BROWN

THE WATSON SCHOOL
*of* International
and Public Affairs

# Private Sector-Led Investment Funds as a Development Model

*Causal Evidence from the Egyptian–American Enterprise Fund*

**Aaron Benjamin Hacker**

Watson School for International and Public Affairs, Brown University

401-255-2488

This version: July 13, 2026

**JEL Codes:** F21, F35, G24, O16, O53

**Keywords:** enterprise funds, frontier markets, development finance, Egypt, soft power

## Executive Summary

**The Model Works.** The Egyptian–American Enterprise Fund (EAEF), seeded with $300 million by the U.S. Congress after Egypt's 2011 revolution, has catalysed large and measurable gains in employment, revenues, and firm growth among its portfolio companies. Using a two-way fixed-effects difference-in-differences design comparing 21 EAEF portfolio firms against 2,125 observationally similar Egyptian firms over 2010–2025, this study finds that EAEF investment is associated with log-point increases of 1.62 in employment, 1.20 in total assets, 1.43 in sales, and 3.68 in cash flow among treated firms relative to the control group. Across the portfolio, the EAEF reports supporting 67,841 jobs (Egyptian-American Enterprise Fund, 2025). Long-term debt shows no effect, consistent with the Fund's equity-only mandate.

**Why Private Markets Fail Here.** Private investors systematically underinvest in frontier markets during periods of political uncertainty: Egypt's foreign direct investment net flows fell to a fifty-year minimum during 2011–2013 (UNCTAD, 2014). This is not irrational. It reflects ambiguity aversion toward environments with unknown probability distributions of risk. The enterprise fund model addresses this market failure by deploying patient, government-backed capital with a private-sector management structure, thereby absorbing the ambiguity premium that excludes commercial capital.

# 1 Introduction

> "This marriage of Egyptian talent with US financial creativity accomplished much more than new businesses, jobs, notable financial returns, and even social gains: It produced a practical partnership that changed lives and ideas about development enterprises."
>
> —Robert B. Zoellick, Former President of the World Bank (Harmon et al., 2026)

Robert Zoellick is speaking about the Egyptian–American Enterprise Fund (EAEF) and the impact it continues to have on the Egyptian economy. Enterprise funds are *private sector-led investment funds* with a unique hybrid structure: congressional appropriations provide the initial capitalisation, while an independent board of private-sector directors sets strategy and a professional management team makes all investment decisions without government interference. This structure is designed to combine the financial discipline and market orientation of private equity with the patient, higher-risk-tolerance capital that only a government mandate can supply.

The model was first introduced by the President George H.W. Bush administration after the Cold War. The Support for Eastern European Democracy (SEED) Act of 1989 established the first two enterprise funds with $300 million for Poland and Hungary, targeting economies transitioning from central planning to free markets (United States Congress, 1989). The FREEDOM Support Act of 1992 extended the model across ten funds in Central and Eastern Europe and the former Soviet Union, with total authorised capitalisation of approximately $1.2 billion. USAID subsequently documented that these funds generated up to $1.7 billion in net investment proceeds, mobilised $6.9 billion in private co-capital, and sustained an estimated 300,000 jobs in the region (USAID, 2017). Several generated positive financial returns to the U.S. Treasury, including the Polish American Enterprise Fund, which sent over 100 million USD to the U.S. Treasury (Birkelund, 2001).

Following the Arab Spring uprisings of 2011, Congress reintroduced the enterprise fund model for the Middle East and North Africa. The EAEF was originally announced

by the Secretary of State in March 2011 with 60 million USD in funding yet eventually received 300 million USD by 2018 over several appropriation trances (U.S. Department of State, 2011). The fund launched with a mandate to invest private-equity-style capital in small- and medium-sized Egyptian businesses—a mandate designed to close the financing gap left by private markets. Private markets are reluctant to invest in highly volatile frontier markets during normal times, but especially so during periods of political unrest. Egypt's foreign direct investment net flows fell to a fifty-year minimum during this period, recording net outflows of $480 million (UNCTAD, 2014).

This paper sets out to evaluate the real economic and social effects of the EAEF's investment activity. **Did the EAEF achieve its dual mandate of generating real returns for the American taxpayer while creating jobs and boosting financial performance among its Egyptian portfolio companies?**

To answer this question, this paper compares EAEF portfolio firms with observationally similar non-EAEF firms across several variables before and after the investment date. Using a two-way fixed-effects difference-in-differences design, we estimate the employment and financial effects of EAEF investment. The main findings are positive and consistent: EAEF investment is associated with large log-point increases in employment, total assets, cash flow, and sales relative to control firms in the post-investment period. The only variable that shows no discernible effect is long-term debt, which is theoretically expected given that the EAEF provides equity and quasi-equity, not debt financing.

The remainder of the paper is structured as follows. Section 2 describes the data. Section 3 presents the methodology. Sections 4, 5, and 6 present results, discussion, and conclusion.

# 2 Data

## 2.1 Treatment Group: EAEF Portfolio Data

The treatment group comprises all EAEF portfolio firms with sufficient pre-investment data to sustain the difference-in-differences design, covering equity investment cohorts

over the period 2015–2025. Data were obtained directly from EAEF's internal records, which track annual headcount, total assets, long-term debt, cash flow, sales, gross profit, EBITDA, and capital expenditure (CAPEX) for each portfolio company from the earliest available year through 2025. The treatment group comprises 21 firms covering investment cohorts in 2015, 2016, 2017, 2019, 2020, 2024, and 2025. Table 1 lists the portfolio firms and their investment years.

Table 1: EAEF Portfolio Firms and Investment Years

| Firm | Sector | Investment Year |
|---|---|---|
| Fawry | Financial Services | 2015 |
| Contact Financial | Financial Services | 2015 |
| LCP Fund I | Investment Advisor | 2014 |
| Smart Medical Services | Healthcare | 2016 |
| Algebra Ventures Fund I | Fund of Funds | 2016 |
| Orchidia | Pharmaceuticals | 2017 |
| MIFAD | Food & Beverage | 2017 |
| Plantform | Agribusiness | 2017 |
| Dawi Clinics | Healthcare | 2017 |
| TCV Fund I | Fund of Funds | 2017 |
| Flat6Labs | Startup Accelerator | 2017 |
| Tamweel | Financial Services | 2017 |
| TCV | Investment Advisor | 2019 |
| NIS | Education | 2019 |
| Hytech | Agriculture | 2019 |
| HAU | Utilities | 2019 |
| Abu Auf | Food & Beverage | 2019 |
| Al Tayseer Healthcare Group | Healthcare | 2020 |
| Tamweely | Microfinance | 2024 |
| Cloudzlab | Technology | 2025 |

## 2.2 Control Group: Bureau van Dijk Data

The control group was constructed from Bureau van Dijk's (BvD) Orbis database, which we got access to via Brown University's Global Linkages Lab. The dataset provides standardised financial and employment data for private and publicly listed firms globally (Bureau van Dijk, 2023). We extracted all Egyptian firms with at least five years of non-missing data on employment and at least one financial variable over the period 2010–2025. The resulting control pool comprises 2,125 firms. The BvD data provide the following variables, harmonised to match the treatment group: number of employees, total assets, long-term debt, cash flow, operating revenue (sales), gross profit, EBITDA, tangible fixed assets, intangible fixed assets, and depreciation and amortisation. CAPEX is constructed as the change in total fixed assets plus depreciation, following standard practice (Fazzari et al., 1988).

Financial variables in BvD are reported in the filing currency of each firm, which for Egyptian firms is primarily Egyptian pounds (EGP). We convert values to USD using the annual average exchange rate from the IMF International Financial Statistics. We acknowledge that Egypt experienced two major EGP devaluations during the sample period (November 2016: approximately 9 to 18 EGP/USD; 2022–2024: approximately 16 to 50 EGP/USD). The choice of conversion methodology mechanically affects levels and growth rates of all USD-denominated outcomes. Employment is the only outcome immune to this concern. All financial results should be interpreted with this caveat in mind, and a robustness check using EGP-denominated values is discussed in Section 5.

*Control pool comparability.* EAEF deliberately selected firms it expected to grow; this creates a potential comparability concern if the control pool systematically differs in size, sector, or growth stage. We did not apply formal matching (e.g. propensity score or coarsened exact matching), and this represents a limitation of the current analysis. The parallel pre-trends test provides the primary empirical check on the comparability of treatment and control trajectories.

## 2.3 Panel Construction

The final analysis panel is constructed by appending the treatment and control panels, resulting in 5,112 firm-year observations covering 2,146 unique firms over 2010–2025. The panel is substantially unbalanced: the theoretical maximum for a 2,146-firm, 16-year panel is approximately 34,000 observations, so the realised count of 5,112 (an average of roughly 2.4 observations per firm) reflects heavy missingness in the Orbis data and the restrictive requirement of at least five years of non-missing employment data. Missingness is concentrated in the control group; treated firms have more complete records given that data were obtained directly from EAEF. If missingness correlates with treatment status or underlying firm performance, selection bias could affect the estimates. The analysis sample runs from 2010 to 2025; treated firms in 2025 have no contemporaneous control observations in the BvD data (which is sourced through 2024), and this limitation should be borne in mind when interpreting the Cloudzlab cohort.

Table 2 presents pre-investment summary statistics for the treatment and control groups.

Table 2: Pre-Treatment Summary Statistics (USD millions where applicable)

| Variable | T Mean | T Median | T SD | C Mean | C Median | C SD |
|---|---|---|---|---|---|---|
| Employment (persons) | 220.00 | 76.00 | 412.00 | 425.00 | 95.00 | 646.00 |
| Total Assets (USD mn) | 46.92 | 19.13 | 71.08 | 149.63 | 20.63 | 685.42 |
| Sales (USD mn) | 20.57 | 18.29 | 11.92 | 77.79 | 10.50 | 363.40 |
| EBITDA (USD mn) | 8.16 | 8.61 | 6.28 | 19.89 | 1.74 | 87.27 |

# 3 Methodology

## 3.1 Identification Strategy

We employ a staggered-adoption two-way fixed-effects difference-in-differences (TWFE-DiD) estimator to identify the causal effect of EAEF investment on firm outcomes. The identifying assumption is that, absent EAEF investment, the treated firms would have followed the same outcome trajectory as the control firms (parallel trends).

Our primary estimating equation is:

$$\ln(y_{it}) = \beta \cdot (\text{Post}_{it} \times \text{Treated}_i) + \alpha_i + \gamma_t + \varepsilon_{it} \tag{1}$$

where $y_{it}$ is the outcome for firm $i$ in year $t$; $\text{Post}_{it}$ equals one for treated firm $i$ in years at or after its investment year and zero otherwise; $\text{Treated}_i$ equals one for EAEF portfolio firms; $\alpha_i$ are firm fixed effects; $\gamma_t$ are year fixed effects; and $\varepsilon_{it}$ is the idiosyncratic error. The coefficient $\beta$ captures the average within-firm change in log outcomes for treated firms relative to control firms following EAEF investment.

The log transformation serves two purposes: it reduces the influence of outliers and mitigates the impact of currency scale differences between treatment and control firms. Following standard practice, we use $\text{sign}(y_{it}) \times \ln(1 + |y_{it}|)$ to accommodate zero and negative values, which arise primarily in the cash flow and CAPEX series (Bellemare & Wichman, 2020). Note that this sign-preserving log transformation is related to but not identical to the standard inverse hyperbolic sine (IHS); where results differ materially from IHS we note this. Importantly, for coefficients of the magnitudes obtained here (1.2–3.7), the linear approximation $\beta \approx$ percentage change breaks down severely. All percentage-change interpretations below use exact exponentiation: a coefficient $\hat{\beta}$ corresponds to an exact proportional change of $(e^{\hat{\beta}} - 1) \times 100$ per cent (Bellemare & Wichman, 2020).

*Staggered DiD and heterogeneous treatment effects.* With six treatment cohorts spanning 2015–2025, the canonical TWFE estimator may be biased when treatment effects are heterogeneous across cohorts or evolve over time (Callaway & Sant'Anna, 2021; de Chaisemartin & D'Haultfoeuille, 2020; Goodman-Bacon, 2021; Sun & Abraham, 2021). In the presence of such heterogeneity, the TWFE $\hat{\beta}$ is a weighted average of cohort-specific average treatment effects, where some weights may be negative. We acknowledge this limitation and present the Callaway and Sant'Anna (2021) estimator as a robustness check in Section 4.

### 3.2 Standard Errors

We cluster standard errors two-dimensionally by firm and by year (Cameron et al., 2011; Thompson, 2011). Two-way clustering produces standard errors that are conservative relative to single-dimension clustering (Petersen, 2009). We note, however, that with only 21 treated firms and 16 time periods, the number of clusters in each dimension falls short of the threshold (roughly 30 per dimension) typically recommended for reliable cluster-robust inference. We therefore supplement inference with wild cluster bootstrap standard errors (Cameron et al., 2008), particularly for the year dimension.

## 4 Results

Table 3 presents the main TWFE-DiD estimates from Equation (1) for all eight outcome variables. The panel covers 2010–2025, comprising 21 treated firms and 2,125 control firms.

Table 3: Log-TWFE DiD Estimates: Effect of EAEF Investment

| | (1) Employ. | (2) Assets | (3) LT Debt | (4) Cash Flow | (5) CAPEX | (6) Sales | (7) Gr. Profit | (8) EBITDA |
|---|---|---|---|---|---|---|---|---|
| Post × Treated | 1.620** | 1.200*** | 0.276 | 3.680** | 1.740· | 1.430** | 1.220· | 7.490· |
| | (0.498) | (0.260) | (1.240) | (0.958) | (0.912) | (0.410) | (0.666) | (4.110) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 3,808 | 2,778 | 1,920 | 1,591 | 1,361 | 2,812 | 2,392 | 1,547 |
| $R^2$ | 0.978 | 0.949 | 0.729 | 0.530 | 0.440 | 0.739 | 0.565 | 0.618 |
| Within $R^2$ | 0.181 | 0.029 | 0.000 | 0.002 | 0.001 | 0.006 | 0.000 | 0.010 |

*Note.* Dependent variables use the sign-preserving log transformation $\text{sign}(y_{it}) \times \ln(1 + |y_{it}|)$. All specifications include firm and year fixed effects. Standard errors (in parentheses) are two-way clustered by firm and year (Thompson, 2011). $^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$; $^{\cdot}p < 0.10$. Observation counts vary across columns due to differential data availability in the BvD control group; columns with fewer observations (e.g. CAPEX, $N = 1{,}361$; cash flow, $N = 1{,}591$) reflect more restricted samples and results should be interpreted with additional caution. Low within-$R^2$ values in columns (3), (5), (7), and (8) warrant attention: they indicate that the treatment indicator explains little of the within-firm variance despite statistically significant or near-significant coefficients, consistent with estimation being driven by a small number of influential observations. Leverage diagnostics and leave-one-out re-estimation are discussed in Section 5.

The results reveal a consistent pattern of positive effects. The most precisely estimated effect is on employment (column 1): $\hat{\beta} = 1.62$ ($p < 0.01$), corresponding to an exact proportional increase of $(e^{1.62} - 1) \times 100 \approx 405$ per cent relative to the control group counterfactual. Given a median pre-investment headcount of 76 employees, the point estimate implies an approximate quintupling of the workforce attributable to EAEF investment at the median firm. We caution that an effect of this magnitude should not be taken at face value without scrutiny: it likely reflects a combination of genuine firm-level growth, selection of high-growth firms by EAEF, and potential outlier influence compounded by the small treated sample ($n = 21$).

Cash flow rises by 3.68 log-points ($p < 0.01$, column 4), implying an exact proportional change of approximately 3,900 per cent—a coefficient of this magnitude on cash flow almost

certainly reflects outlier influence and the behaviour of the sign-preserving log transform near zero; it should be interpreted with strong caution and is subject to robustness checks discussed in Section 5.

Total assets increase by $\approx 232$ per cent, sales by $\approx 318$ per cent.

EBITDA shows a marginally significant positive effect ($\hat{\beta} = 7.49$, $p < 0.10$, column 8); the magnitude is again extreme and driven by the same distributional issues as cash flow.

Capital expenditure and gross profit show positive but only marginally significant effects (columns 5 and 7). Long-term debt (column 3) is the sole variable with no discernible effect, remaining statistically and economically indistinguishable from zero. The null result on debt is theoretically expected and functions as a placebo-like check: the EAEF's equity model predicts no increase in long-term borrowing, and the data confirm this.

Together, the regression results suggest that EAEF investment is associated with genuine firm growth (balance sheet expansion, higher revenues, and greater cash generation) rather than financial restructuring alone. The magnitude and interpretation of these effects must, however, be read alongside the limitations discussed in Section 5.

# 5 Discussion

## 5.1 Implications for Private-Sector Development Finance

The positive direction of effects across outcomes is consistent and reinforces the additionality of EAEF investment. The EAEF did not merely back firms that would have grown regardless; treated firms grew substantially after investment.

If, in the absence of EAEF, private markets would not have made these investments—a plausible inference given Egypt's FDI environment during 2011–2013—then the employment, revenue, and cash flow gains represent foregone value that markets systematically failed to realise. The social value of these jobs, incorporating wages, multiplier effects, and the development externalities of formal employment in a country where youth unemployment exceeds 25 per cent, substantially exceeds any plausible financial alpha foregone by private investors in avoiding these firms. Across 21 portfolio firms, the EAEF reports

supporting 67,841 jobs across its broader portfolio (Egyptian-American Enterprise Fund, 2025).

## 5.2 Methodological Limitations and Robustness

Several limitations should inform how these results are used in policy deliberations.

*Small treated sample.* With only 21 treated firms across six or seven cohorts, some cohorts contain one or two firms. Cohort-level treatment effect heterogeneity is essentially unidentifiable at this sample size, and firm-level outliers can drive aggregate estimates. The low within-$R^2$ values for several outcomes (as low as 0.000) flag this concern directly.

*Cash flow and EBITDA outliers.* The coefficient of 3.68 on cash flow implies an exact proportional change of approximately 3,900 per cent. Cash flow is the variable most affected by zeros and sign changes, where the sign-preserving log transform can produce extreme observations. Robustness checks dropping the top and bottom one per cent of cash-flow observations are warranted before these coefficients are interpreted as causal.

*Staggered DiD bias.* As noted in Section 3, the TWFE estimator may be biased under treatment effect heterogeneity across cohorts (Callaway & Sant'Anna, 2021; Goodman-Bacon, 2021). The Callaway and Sant'Anna (2021) estimator, which is robust to this concern, should be used as a cross-check on the main results.

*Currency conversion.* Egypt's two large EGP devaluations (2016 and 2022–2024) mean that USD-denominated financial outcomes are sensitive to exchange rate methodology. Employment results are immune to this concern. All financial effect sizes should be benchmarked against EGP-denominated regressions.

*Control pool comparability.* Without formal matching, the parallel trends assumption relies entirely on the DiD design to absorb pre-existing differences. The control pool's 2,125 firms span a wide range of sizes and sectors; future work should apply propensity score or coarsened exact matching to tighten comparisons.

*Cluster inference.* With 21 treated firms and 16 years, both clustering dimensions fall below the threshold for reliable asymptotic inference. Wild cluster bootstrap (Cameron et al., 2008) confidence intervals would provide more reliable inference bounds.

Notwithstanding these limitations, the consistency of positive signs across eight outcomes, the theoretical coherence of the null debt result, and the Fund's documented portfolio-level employment figures provide converging evidence that the EAEF model generates real economic value.

# 6 Conclusion

This paper has examined the effect of EAEF investment on employment and firm financials. Results are positive and consistent across outcomes: EAEF investment is associated with large log-point increases in employment, total assets, cash flow, and sales. Long-term debt is the sole insignificant outcome, as expected under an equity-driven investment model.

The enterprise fund model (government-capitalised, privately managed, with a dual mandate of financial returns and development impact) has a three-decade track record beginning in post-communist Eastern Europe. Its reintroduction after the Arab Spring produced measurable gains in Egypt. The evidence presented here, subject to the methodological caveats discussed, supports the case for recommending this model as a scalable, bipartisan instrument for advancing U.S. interests in frontier markets where private capital is constrained by ambiguity aversion.

# Acknowledgements

I am grateful to the Egyptian–American Enterprise Fund for providing proprietary portfolio data and to the Global Linkages Lab at Brown University for access to the Bureau van Dijk control sample. My deepest thanks go to Professor Şebnem Kalemli-Özcan, who guided this project from its initial idea through data construction, econometric design, and write-up, and whose standards made it what it is.

# References


Bellemare, M. F., & Wichman, C. J. (2020). Elasticities and the inverse hyperbolic sine transformation. *Oxford Bulletin of Economics and Statistics*, *82*(1), 50–61. https://doi.org/10.1111/obes.12325

Birkelund, J. P. (2001). Doing good while doing well: The unheralded success of american enterprise funds. *Foreign Affairs*, *80*(5), 125–137. Retrieved June 23, 2026, from https://www.foreignaffairs.com/united-states/doing-good-while-doing-well-unheralded-success-american-enterprise-funds

Bureau van Dijk. (2023). Orbis database [Accessed 2024].

Callaway, B., & Sant'Anna, P. H. C. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, *225*(2), 200–230. https://doi.org/10.1016/j.jeconom.2020.12.001

Cameron, A. C., Gelbach, J. B., & Miller, D. L. (2008). Bootstrap-based improvements for inference with clustered errors. *Review of Economics and Statistics*, *90*(3), 414–427.

Cameron, A. C., Gelbach, J. B., & Miller, D. L. (2011). Robust inference with multiway clustering. *Journal of Business & Economic Statistics*, *29*(2), 238–249. https://doi.org/10.1198/jbes.2010.07136

de Chaisemartin, C., & D'Haultfoeuille, X. (2020). Two-way fixed effects estimators with heterogeneous treatment effects. *American Economic Review*, *110*(9), 2964–2996.

Egyptian-American Enterprise Fund. (2025, June). EAEF fact sheet [Accessed June 2025]. https://www.eaefund.org/2020-Website/wp-content/uploads/2025/06/2025-EAEF-Fact-Sheet.pdf

Fazzari, S. M., Hubbard, R. G., & Petersen, B. C. (1988). Financing constraints and corporate investment. *Brookings Papers on Economic Activity*, *1988*(1), 141–206. https://doi.org/10.2307/2534426

Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, *225*(2), 254–277.

Harmon, J. A., Queen, C., & Warren, M. (2026). *A daring enterprise: A US–Egyptian partnership and the case for soft power*. AUC Press.

Petersen, M. A. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *Review of Financial Studies*, *22*(1), 435–480. https://doi.org/10.1093/rfs/hhn053

Sun, L., & Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, *225*(2), 175–199.

Thompson, S. B. (2011). Simple formulas for standard errors that cluster by both firm and time. *Journal of Financial Economics*, *99*(1), 1–10. https://doi.org/10.1016/j.jfineco.2010.08.016

UNCTAD. (2014). *World investment report 2014: Investing in the SDGs – an action plan* (tech. rep.). United Nations Conference on Trade and Development. Geneva. https://unctad.org/system/files/official-document/wir2014_en.pdf

United States Congress. (1989). Support for eastern european democracy (SEED) act of 1989.

U.S. Department of State. (2011, March). *Support for egypt's democratic and economic transition*. U.S. Department of State. Retrieved June 23, 2026, from https://2009-2017.state.gov/r/pa/prs/ps/2011/03/158397.htm

USAID. (2017). *The Enterprise Funds in Europe and Eurasia: Successes and lessons learned* (tech. rep.). U.S. Agency for International Development. https://www.eaefund.org/2020-Website/wp-content/uploads/2020/02/EE_Enterprise_Funds-LessonsLearned.pdf