Private Equity Investment and Local Employment Growth: A County-Level Analysis

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This study examines the relationship between private equity investment and local employment growth. Using a sample of 3,053 U.S. counties with available private equity investment data, we estimate the effect of private equity investment volume and demographic determinants of employment growth (labor supply, labor quality, labor cost, unionization, agglomeration, industry concentration, and regional geography) on employment changes from 2011 to 2014. Controlling for these demographic factors, private equity investment shows a positive correlation with employment growth.

Introduction

The relationship between private equity and job creation is difficult to isolate. One can find studies showing that private equity stimulates employment through investment and better management of private companies. By contrast, research indicates that private equity fund managers reduce jobs by lowering costs of production at the companies in their portfolios. Capital invested in private equity funds has more than doubled since 2000,[1] underscoring the importance of this investment strategy and understanding its economic impact. Because of the scarcity of information on these investments, robust analysis on private equity's impact on employment has yet to be provided.

This paper examines how private equity investment affects employment by analyzing the relationship between investment volumes and job growth in local economies—the U.S. county where the portfolio company is located. By focusing on the geographic impact, this analysis draws on insights from labor economics. We find that private equity investment has a positive relationship with change in employment at the county level between 2011 and 2014, when controlling for economic, industrial, and demographic characteristics that also impact job growth.

[1] According to the 2016 Preqin Global Private Equity & Venture Capital Report, annual global private capital fundraising increased from $238 billion in 2000 to $551 billion in 2015.

Literature Review

The question how private equity impacts job creation does not receive a consistent answer based on the results of academic studies. Conclusions from the limited body of research that tested the relationship between employment and buyouts or private equity ownership are mixed. The likely cause for this inconsistency is that analyzing job changes at private companies presents several difficulties. First, an unbiased dataset is not readily available and constructing a sample can be an arduous process. When analyzing changes at the company level, obtaining a sizeable sample of private companies with available employment data is a difficult. Second, tracking changes over time is also a demanding process since firms can change names or become acquired. These changes convolute the recording of information associated with a single company, including job growth. Establishing a control group is tedious for the same reasons, and the need to match the control firm's industry, size, location, etc., with that of the experimental group adds further complications.

Perhaps due to data limitations, most earlier studies testing the relationship between jobs and private equity investment were based on smaller sample sets. These studies generally indicate that private equity dampens employment at firms receiving investment. Kaplan (1989) relies on a sample of 76 public-to-private leveraged buyouts (LBOs) completed between 1980 and 1986, which are typically some of the largest acquisitions in private equity. He found a 12 percent industry-adjusted loss of median employment in the year after a management buyout. Amess and Wright (2007) studied the impact of management buyouts (MBOs) and management buy-ins (MBIs)[2] on wages and employment of 1,350 firms in the UK between 1999 and 2004, but monitored overall employment in a group of firms instead of matching firms. Their findings indicate that overall LBOs—MBOs and MBIs together—have a statistically insignificant effect on employment growth. However, these results do not differentiate the impact of private equity buyouts compared to management buyout deals.

In a more recent study, the same authors found conflicting results. Amess *et al.* (2014) used differences-in-differences methods combined with propensity score matching, as well as a control function approach—a strategy which allows a regression to control for selection bias. Based on this analysis, Amess *et al.* found that private equity backed-LBOs have a negative effect on employment in the three years following ownership change.

Other studies indicate a possible lagged *positive* effect of private equity investment on firm employment. Analyzing British companies, Cressy, Munari, & Malipiero (2011) used a dataset of 48 private equity buyouts and a control group of 84 non-private equity backed companies in the 1990s and 2000s to find that employment falls during the first four years of private equity ownership, but it increases in its fifth year. The authors concluded that job losses are offset with job creation.

[2] In MBOs, management gains significant ownership of the company. In MBIs, external management and investors acquire the company.

A more recent U.S. study of buyouts generated similar findings. Davis *et al.* (2014) built a sample containing 3,200 U.S. firms acquired in buyouts from 1980 to 2005 and 150,000 U.S. establishments operated by these firms during the buyout year—a substantial improvement in sample size from previous studies.[3] They restricted their sample, which is supplied by Capital IQ, to transactions with a financial sponsor and use of leverage. Transactions not classified as "going private," "leveraged buyout," "management buyout," "platform," and similar terms are omitted. The study concluded that private equity buyouts lead to greater job loss at establishments in the year of the buyout, shrinking 3 percent in comparison to controls in the two-year post buyout period and by 6 percent over five years. However, private equity buyouts create new jobs in newly opened establishments more rapidly than control firms. Once the purchase and sale of establishments are accounted for, the target-control growth differential is less than 1 percent of initial employment over two years. The authors argue that these findings demonstrate that private equity investment accelerates the process of creative destruction by shutting down less productive establishments and constructing more productive ones.

Examining the effect of private equity and venture capital financing on small and mid-sized single entity business establishments, results from Paglia and Harjoto (2014) support a positive lagged finding. Using a sample of over 16,000 private equity-backed companies, the authors find that while private equity financing does not immediately impact establishments' employment growth rates in the year of financing, it does have a positive impact three years after funding. Similarly, Boucly, Sraer & Thesmar (2011) use a sample of 839 LBOs between 1994 and 2004 to find that private equity-backed buyouts in France increase employment in the four years after the buyout when compared to a control group.

As noted, the current discussion of the influence of private equity ownership on employment growth is mainly at the company level, which creates data constraints. Analyses of private equity-backed companies require an unbiased matching control group, which can be difficult to create. This provides an opportunity to research the effect of private equity ownership more generally on the local employment growth. This methodology draws on evidence from prior studies (Aldatmaz, 2013; EY 2013) that find positive spillover effects of private equity investment on employment and competitiveness of industries and geographies.

This paper aims to contribute to the understanding of private investment's employment impact by studying job growth in counties where private equity-backed companies are located. By focusing on the geographic employment, rather than company employment, we also draw on insights from previous economic research on factors promoting labor growth.

[3] "Firms" refers to the companies. "Establishments" refers to the individual locations or branches operated by the firms.

Data and Analysis

This study's unit of analysis is counties in the United States. We selected this unit since it is the smallest geographic entity for a range of economic and demographic variables contained in numerous available datasets. While there is no doubt that there is greater availability of state-level data, a state-centric analysis limits us to a much smaller sample size and ignores the economic and social variations that occur within states. The use of counties as a unit of analysis for local economic development is not a new practice (Aldrich & Kusmin, 1997; James, Ilvento, & Hastings, 2002; Addison Blackburn & Cotti, 2008).

The data on 3,141 counties used in this analysis obtained from a combination of sources.[4] The main independent variable of interest, *private equity investment volume*, is provided by PitchBook, a comprehensive private equity database. Information for the dependent variable, *employment growth*, comes from the Bureau of Labor Statistics. Data for most of the independent variables are pulled from government websites, such as the U.S. Bureau of Labor Statistics, the U.S. Census Bureau, the U.S. Department of Agriculture, and the Bureau of Economic Analysis. Some variables, such as *right-to-work* and *minimum wage*, are state and city level characteristics assigned to the respective counties. A complete list of data sources is found in Appendix 1.

Dependent Variable: Employment Growth

The model in this study is designed to examine the degree to which hypothesized determinants of employment levels, including private equity investment, affect county-level employment growth. To perform this analysis, we obtained county-level employment data from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW). With this data we calculated the dependent variable, *employment growth*, from the absolute change in employment from 2011 to 2014. Since past company-level studies indicate that private equity investment is unlikely to have the greatest impact on employment growth in the year of financing, we expect that measuring employment impact two or three years after a private equity investment will produce more measurable results (Paglia and Harjoto, 2014).

Independent Variables

We specified the model's independent variables after reviewing the prominent literature investigating the local to global determinants of employment levels and the availability of data which allows us to operationalize them:

- Private Equity Investment Volume: The independent variable of interest, *private equity investment volume*, is measured by the amount of private equity investment (in millions of dollars) in each county in 2011 and 2012 and was obtained from PitchBook. The

[4] The number of United States counties varies by source. This paper reflects the number of counties (3,141) found in Bureau of Labor Statistics' data.

preponderance of private equity investment volume is in single locations. As previously discussed, the current literature suggests that there is a potential 1 to 5 year lag[5] in the effect of private equity investment on employment growth at the firm level. As a midpoint of existing literature, we utilize 2011 investment data to allow for a three year lag to measure employment growth; however, we also included 2012 investment data during the 2011-2014 time period to capture more counties receiving private equity investment. This allows for a two-year lag for 2012 investments. Private equity investment volume data were available for 3,053 counties, just 88 shy of the total counties examined. This sample included 374 counties that received private equity investment. Visuals of the geographic distribution of private equity investment and employment changes are found in Appendix 2. Summary statistics for these variables and the other variables in the models are found in Appendix 3.

- Labor Supply: An abundance of labor supply is hypothesized to generate economic and business growth and, in turn, employment levels since human capital is a major component of production and comprises a greater share of production costs (Blair & Premus, 1993). Similar to past studies examining economic and employment growth (James, Ilvento, & Hastings, 2002; Addison Blackburn & Cotti, 2008), we measure the labor supply with an *unemployment* variable using data from the U.S. Bureau of Labor Statistics. Low unemployment levels are hypothesized to indicate that a county's labor supply is healthy, thus attracting business and increasing employment.

- Labor Quality: The quality of the labor force has the potential to affect the attractiveness of the local economy to businesses. To measure the quality of county-level labor force, two variables are included in the model. The first, *education*, is a heavily researched determinant of employment and wage growth and a strong indicator of labor force quality (Glaeser, Scheinkman, & Shleifer 1995; Crain & Lee 1999; Blumenthal, Hill, & Wolman 2008). Using U.S. Census Bureau data, we use a variable of education levels measured by the average percentage of adults with a bachelor's degree or higher. The expectation is that counties with more educated populations will experience higher employment growth.

  We also hypothesize that age plays a role in predicting employment growth. We expect that countries with aging work forces will see lower employment growth, in part because older workers are expected to leave the labor force and are more costly to hire than younger employees. *Labor force age* is measured by the median age of women and men between the ages of 16 and 64 (U.S. Census Bureau).

- Labor Cost: It is hypothesized that businesses prefer low labor costs (Aldrich & Kusmin 1997); therefore, the model incorporates controls for county-level labor costs. The U.S Bureau of Labor Statistics provides county wage data from which we acquired *annual average pay*. We

[5] Boucly, Sraer & Thesmar (2011) find that PE-backed buyouts affect employment in the four years after the buyout. Cressy, Munari, & Malipiero (2011) and Davis *et al.* (2014) find fluctuations in the following five years. Paglia and Harjoto (2014) find the effect of private equity insignificant in the first year, but positive three years after. Amess *et al.* (2014) see a negative impact when examining three years after ownership change.

expect countries with higher wage levels (i.e. annual pay) to experience less employment growth, when controlling for other factors.

Additionally, there has been much discussion around the effect of minimum wage levels on employment growth, most of which concludes that higher minimum wages does not reduce employment (Card & Kreuger, 1994; Neumark & Washer, 2007; Addison, Blackburn, & Cotti, 2008). To test this, we included a 2011 *minimum wage* variable to estimate a state or city minimum wage rate's impact on local employment. Counties in states without a minimum wage are assigned the federal minimum wage. Consistent with the literature, higher minimum wages are expected to reduce employment growth.

- Unionization: There is also a substantial amount of research examining the influence of unionization on employment, but conclusions are varied with some studies (Nickell, Nunziata & Ochel, 2005; Bassanini & Duval, 2006) showing a positive correlation and other studies showing the opposite (Blanchard & Wolfers, 2000; Baccaro & Rei, 2006). To account for the potential effect of union participation of employees on overall employment growth, we assigned counties a *right-to-work* dummy variable indicating whether or not they were located in a "right-to-work" state in 2011. In states with right-to-work laws, union security agreements are prohibited, which forbids unions and employers from requiring employees to join a union and pay dues.

- Agglomeration and Urbanization: The theory of agglomeration argues that economies benefit when firms and their potential labor source are located near each other (Glaeser 2010). We also draw on an extensive amount of research showing a positive impact of urbanization and concentrated firm location on economic growth (Glaeser *et al.*, 1992; Simon, 1998; Feldman, 1999; Rosenthal & Strange, 2003). To account for agglomeration and urban effects on employment growth, we include three variables in the model: *establishment count*, *population density*, and *metro*. *Establishment count*, as its name suggests, is the annual average establishment count in 2011 and comes from the U.S. Bureau of Labor Statistics. *Population density* data was obtained from the Population Division of the U.S. Census Bureau and measures the number of people per square mile in 2011. *Metro* is a dummy variable indicating whether or not the county is in a metropolitan area as defined by the U.S. Census Bureau (only 2013 data was available). Agglomeration and urbanization are expected to boost employment growth.

- Industry Concentration: Past studies have asserted the positive effect of the presence of certain industries on economic growth, particularly *manufacturing*, *financial*, and *services* (Crain & Lee, 1999; Blumenthal, Hill, & Wolman, 2008). The U.S. Bureau of Labor Statistics provides location quotients (LQ)—a ratio that describes an area's distribution of employment by industry as compared to a reference or base area's distribution—which we use to operationalize industry concentration. The location quotients used in the model are relative to the United States reference base.

- Regions: We include regional dummy variables commonly found in geographical studies concerning economic growth in the United States. The model contains the eight regions defined by the Bureau of Economic Analysis: New England, Midwest, Great Lakes, Plains, Southeast, Southwest, Rock Mountain, and Far West. Southeast is not included in the models as the omitted reference variable.

Regression and Results

To test the significance of private equity investment on employment growth, this study uses a change score of employment as the dependent variable. The change score, $T_2 - T_1$, or employment in 2014 minus employment in 2011 in this study, requires the inclusion of T_1 as control variable in the model.[6] By incorporating the baseline 2011 employment levels into the model, the net relationships of the change score to the independent variables in the model are adjusted for effects of T_1 (Allison, 1990; Dalecki & Willits, 1991).

Using a progression of five different models, the regressions transition from encompassing only the employment baseline to including all available independent variables. These models were initially tested using OLS regression, and we detected heteroscedasticity in all of the models. To correct for this inconsistency, the second round of models estimate standard errors using the Hubert-White sandwich estimators. A discussion of the regression results with robust standard errors follows and details are presented in Appendix 4.

Model 1 examines the bivariate relationship between employment change and the baseline year. The results of this model show that on average, counties with higher levels of employment in 2011 gained more employment from 2011 to 2014. This demonstrates why it is crucial to include the employment baseline variable in all of the models as a control.

Models 2 and 3 integrate more control variables into the estimation. Model 2 controls for what we consider "core" variables. The variables selected for inclusion in this model were chosen as a representation of the core factors in local determination of growth according to our survey of related literature. They include controls accounting for labor quality (*education* and *labor force age*), labor cost (*annual average pay*), and agglomeration and urbanization (*establishment count* and *metro*). Model 3 adds labor supply (*unemployment*) as well as additional labor cost (*minimum wage*) and agglomeration (*population density*) variables. It also integrates the effect of unionization (*right-to-work state*). Both models yielded similar results: *private equity investment volume*, *education*, *labor force age*, *annual average pay*, *establishment count*, and *metro* are statistically significant. Holding the demographic variables constant, Models 2 and 3 indicate that private equity investment adds on average 9.81 and 9.45 employees per million dollars of invested in a county, respectively.

[6] The change score is the absolute change in employment between 2011 and 2014, not the percentage change.

The last two models add controls for *industry concentration* and *regions*. Since previous studies found significant relationships between certain local industrial composition and employment growth, we first add only industry controls in Model 4 to isolate the effect from regional differences. Having already controlled for numerous variables capturing county-level differences, we expect that high-level geographic controls are likely insignificant. Model 4 yields the same results as Model 3 but the additional *finance* variable is found to be significant at the 99 percent level. The final model, Model 5, which incorporates regional dummy variables, finds that all of the control variables that were significant in the previous models remain statistically significant with the addition of *manufacturing* and *region – southwest*. In the final models, the results show that on average, county employment grew by an additional 9.75 and 9.82 employees, respectively, for each one million dollars of private equity investment. *Private equity investment volume* is significant in all models at the 95 percent level. It is also notable that the value of the coefficient for *private equity investment volume* is consistent across these models with a high of 9.82 and a low of 9.45.

The results of these tests confirm the core theories about the determinants of employment growth. This paper's analysis upholds the hypothesis that the quality and cost of the labor force (*education, labor force age*, and *annual average pay*) are highly correlated to local employment growth. Furthermore, the models are consistent with previous research showing that agglomeration (*establishment count*) and urbanization (*metro*)—significant at the 95 and 99 percent levels— predict higher employment growth.

This study represents early research examining the effect of private equity investment volume on employment. One could critique the analysis because it measures the *overall* effect of private equity investment on local employment instead of job changes at the specific company receiving private equity investment. However, the results in this study underscore conclusions drawn from past research showing private equity investment creates positive externalities that may be absorbed by local industry and thus create more employment (Aldatmaz, 2013). Indeed, an increase in employment—or even more secure employment—could stimulate consumer spending and business to business transactions, which positively affects local companies. Following this hypothesis, we might consider that this study's estimations capture the externalities of private equity investment and resulting local employment growth.

Conclusion

While there is substantial research surrounding the relationship between private equity investment and employment growth at the firm level, the results are mixed. Older studies utilized mostly small sample sizes, which are not ideal for extrapolation of results. New studies have utilized larger datasets, yet the existing data limitations of analyzing changes at private companies, which do not publicly report operational or financial information, provide only a partial view of the relationships between private investment and jobs.

Most research on private equity investment stems from scholarly work in finance and the economics of the firm. While this focus helps us understand the inner financial workings of companies, it does not examine the economic impact of capital inflows. To fill this gap, this paper employs county-level data to analyze how private equity investment in local companies affects employment growth in respective counties.

When constructing models to estimate private equity's effect on employment growth, the established body of research analyzing the determinants of employment growth provided a rich resource. Indeed, this paper is unusual in that it marries a financial investment topic with hypotheses more often found in labor economics. Estimations of the impact of private investment on employment include variables controlling for labor supply, labor quality, labor cost, unionization, agglomeration and urbanization, industry concentration, and regional location.

The results of this study show a positive correlation between private equity investment and employment growth at the county level. All models find the influence of private equity investment to be statistically significant at the 95 percent level. Model 5, which includes all control variables, estimates that on average private equity investment increases employment growth by 9.82 employees per million dollars of investment between 2011 and 2014.

Scholarly research on private equity's effect on job creation has typically been curtailed by data limitations. This paper sets out to analyze the employment impact of private equity investment at a level at which more data are available and the unit of analysis provides a robust sample size. By analyzing the employment impact at a geographic level—U.S. counties—we are able to draw on previous literature by labor economists that explain why certain demographics are predisposed to employment growth. Controlling for these factors, this early study supports the view that private investment improves local employment and therefore has a positive economic impact.

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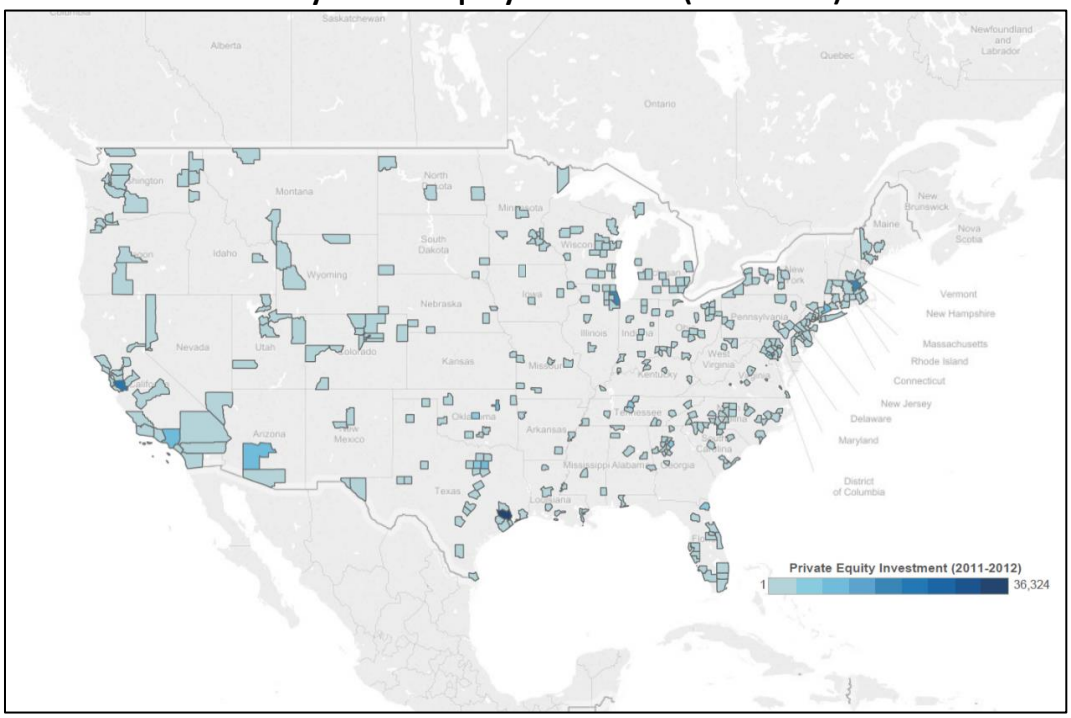
Appendix 1: Variable Data Sources

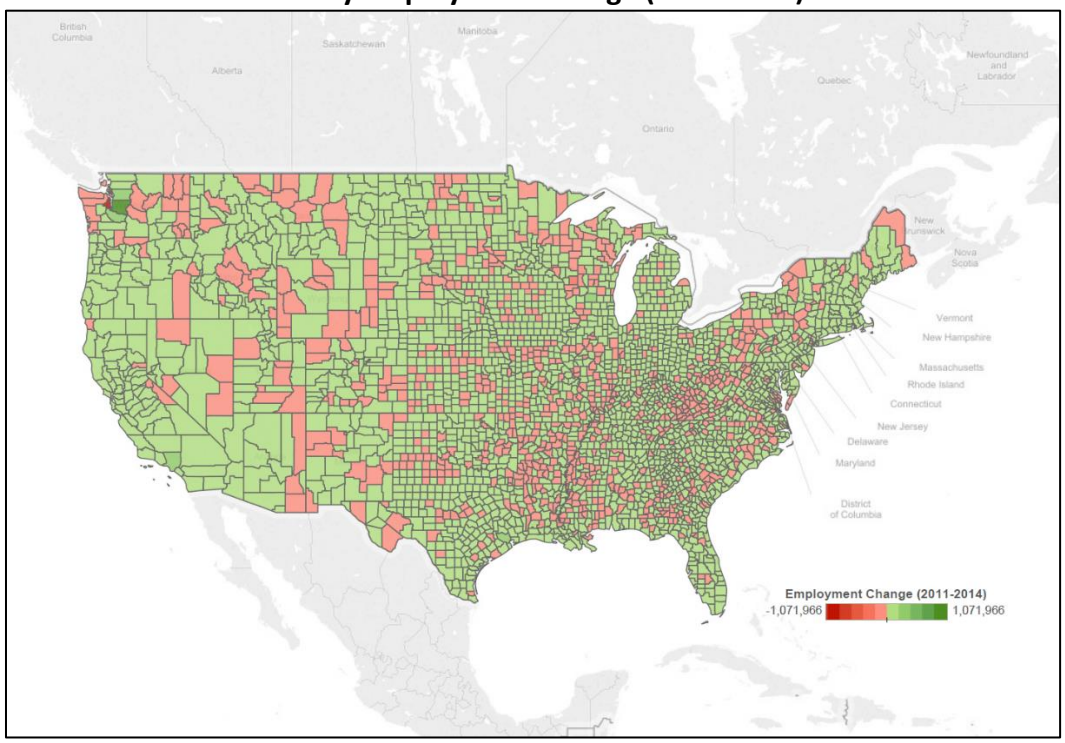
Name	Source
Employment Change	U.S. Bureau of Labor Statistics
Employment Baseline	U.S. Bureau of Labor Statistics
Private Equity Investment volume	PitchBook
Unemployment	U.S. Bureau of Labor Statistics U.S. Department of Agriculture
Education	U.S. Census Bureau U.S. Department of Agriculture
Labor Force Age	U.S. Census Bureau
Annual Average Pay	U.S. Bureau of Labor Statistics
Minimum Wage	U.S. Department of Labor
Right-to-work State	Politifact
Establishment Count	U.S. Bureau of Labor Statistics
Population Density	U.S. Census Bureau, Population Division
Metro	U.S. Census Bureau
Manufacturing	U.S. Bureau of Labor Statistics
Services	U.S. Bureau of Labor Statistics
Finance	U.S. Bureau of Labor Statistics
Regions	Bureau of Economic Analysis

Appendix 2:

County Private Equity Investment (2011-2012)



County Employment Change (2011-2014)



Appendix 3: Variable Description and Descriptive Statistics

Name	Description	N	Mean	Standard Deviation	Min	Max
Employment Change	Employment growth (2011 to 2014)	3,141	2,272.2	32,274.7	-928,231	1,071,966.0
Employment Baseline	Employment (2011)	3,141	33,627.6	121,875.1	0.0	3,340,009.0
Private Equity Investment volume	Private equity investment, $Ms (2011-2012)	3,053	113.5	1,159.0	0.0	36,324.2
Unemployment	Unemployment rate (2011)	3,141	8.7	3.0	1.4	29.1
Education	% of adults with a bachelor's degree or higher (2010-2014)	3,141	20.1	8.9	2.6	75.1
Labor Force Age	Median age of women and men between age 16-64	3,141	41.8	3.0	21.8	53.9
Annual Average Pay	Annual average pay (2011)	3,141	34,206.5	9,201.4	0.0	116,904.0
Minimum Wage	Minimum wage (2011)	3,141	7.33	0.4	7.25	10.74
Right-to-work State	County in right-to-work state (2011)	3,141	0.6	0.5	0.0	1.0
Establishment Count	Annual establishment count (2011)	3,141	2,637.8	10,850.0	6.0	430,115.0
Population Density	Population per square mile (2011)	3,128	262.5	1,745.8	0.03	70,172.7
Metro	Metropolitan area	3,141	0.4	0.5	0.0	1.0
Manufacturing	Manufacturing employment quotient (2011)	3,140	0.6	0.4	0.0	5.6
Services	Services employment quotient (2011)	3,140	0.8	0.2	0.0	1.4
Finance	Finance employment quotient (2011)	3,140	1.2	1.1	0.0	7.4
Regions	Eight BEA regions					

Appendix 4: Regression Models and Results *(Robust Standard Errors)*

Name	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	611.09	26092.26	20250.23	9924.75	26816.68
	(644.71)	(7711.31)	(31405.46)	(29942.44)	(25018.25)
Employment Baseline	0.05	-0.13	-0.14	-0.16	-0.16
	**(0.02)	(0.09)	(0.09)	*(0.10)	(0.10)
Private Equity Investment volume		9.81	9.45	9.75	9.82
		**(3.91)	**(3.81)	**(3.90)	**(3.95)
Unemployment			182.44	221.45	187.05
			(170.54)	(173.51)	(268.23)
Education		402.35	412.44	332.85	340.36
		**(184.59)	**(188.15)	*(170.19)	*(175.64)
Labor Force Age		-561.46	-524.35	-522.07	-488.67
		***(169.37)	***(160.73)	***(156.60)	***(160.93)
Annual Average Pay		-0.31	-0.33	-0.34	-0.36
		***(0.10)	***(0.10)	***(0.11)	***(0.12)
Minimum Wage			426.86	907.22	-1871.89
			(4296.85)	(4252.25)	(3442.73)
Right-to-work State			-81.49	134.50	795.57
			(776.89)	(723.36)	(1218.38)
Establishment Count		1.32	1.37	1.47	1.46
		**(0.52)	**(0.56)	**(0.59)	**(0.60)
Population Density			1.12	1.00	1.08
			(0.86)	(0.82)	(0.83)
Metro		6024.57	5857.95	5514.26	5620.32
		***(1555.00)	***(1474.01)	***(1321.33)	***(1302.59)
Manufacturing				807.43	1042.31
				(433.76)	**(504.17)
Services				3107.72	4301.59
				(3173.87)	(3013.89)
Finance				7587.43	7822.03
				***(2586.90)	***(2644.92)
Region- New England					-1635.73
					(5044.79)
Region- Mideast					666.06
					(2952.99)
Region- Great Lakes					2433.49
					(3271.79)
Region- Plains					28.01
					(1189.07)
Region- Southwest					3570.51
					***(1283.48)
Region- Rocky Mountains					658.26
					(1798.57)
Region- Far West					8170.69
					(5296.17)
R^2	.0345	.1097	.1124	.1191	.1217
Observations	3,141	3,053	3,041	3,040	3,040

* significant at the 90% confidence level
** significant at the 95% confidence level
*** significant at the 99% confidence level