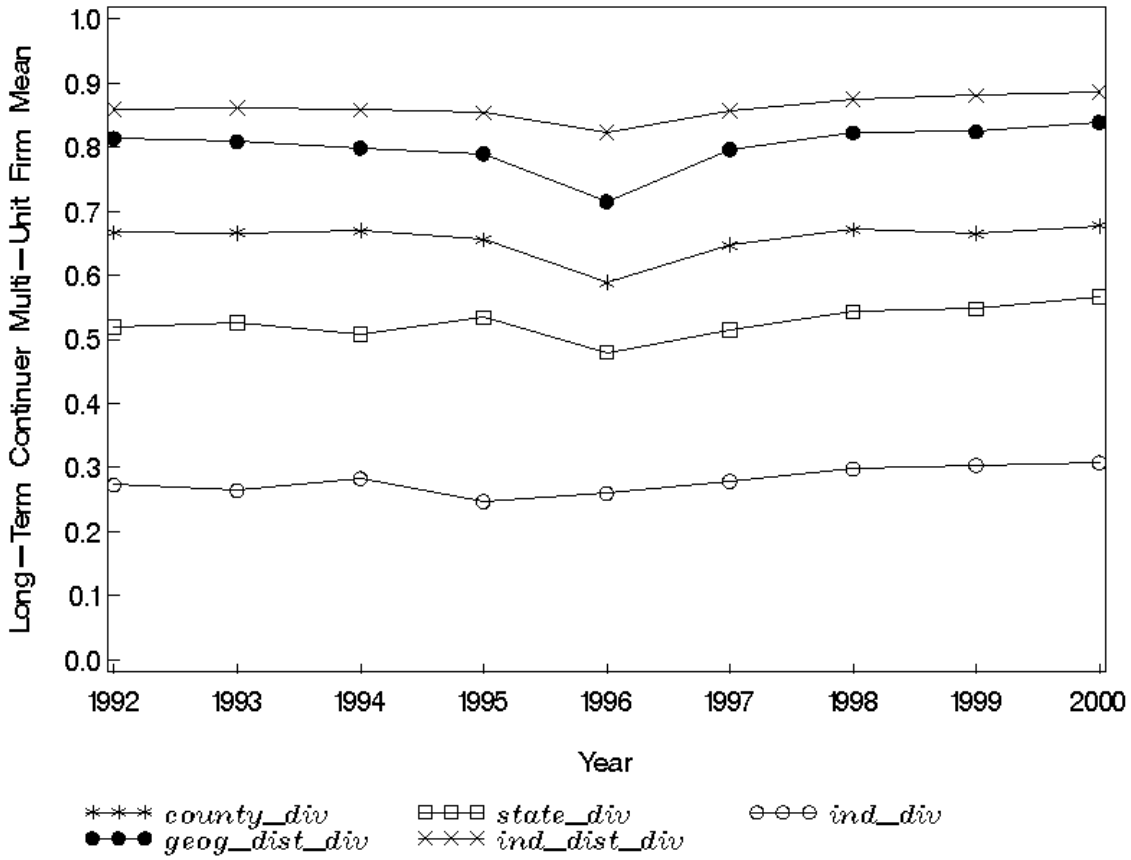
Year	County Diversification		State Diversification		Industry Diversification		Geographic Distance		Industry Distance	
	All firms	Long-term continuers	All firms	Long-term continuers	All firms	Long-term continuers	All firms	Long-term continuers	All firms	Long-term continuers
1992	0.618	0.668	0.456	0.520	0.244	0.273	0.778	0.814	0.831	0.860
1997	0.626	0.648	0.494	0.516	0.258	0.279	0.784	0.797	0.844	0.858
2000	0.642	0.678	0.541	0.568	0.273	0.308	0.806	0.839	0.859	0.887

Source: Authors' calculations on the LBD.



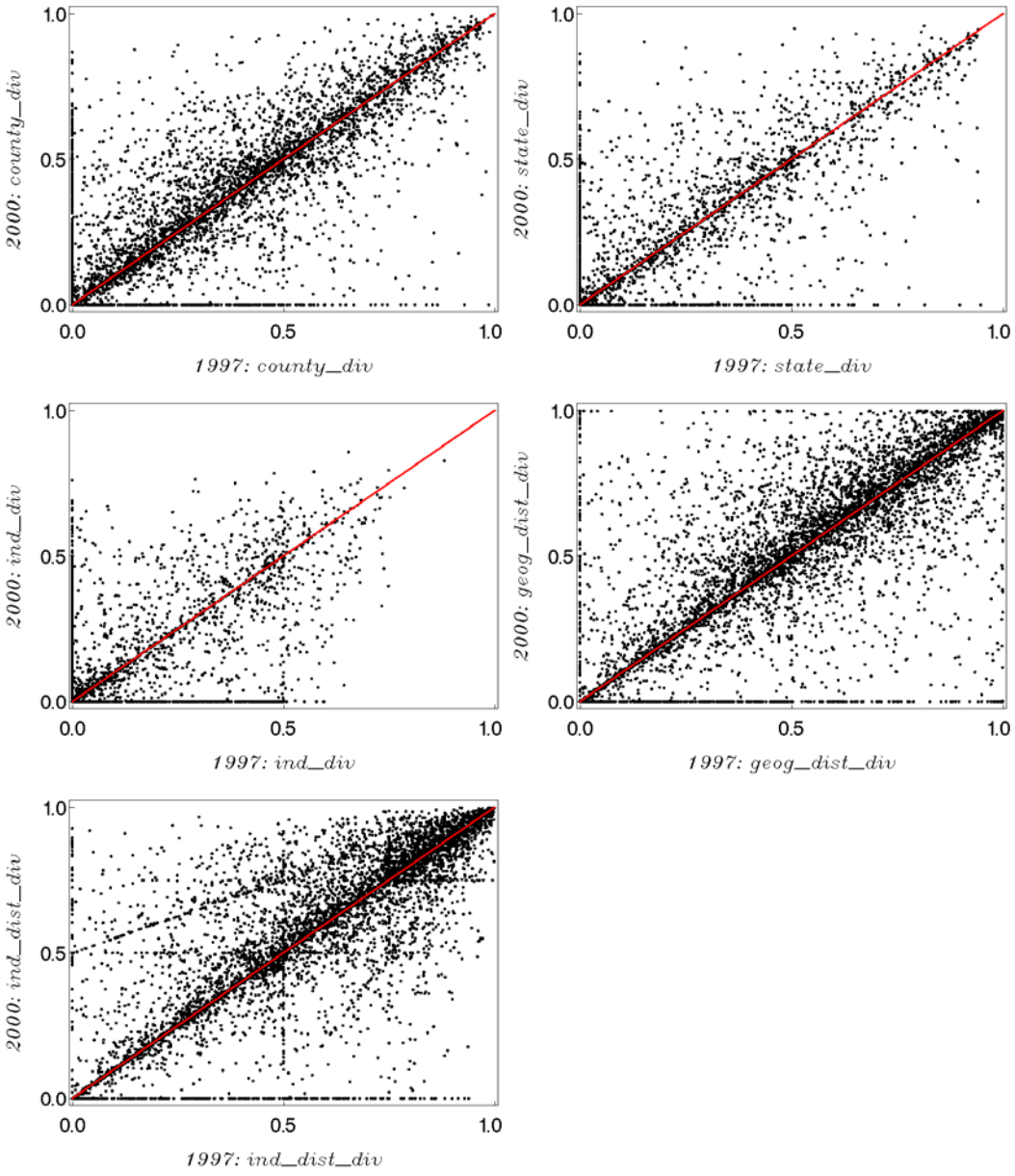
Source: Authors' calculations on the LBD.

Figure 1. Mean of multi-unit firm diversification measures weighted by total firm payroll, 1992-2000



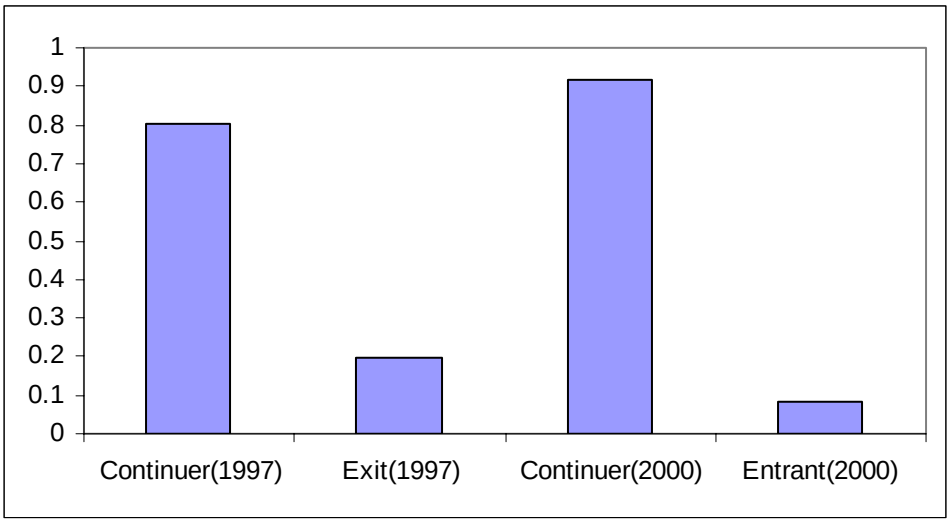
Source: Authors' calculations on the LBD.

Figure 2. Mean of long-term continuer multi-unit firm diversification measures weighted by total firm payroll, 1992-2000



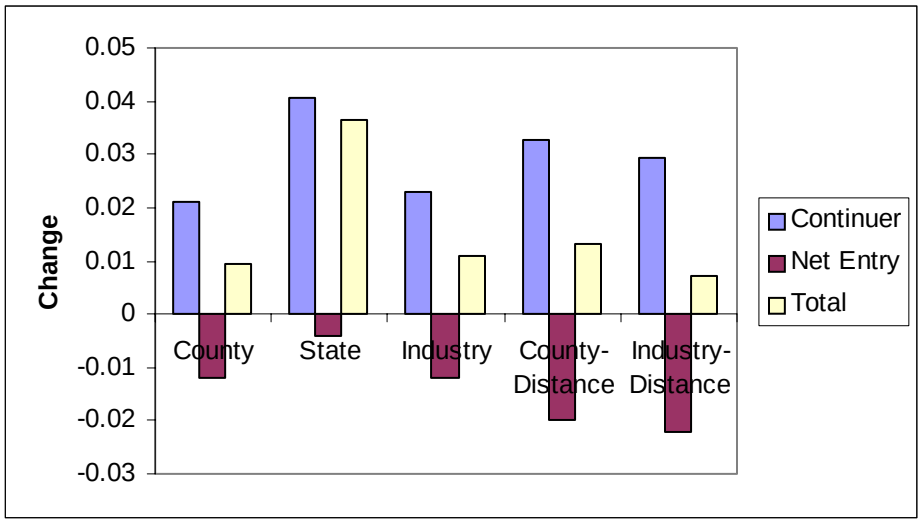
Source: Authors' calculations on the LBD.

Figure 3. Scatter plots of multi-unit firm diversification measures, 1997 and 2000



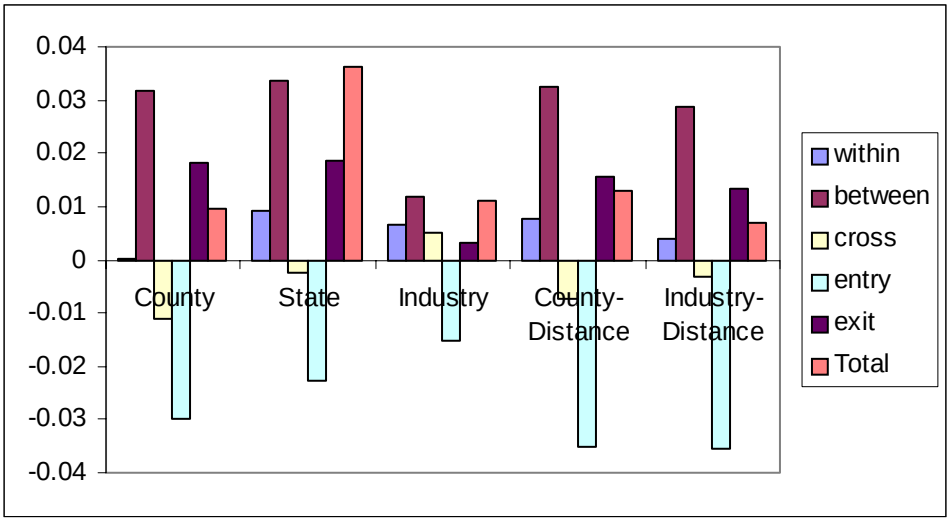
Source: Authors' calculations on the LBD and LEHD data.

Figure 4a. Shares of payroll for continuing, entering, and exiting firms



Source: Authors' calculations on the LBD and LEHD data.

Figure 4b. Diversification decomposition (1997-2000) change: continuers, net entry, and total



Source: Authors' calculations on the LBD and LEHD data.

Figure 4c. Diversification decomposition (1997-2000 change): within, between, cross, entry, exit, and total

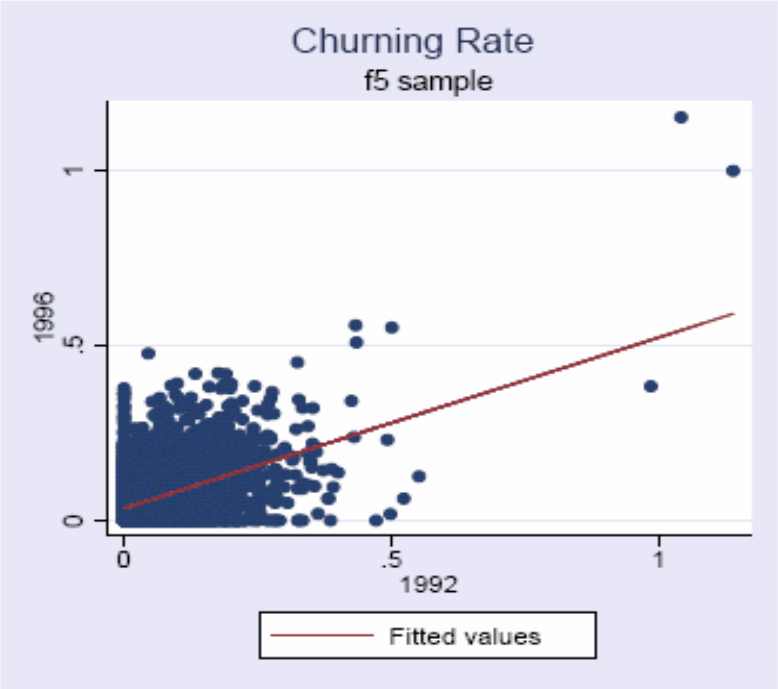


Figure 5a. Scatter plot of firm-level churning

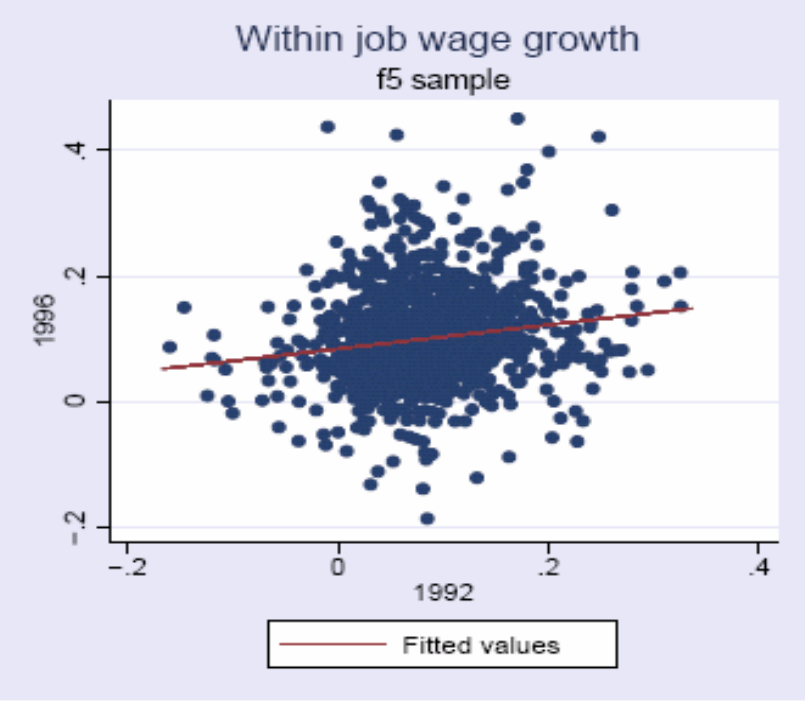


Figure 5b. Scatter plot of firm-level wage-tenure profiles

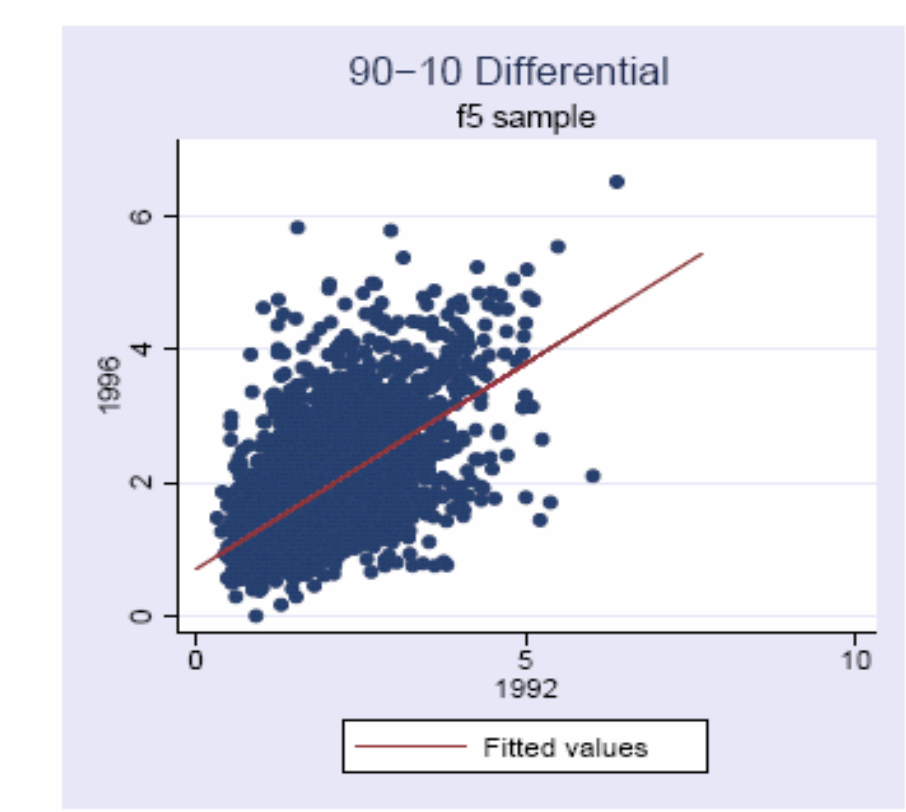


Figure 5c. Scatter plot of within firm wage dispersion (log difference between 90th and 10th percentile within firm)

Figure 5. Scatter plots of ILM indicators

Source: Authors' calculations on LEHD data.

Table 6. Summary of variable definitions

Independent Variable	**Definition**
firmage1997	Firm age in 1997
growth	Average net employment growth
size	Average number of full quarter workers
lnsize	Average log number of full quarter workers
shr_fem	Average share of female workers
shr_low	Average share of low human capital workers
shr_high	Average share of high human capital workers
shr_hw	Average share of high wage workers
wjwg	Average within job wage growth (five years) for new hires
chr	Average churning
diff	Average within firm 90-10 log wage differential

Dependent Variable	**Definition**
county_div	Change in geographic diversification at county level
state_div	Change in geographic diversification at state level
ind_div	Change in diversification at industry level
geog_dist_div	Change in geographic diversification at county level, weighted by distance
ind_dist_div	Change in diversification at industry level, weighted by relatedness

Notes:
The independent variables in this table are five-year (1992-1996) averages.
The dependent variables indicate the change in the indices (construction described in the text) from 1997 to 2000.

Table 7. Unweighted Summary Statistics

Statistics	*chr*	*diff*	*shr_hw*	*wjwg*	*shr_low*	*shr_high*	*growth*	*shr_fem*	*size*	*lnsize*
Mean	0.07	1.89	0.35	0.09	0.25	0.26	0.07	0.64	63.99	2.74
Std. Dev.	0.07	0.72	0.22	0.09	0.16	0.16	0.24	0.20	441.93	1.12
N	8,775	8,775	8,775	5,370	7,963	7,857	8,775	8,775	8,775	8,775
Correlation										
chr	**1.00**									
diff	**-0.06**	**1.00**								
share_hw	**-0.11**	**0.04**	**1.00**							
wjwg	**0.05**	**0.07**	**0.09**	**1.00**						
shr_low	**-0.16**	**0.12**	**-0.36**	**-0.09**	**1.00**					
shr_high	**-0.03**	**0.24**	**0.55**	**0.17**	**-0.40**	**1.00**				
growth	**-0.06**	0.01	**0.09**	**0.03**	**-0.04**	**0.13**	**1.00**			
shr_fem	**-0.08**	**-0.14**	**-0.46**	**-0.08**	**0.17**	**-0.42**	**-0.11**	**1.00**		
size	**0.04**	**-0.06**	**0.04**	0.01	**-0.07**	**-0.03**	**-0.03**	**0.00**	**1.00**	
lnsize	**0.17**	**-0.26**	**0.04**	0.00	**-0.26**	**-0.22**	**-0.10**	**0.06**	**0.47**	**1.00**

Table 8. Weighted Summary Statistics

Statistics	*chr*	*diff*	*shr_hw*	*wjwg*	*shr_low*	*shr_high*	*growth*	*shr_fem*	*size*	*lnsize*
Mean	0.09	1.60	0.41	0.09	0.18	0.22	0.02	0.64	3115.84	6.37
Std. Dev.	0.05	0.48	0.19	0.04	0.10	0.11	0.16	0.13	4666.29	2.29
N	8,775	8,775	8,775	5,370	7,963	7,857	8,775	8,775	8,775	8,775
Correlation										
chr	**1.00**									
diff	**0.20**	**1.00**								
share_hw	**-0.25**	**-0.09**	**1.00**							
wjwg	**0.07**	**0.20**	**0.05**	**1.00**						
shr_low	**-0.05**	**0.10**	**-0.46**	**-0.15**	**1.00**					
shr_high	**0.07**	**0.42**	**0.52**	**0.27**	**-0.55**	**1.00**				
growth	**-0.16**	0.00	0.02	0.02	**-0.06**	**0.09**	**1.00**			
shr_fem	**-0.08**	**-0.23**	**-0.58**	**-0.11**	**0.29**	**-0.55**	**-0.01**	**1.00**		
size	**-0.02**	**-0.04**	**0.26**	**0.05**	**-0.21**	**0.07**	**-0.07**	**-0.12**	**1.00**	
lnsize	**0.08**	**-0.17**	**0.27**	**0.06**	**-0.29**	**-0.02**	**-0.11**	**-0.09**	**0.74**	**1.00**

Note: All variables as defined in Table 6. Weighted statistics are weighted by average employment from 1992-96. Correlations in bold are statistically significantly different from zero at $p<0.05$.

Table 9. Ordinary least squares regression results for diversification measures[a]

	(1) *county_div*	(2) *state_div*	(3) *ind_div*	(4) *geog_dist_div*	(5) *ind_dist_div*
(Constant)	0.132**	0.237**	0.008	0.090**	0.052**
	(0.024)	(0.025)	(0.025)	(0.023)	(0.014)
firmage1997[b]					
1-6 years	-0.026	-0.020	-0.039	-0.010	-0.007
	(0.025)	(0.025)	(0.026)	(0.023)	(0.014)
7-10 years	-0.021	-0.031	-0.038	-0.006	0.011
	(0.020)	(0.020)	(0.020)	(0.018)	(0.011)
11-20 years	0.018*	0.005	0.085**	-0.007	-0.007
	(0.009)	(0.009)	(0.009)	(0.008)	(0.005)
log_size	-0.019**	-0.025**	-0.007**	-0.011**	-0.007**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Growth	0.054*	-0.057*	0.044	0.078**	0.103**
	(0.025)	(0.025)	(0.026)	(0.023)	(0.014)
shr_fem	0.109**	0.143**	0.025	0.099**	0.048**
	(0.024)	(0.024)	(0.024)	(0.022)	(0.014)
shr_high	-0.018	0.019	-0.012	-0.136**	-0.052**
	(0.022)	(0.023)	(0.023)	(0.021)	(0.013)
N	4818	4818	4818	4818	4818
R^2	0.21	0.27	0.14	0.20	0.21

[a] Industry dummies and state dummies are not reported. Standard errors are in parentheses; [b] over 20 years old is omitted; * $p < 0.05$, ** $p < 0.01$

Further note: For this and subsequent regression models we measure firm size with the the overall (national) level of employment in the firm. Tables 7 & 8 reflected only employment in our three LEHD states. Subsequent drafts will use the national level in all tables.

Table 10. Ordinary least squares regression results for diversification measures[a]

	(1) *county_div*	(2) *state_div*	(3) *ind_div*	(4) *geog_dist_div*	(5) *ind_dist_div*
(Constant)	0.206**	0.294**	0.074**	0.155**	0.097**
	(0.024)	(0.025)	(0.025)	(0.023)	(0.014)
firmage1997[b]					
1-6 years	-0.054*	-0.032	-0.052*	-0.031	-0.023
	(0.024)	(0.025)	(0.025)	(0.023)	(0.014)
7-10 years	-0.056**	-0.052**	-0.060**	-0.032	-0.009
	(0.019)	(0.020)	(0.020)	(0.018)	(0.011)
11-20 years	0.000	-0.011	0.065**	-0.024**	-0.019**
	(0.008)	(0.009)	(0.009)	(0.008)	(0.005)
log_size	-0.021**	-0.027**	-0.009**	-0.014**	-0.008**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Growth	0.011	-0.091**	0.013	0.045	0.080**
	(0.024)	(0.025)	(0.025)	(0.023)	(0.014)
shr_fem	0.071**	0.105**	-0.028	0.057**	0.020
	(0.023)	(0.024)	(0.024)	(0.022)	(0.014)
shr_high	-0.069**	0.005	0.013	-0.148**	-0.065**
	(0.023)	(0.024)	(0.024)	(0.022)	(0.013)
chr	-0.473**	-0.412**	-0.075	-0.178**	-0.132**
	(0.057)	(0.059)	(0.060)	(0.054)	(0.033)
diff	-0.044**	-0.055**	-0.076**	-0.052**	-0.033**
	(0.006)	(0.007)	(0.007)	(0.006)	(0.004)
wjwg	0.721**	0.345**	0.387**	0.568**	0.425**
	(0.049)	(0.050)	(0.051)	(0.046)	(0.028)
N	4818	4818	4818	4818	4818
$\mathbf{R^2}$	0.26	0.30	0.17	0.24	0.26
$\Delta\ \mathbf{R^2}$	0.05**	0.03**	0.03**	0.04**	0.05**

[a] Industry dummies and state dummies are not reported. Standard errors are in parentheses; [b] over 20 years old is omitted; $\Delta\ R^2$ **:** vs**.** control only model; * $p < 0.05$, ** $p < 0.01$

Table 11. Ordinary least squares regression results for diversification measures[a]

	(1) *county_div*	(2) *state_div*	(3) *ind_div*	(4) *geog_dist_div*	(5) *ind_dist_div*
(Constant)	0.203**	0.296**	0.061*	0.141**	0.086**
	(0.024)	(0.025)	(0.025)	(0.023)	(0.014)
firmage1997[b]					
1-6 years	-0.054*	-0.032	-0.048	-0.024	-0.019
	(0.024)	(0.025)	(0.025)	(0.023)	(0.014)
7-10 years	-0.057**	-0.053**	-0.057**	-0.030	-0.007
	(0.019)	(0.020)	(0.020)	(0.018)	(0.011)
11-20 years	-0.000	-0.011	0.067**	-0.020*	-0.017**
	(0.009)	(0.009)	(0.009)	(0.008)	(0.005)
log_size	-0.021**	-0.027**	-0.010**	-0.014**	-0.009**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Growth	0.009	-0.089**	-0.000	0.033	0.070**
	(0.024)	(0.025)	(0.025)	(0.023)	(0.014)
shr_fem	0.076**	0.103**	-0.010	0.073**	0.034*
	(0.023)	(0.024)	(0.024)	(0.022)	(0.014)
shr_high	-0.074**	0.001	0.028	-0.132**	-0.055**
	(0.023)	(0.024)	(0.024)	(0.022)	(0.014)
chr	-0.468**	-0.396**	-0.147*	-0.256**	-0.189**
	(0.059)	(0.061)	(0.062)	(0.056)	(0.034)
diff	-0.044**	-0.056**	-0.074**	-0.053**	-0.033**
	(0.006)	(0.007)	(0.007)	(0.006)	(0.004)
wjwg	0.767**	0.292**	0.598**	0.649**	0.545**
	(0.063)	(0.065)	(0.066)	(0.060)	(0.037)
chr×wjwg	-3.372**	-1.682*	0.472	-1.761*	-1.471**
	(0.788)	(0.816)	(0.821)	(0.745)	(0.455)
chr×diff	0.118	-0.002	0.385**	0.575**	0.408**
	(0.107)	(0.110)	(0.111)	(0.101)	(0.062)
wjwg×diff	0.026	0.133*	-0.346**	-0.078	-0.148**
	(0.061)	(0.063)	(0.063)	(0.057)	(0.035)
N	4818	4818	4818	4818	4818
R^2	0.26	0.30	0.18	0.25	0.27

[a] Industry dummies and state dummies are not reported. Standard errors are in parentheses; [b] over 20 years old is omitted; * $p < 0.05$, ** $p < 0.01$