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

Overview

In **Private Equity Investment and Local Employment Growth: *A County-Level Analysis***, from the Winter 2020 issue of ***The Journal of Alternative Investments***, **Joshua Cox** (of **Control Risks**) and **Bronwyn Bailey** (of **BB-Advisors**) use a new approach to answer the question of whether private equity investment increases employment. Previous studies have been inconclusive or contradictory. Sometimes past results indicated a loss of employment due to increased efficiencies from private equity investment, while other results indicated an increase in employment, albeit a statistically insignificant one. These studies focused on company-level employment growth, however. In contrast, Cox and Bailey examine countywide data and look for spillover effects: employment growth beyond that in the company receiving the private equity investment. The authors examine a host of control variables that might otherwise explain employment growth. In each statistical test, the association between lagged, countywide employment growth and private equity investment is positive and statistically significant.

Key Takeaways

- **There is a positive association between private equity investment and employment growth.** The results indicate that for each $1 million in additional private equity investment, a little more than 1.3 new jobs are created.

- **The results imply that private equity investment can create positive externalities.** Specifically, statistical tests using county-wide employment data suggest that the job-creation effects of company-specific private equity investment spill over from the company receiving financing to the local economy.

- **The popular notion that a higher minimum wage reduces employment growth is not supported empirically.** The minimum wage variable has a positive sign that is the opposite of that hypothesized.

Key Definitions

Externalities

Externalities are spillover effects, which can be positive or negative. An example of a negative externality is pollution. An example of a positive externality is when the job-creation effects of company-specific private equity investment spill over from the company receiving financing to the local economy through job growth and increased consumer spending.

Right-to-work state

A right-to-work state is a state that has enacted laws permitting individuals to work in unionized workplaces without joining a union or paying union dues, thereby making union membership optional. As of 2019, the right-to-work states comprise Alabama, Arizona, Arkansas, Florida, Georgia, Guam, Idaho, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Mississippi, Nebraska, Nevada, North Carolina, North Dakota, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, West Virginia, Wisconsin, and Wyoming.

Huber–White sandwich estimator

Huber–White sandwich estimators are a tool for estimating the standard errors of linear regression results when the data display "heteroscedasticity"—that is, when the error terms of the

Discussion

The study examines whether private equity investment tends to create jobs by boosting economic growth, or to reduce jobs by cutting costs and improving efficiencies. Previous studies on the economic impact of private equity investment often have been inconclusive or contradict one another.

> 66 This study is unusual because it marries a financial investment topic with hypotheses more often found in labor economics and socioeconomic studies. 99
>
> —*Joshua Cox and Bronwyn Bailey*

APPROACH

The authors' regression approach defines the dependent variable as employment growth from 2011 to 2014. This is the absolute change in employment for 3,141 individual US counties, not the percentage change. This approach contrasts to many previous and often inconclusive studies of employment level changes within companies financed with private equity. Expanding the scope from the company level to the county level allows the authors to test the hypothesis that investment in a company can produce externalities to the local economy.

The independent variable of interest is private equity investment, measured as the sum of private equity investment in each county during 2011 and 2012. The longer span for the employment growth variable accommodates previously documented lags in employment changes after investment. Independent control variables represent labor supply, labor quality, labor cost, unionization (a dummy variable), agglomeration and urbanization, industry concentration, and dummy variables for eight US regions.

Two types of regressions are performed. The first is a set of five level-level regressions, where the set of independent variables is increasingly larger and more encompassing; the second type is a log-log regression that contains all independent variables. The level-level regressions utilize ordinary least squares regression methods, while both the dependent and independent variable measurements are in their original levels, e.g., 115 jobs. The log-log regression
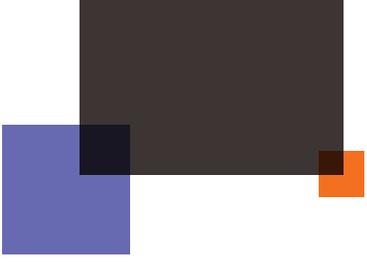
regression have uneven variability. The error terms of the regression represent the portion of the relationship among the regression variables that is *not* explained by the regression model.

transforms the dependent and independent variables into natural logs of the original levels, e.g., *ln*(115). One notable difference between the two types of regressions is that the 3,141 sample size of the level-level regressions is decreased to 329 counties in the log-log model, because more than 2,000 counties did not receive any private equity investment during the sample period. In creating this model, the authors dropped counties that had no private equity investment. A motivation for using the log-log mode is that both key variables (the dependent variable, employment change, and the independent variable of interest, private equity investment) have distributions that are skewed to the right, like the lognormal distribution.

Six regression models are tested, correcting for heteroscedasticity in errors with the Huber–White sandwich estimators. They are 1) a level-level model with a single baseline independent variable (discussed below); 2) a model that adds private equity investment as the independent variable of interest; 3) a model that adds 7 core control variables, for a total of 9 independent variables; 4) a model that adds 3 industry concentration variables, for a total of 12 independent variables; 5) a level-level model that adds 7 geographic control variables, for a total of 19 independent variables; and 6) a single log-log model with all 19 independent variables.

CHANGE SCORING METHOD

The use of an absolute change in the dependent variable (employment) is consistent with many social science studies but less common in financial research, which more often uses percentage changes. This absolute change from the initial period level (T1) to the second period level (T2), referred to as a "change scoring method," is used because the dependent variable is in units (jobs). A percentage change of 10% in employment may require relatively little investment in a sparsely populated county but far more in a county with a very large population. For this reason, Model 1 regresses a change in employment (T2 – T1) against baseline employment (T1). Results show that higher levels of employment in the first period (2011) result in higher changes from 2011 to 2014.

MAJOR FINDINGS

Level-level regression models 2 through 5 yielded statistically significant coefficients and stable estimates for private equity investment, ranging from 1.31 to 1.36. The interpretation is that, all else equal, for each $1 million in additional private equity

investment, a little more than 1.3 new jobs are created. The log-log model yielded a statistically significant coefficient of 0.06. The interpretation is that a one percent change in private equity investment yields a 0.06 percent change in employment. These two results are very similar, given that the mean county-level private equity investment over the 2011 to 2014 period is $114 million, since $e^{0.06*ln(114)} = 1.33$.

> **"** The log-log model shows that a one percent change in private equity investment yields a 0.06 percent change in employment, holding all other variables in the model equal. **"**
>
> *—Joshua Cox and Bronwyn Bailey*

## CONTROL VARIABLE HYPOTHESES AND FINDINGS

Model 3 includes a group of core variables: labor supply (unemployment), labor quality (education and labor force age), labor cost (average annual pay and minimum wage), effect of unionization (right-to-work state), and agglomeration and urbanization (metro).

Model 4 adds a set of control variables for industry concentration, and model 5 adds a set of regions.

Core Variables. Interestingly, in level-level model 3, the core variable for a unionization effect produces the only statistically significant coefficient of all the core variables. The effect of unionization is represented as a dummy variable. If a county resides in a "right-to-work" state, it is assigned a 1; if not, it is assigned a 0. The results are as hypothesized: positively correlated with net new jobs. In the log-log model, the right-to-work state variable remains positive but becomes statistically insignificant. Yet other core variables become significant in the log-log model: labor force age (with a negative correlation to employment change) and average annual pay and metro, both with positive correlations with employment change. Metro is a dummy variable assigned to 1 if the US Census Bureau indicates that it is a metropolitan area.

Industry Concentration. The presence of certain industries, proxied by a location quotient—manufacturing, services, and financial—are hypothesized to have a positive effect on economic growth based
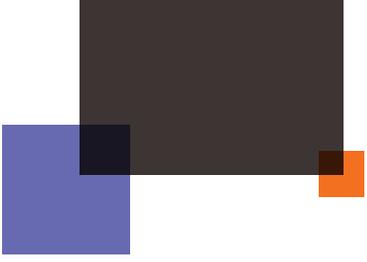
on past studies. The industry concentration coefficients in model 4 are negative for all three industries in both level-level models and positive in log-log model 6. Only the coefficient for services is significant in model 4, and highly significant in log-log model 6, where manufacturing is also significant. Additionally, in log-log model 6, the core variable labor force age and the industry concentration coefficient for services have significant signs that are opposite of those respective signs in level-level model 4, and thus become consistent with their respective hypotheses. Interestingly, the minimum wage variable becomes significant in model 4, with a positive sign that is the opposite of that hypothesized. (The expectation is that a higher minimum wage will reduce employment growth.) But the coefficient becomes insignificant, albeit still positive, in log-log model 6.

Regions. In level-level model 5, the coefficients for the New England, Mideast, and Great Lakes regions are negative and statistically significant; the Plains, South West, Rocky Mountain, and Far West regions are positive and statistically significant. The labor force age and manufacturing variables becomes significant and positive in this model. These results imply that job loss and growth are concentrated in specific regions. Yet in log-log model 6, only the South West and Far East regions are significant, and still positive.

For all six models, the variable of interest, private equity investment, remains stable, from 1.31 to 1.36, and is always significant.

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Ms. Bailey led industry outreach and analytical research at the American Investment Council (AIC), the private equity trade association. She began her private capital career at SVB Financial Group's venture fund division, SVB Capital, where she briefed investors on fund performance, wrote quarterly points-of-view to help clients navigate market shifts, and monitored a $1 billion fund portfolio. She also advised the ILPA on a new performance benchmark and managed an analytics team at BlackRock to optimize marketing and sales efforts for iShares ETFs. She began her career as a management consultant at Gemini Consulting in London and PwC in Los Angeles, advising global telecom, media, and technology clients on strategy and financial services. Ms. Bailey graduated magna cum laude from Cornell University and earned a doctorate from the University of California, Los Angeles. She is a CAIA charterholder.