Capital Allocation Decisions in Private Equity

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Motivation & Research Question

- Increased allocation of institutional investors to private equity.
- PE firms (VC & Growth) drive innovation – investments are however concentrated within industries and geographical sectors (Lerner and Nanda, 2020).
- Capital allocation efficiency linked to macro growth (Aghion and Howitt, 1992).

Research Question: How do private equity firm (GP) characteristics affect where capital is allocated? How do the agency issues between GPs and LPs affect these allocation decisions?

Importance:

- PE industry: Concerns about 'style drift' of PE managers – when is style drift optimal? (Cumming et. al, 2009).
- To what extent and when should PE firms specialize? (e.g., Gompers et. al., 2009).

Contribution

I. Develop a dynamic portfolio allocation model of a private equity firm (GP) raising capital for subsequent funds. The model features an exploration vs. exploitation tradeoff and learning by the PE firm. The allocation choice depends on GP characteristics and market conditions.

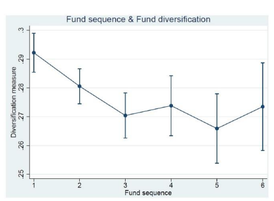
II. Introducing agency issues between investors (LPs) and private equity firms (GPs) affects this allocation choice.

III. Model helps rationalize certain empirical facts about the PE industry and generates novel empirical predictions.

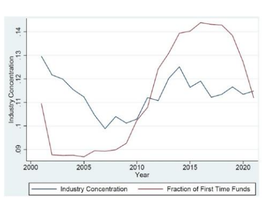
Motivating facts

I. Subsequent funds raised by the same PE firm are more diversified than first time funds (Gompers, Kovner and Lerner, 2008) – effect not explained by size or number of investments purely.

II. Overall private equity industry concentration co-moves with the fraction of firs time funds



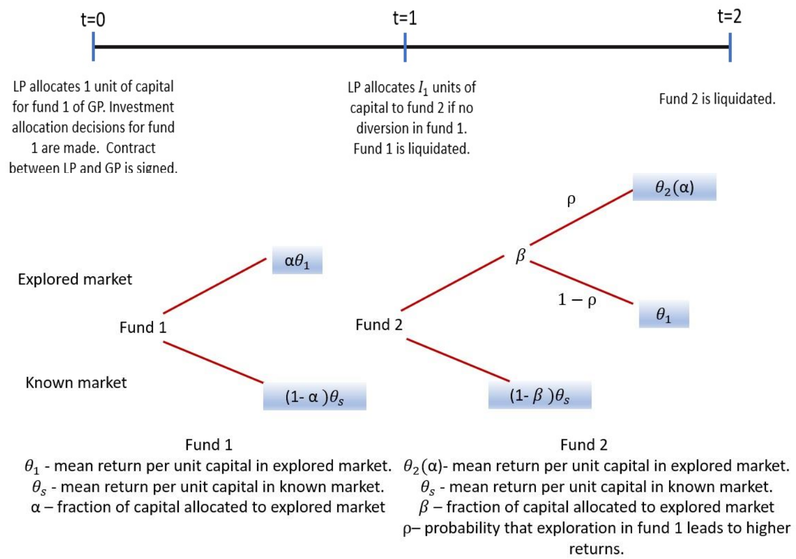
- Source: Pitchbook, VC funds with vintages 1990-2018.
- Diversification measure: "Herfindahl" index calculated at a fund level based on 42 industry classifications.



- Source: Pitchbook
- Industry concentration measure: "Herfindahl" index across all VC backed deals in a given year (42 industries).

Baseline model

- Two periods. 1 General Partner (GP - agent) and 1 Limited Partner (LP - principal). Both parties are risk- neutral.
- GP can allocate capital to a known market (exploitation) or explore a new market (exploration) (Manso, 2011). GP learns by doing – second period returns in the new market may increase.. Convex cost of managing a fund of a given size.



Fund 1
θ_1 - mean return per unit capital in explored market.
θ_s - mean return per unit capital in known market.
α – fraction of capital allocated to explored market

Fund 2
$\theta_2(\alpha)$- mean return per unit capital in explored market.
θ_s - mean return per unit capital in known market.
β – fraction of capital allocated to explored market
ρ– probability that exploration in fund 1 leads to higher returns.

Key tradeoff: Exploration decreases fund 1 returns, but if successful may raise fund 2 returns

First Best

Social surplus:

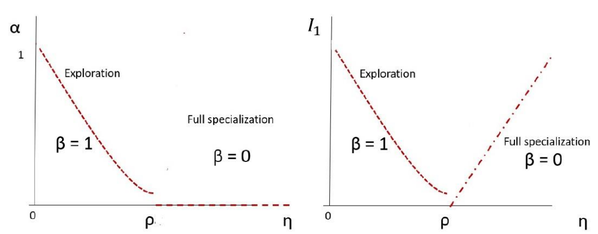
$$S(\alpha, I_1) = \Big(\alpha\theta_1+(1-\alpha)\theta_s\Big)-1-\frac{\gamma}{2}+I_1\big((1-\rho)\theta_1+\rho\theta_2(\alpha)\big)-I_1-\frac{\gamma I_1^2}{2}$$

FOC α: $\theta_2'(\alpha) = \frac{\theta_s-\theta_1}{\rho I_1}$.

FOC I_1: $\gamma I_1 = (1-\rho)\theta_1 + \rho\theta_2(\alpha) - 1$.

Define $\eta = \theta_s - \theta_1$ - opportunity cost of exploration.

α and I_1 increase in ρ, decrease in η and γ.



Moral hazard and exploration

- Reduced form moral hazard: At time 1 and time 2 the GP can divert a fraction of profits λ from total returns of fund 1 and fund 2. If diversion occurs fund 2 is not financed (Bolton and Scharfstein, 1990). Contract analysed under full commitment.

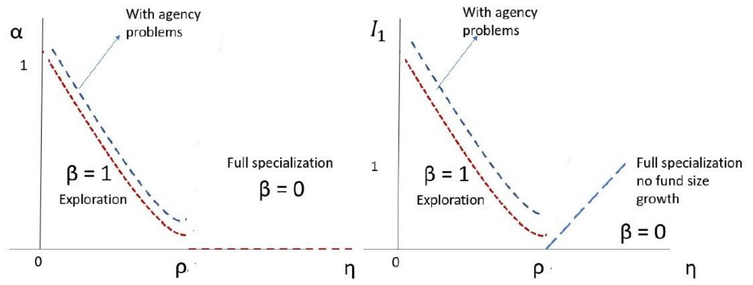
- First best:

$$I_1^{FB} = \frac{\rho\theta_2(\alpha^{FB})}{\gamma}, \text{ and } \theta_2(\alpha^{FB})\theta_2(\alpha^{FB})' = \frac{\gamma\eta}{\rho^2}.$$

- Moral hazard

$$I_1 = \frac{\rho\theta_2(\alpha)}{\gamma} \text{ and } \theta_2(\alpha)\theta_2'(\alpha) = \frac{(1-\lambda)\eta\gamma}{\rho^2}$$

1. Under moral hazard α higher, I_1 higher
2. Intuition: $\alpha\uparrow \rightarrow$ Return for fund 1 $\downarrow$ and Return for fund 2 $\uparrow \rightarrow I_1\uparrow$ GP raises a larger fund.
3. Incentive compatible because the GP is compensated partly by raising a larger fund.



Key insight: By promising the GP a larger fund in the future LPs alleviate the moral hazard problem for fund 1. Since fund 1 returns are not fully pledgeable the GP is encouraged to explore (exploration may increase fund 2 returns at the expense of fund 1 returns).

Takeaways and Implications

1. The degree to which GPs specialize or diversify is determined by market conditions and experience of the GP.
2. First funds raised by GPs who are generalists will likely explore more and if successful raise larger funds.
3. The moral hazard problem can encourage exploration among generalist GPs – this may be welfare improving if the exploration takes place in innovative sectors (e.g., semiconductors in 1970s or AI and cloud computing 2010s)