Hyunji Moon (2015-13196)
Industrial Engineering, SNU

Corporate Diversification and the Value of Individual Firms: a Bayesian Approach

By Tyson B. Mackey, Jay B. Barney, and Jeffrey P. Dotson
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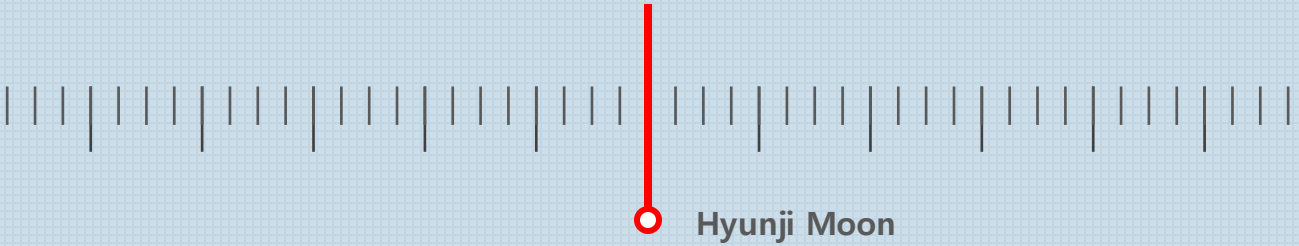
INDEX



Mismatch between

theoretical diversification literature (diversification-firm performance relationship for **individual firm**)

empirical diversification literature (**average** relationship between diversification-firm performance)

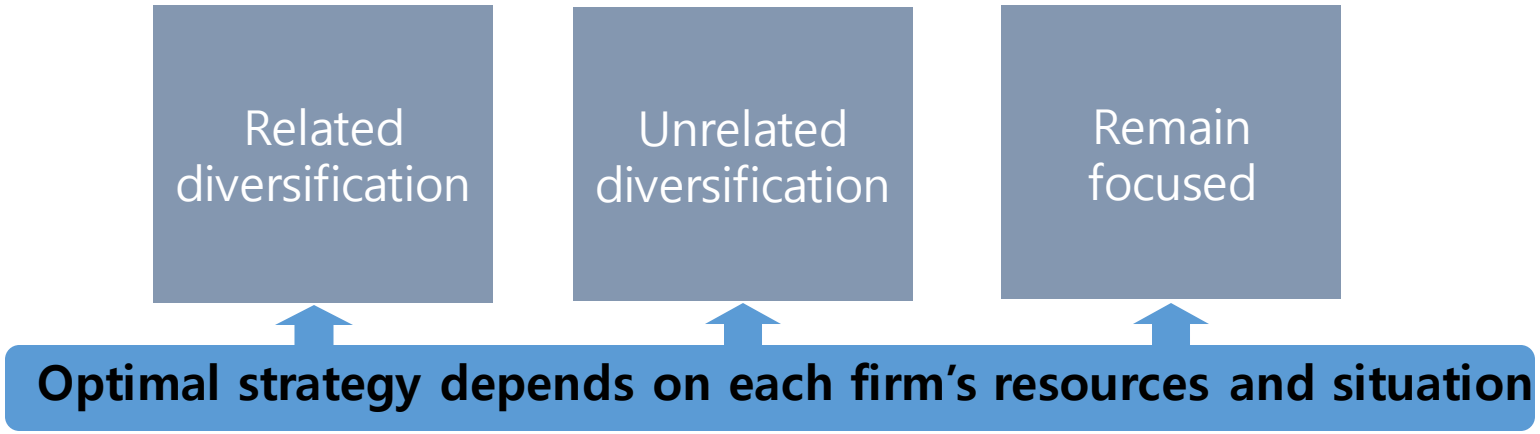
'Hierarchical Bayesian Modeling'
enables estimation of this relationship at the firms level

Re-examine relationship between **firm's diversification strategy** and its **performance** with Hierarchical Bayesian Modeling.

2.1 **Theoretical diversification literature** explains…

-conditions under which a firm can enhance its economic value by related, unrelated diversification or by remaining undiversified.

-conditions under which a firm may abandon its profit-maximizing objectives in choosing its diversification strategy.



Hypothesis:

"A profit maximizing firm will tend to pursue that corporate diversification strategy that enhances its economic value"

2.2 **Empirical diversification literature** Explains…

- positive average effect of diversification on firm value (Campa and Kedia, 2002).
  - ✓ average value created: diversification **>** a portfolio of focused firms
  - ✓ does not mean that remaining focused is not the most value strategy.
- related diversification > unrelated diversification (Miller, 2006)
  - ✓ firms that have related knowledge assets are more likely to create value through diversification.
  - ✓ does not mean that unrelated diversification is not the most value creating strategy

Testing hypothesis in this article requires the examination of the **relationship between a particular firm's diversification and value across a firm.**

3.1 To remove **heterogeneity**...

- use fixed or random effects models.

- estimate firm-specific relationships.
  - ✓ apply contingency studies and mixed effects modeling.
  - ✓ random coefficient models, hierarchical linear models can be used to estimate average coefficient plus an individual specific deviation from the average coefficient.

3.2 **Hierarchical Bayesian** model: beneficial to strategy research because…

- estimates a **distribution** for **firm-specific parameter.**
- **improves precision** by imposing a common distribution between the firm-specific coefficients.

non-Bayesian

- Point estimation for the firm-specific parameter.
- Weak confidence on firm-specific parameter.

Bayesian

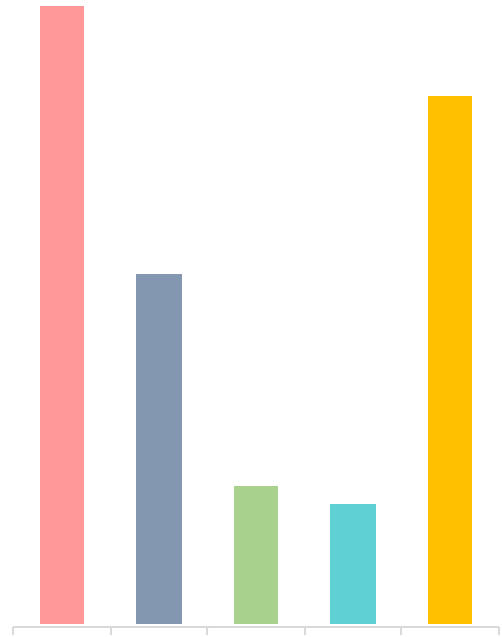
- **Estimates a distribution for each coefficient.**
- **Estimates impact-prob. of independent variable on dependent variable.**

Hierarchical Bayesian

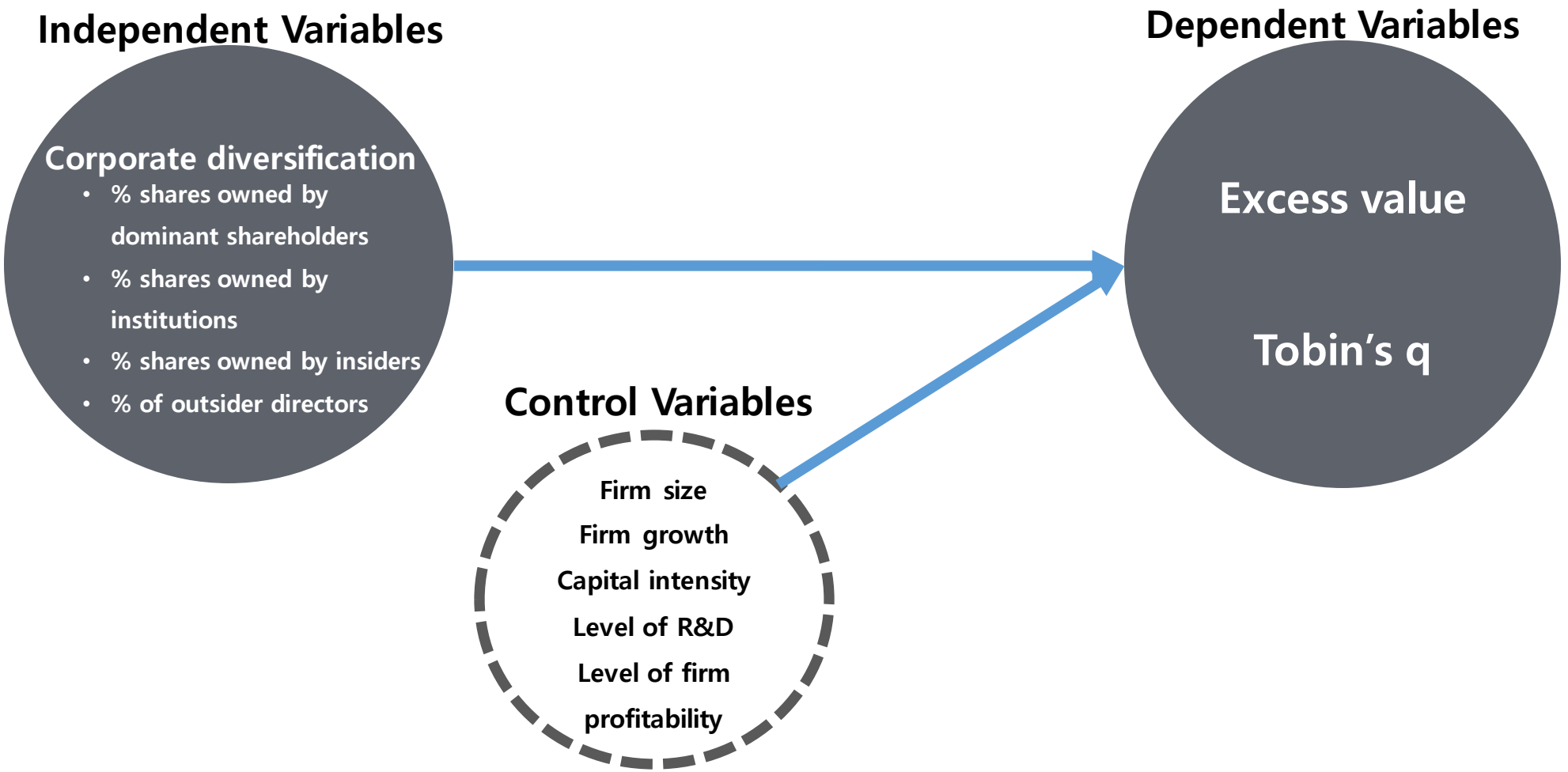
- **Distinct modeling approach that estimates firm-specific parameters.**
- **Adequately model heterogeneity in the value of diversification.**

3.3 How are **Data and Sample** collected?

- Firms in the Compustat Industry Segment file.
- From year 1985 to 1996.
- Remove firms with less than five observations.
- Total of 7,442 observations on 838 firms.



3.4 Research model



3.5 Model development

Impact of diversification on firm performance

$$y_{it} = \beta_{0i} + \rho_i y_{it-1} + \beta_{Di} D_{it} + \sum_k \gamma_k \tilde{x}_{kit} + \varepsilon_{it}.$$

y_{it} Measure of performance(firm i, time period t)

D_{it} Diversification state (firm i, time period t)

Endogenous diversification

$$V_{it} = \alpha_0 + \alpha_1 \left(\beta_{Di} / \left(1 - \rho_i\right)\right) + \sum_k \delta_k x_{kit} + \xi_{it}.$$

V_{it} Function for the value

$\beta_{Di} / \left(1 - \rho_i\right)$ Expected, long-term impact of diversification on performance

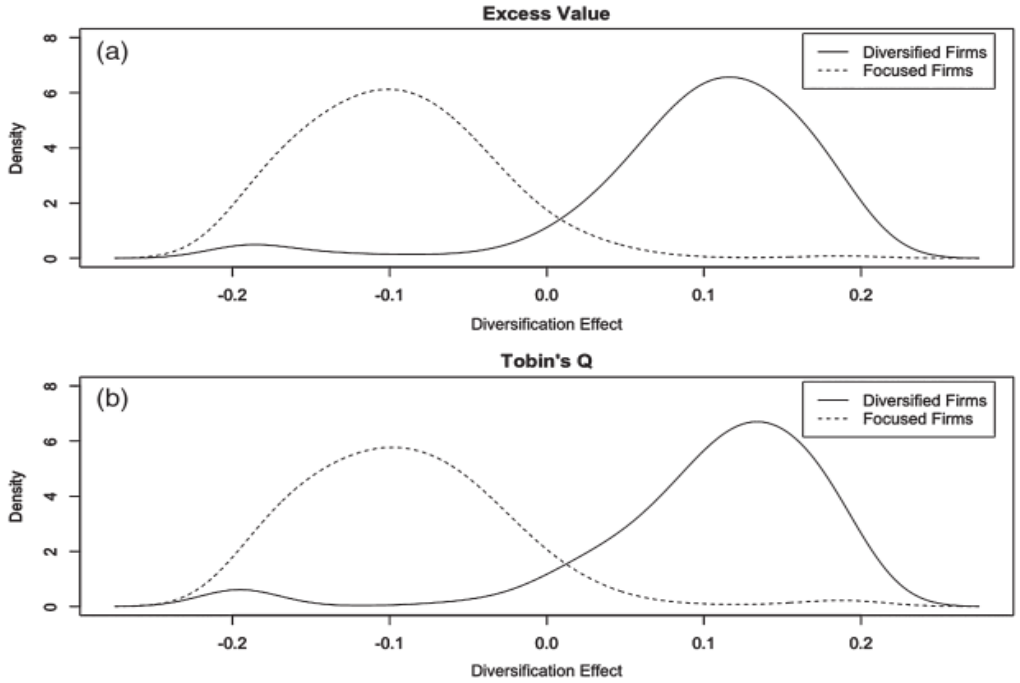
$$pr\left\{D_{it} = 1\right\} = \frac{e^{V_{it}}}{1 + e^{V_{it}}}.$$

$pr\left\{D_{it} = 1\right\}$ **Probability that the firm will diversify**

4.1 **Empirical implementation** of the theory in this article is…

Divide the distribution of the firm specific diversification coefficients into

focused + related diversifiers + unrelated diversifiers!



Effects of diversification on excess value and Tobin's q for diversified and undiversified firms.

→ Diversified firms have an expected increase in value through diversification.
&
Focused firms are generally expected decrease in value through diversification.

4.2 **What affects** the relationship between diversification and firm value**?**

Independent, controlled variable analysis

- **Expected value of diversification** has a strong effect on the diversification choice.

- Larger **firm size** increases diversification's effect on excess value with 48.3 percent probability.
- Faster **growth rate** increases the value of diversification with 0 percent probability.
- Higher **capital intensity** increases the value of diversification with 13.4 percent probability.
- Higher **R&D intensity** are less likely to diversify successfully.
  → Governance has little impact on the value of diversification.

Table 4. Determinants of firm-specific parameters affecting excess value and Tobin's q

	Excess value				Tobin's q			
	Diversification effect		Intercept		Diversification effect		Intercept	
	Mean	% > 0	Mean	% > 0	Mean	% > 0	Mean	% > 0
Intercept	−0.087	0.0%	−0.256	0.0%	−0.095	0.0%	0.131	98.0%
Size	0.016	100.0%	−0.005	27.9%	0.018	100.0%	−0.002	37.8%
Profitability	−0.010	48.3%	1.204	100.0%	0.022	64.2%	0.012	55.7%
Capital intensity	−0.041	13.4%	0.007	51.2%	−0.032	15.9%	−0.042	26.9%
R&D/sales	−0.234	0.0%	0.431	97.5%	−0.244	0.5%	0.412	99.0%
Growth	−0.122	0.0%	0.582	100.0%	−0.149	0.0%	−0.021	40.8%
% of shares held by dominant shareholders	−0.043	9.5%	0.152	98.5%	−0.064	0.5%	0.003	52.2%
% of shares held by insiders	−0.007	38.3%	0.120	95.5%	0.005	57.7%	−0.004	50.2%
% of shares held by institutions	0.003	53.2%	−0.065	13.9%	−0.029	14.4%	0.110	99.0%
% of board composed of outsiders	−0.055	3.5%	0.243	100.0%	−0.037	9.5%	0.042	80.1%

5.1 **Summary**

What?
Relationship between a firm's diversification strategy and its performance for individual firms.

How?
Hierarchical Bayesian modeling approach that allowed for firm-level estimates.

- ✓ Firms tend to be **profit-maximizing** in their choice of diversification strategy.
- ✓ Diversification has a higher expected value for related diversifiers than unrelated diversifiers, but that diversification also has a highest expected value that focus for unrelated diversifiers as well.

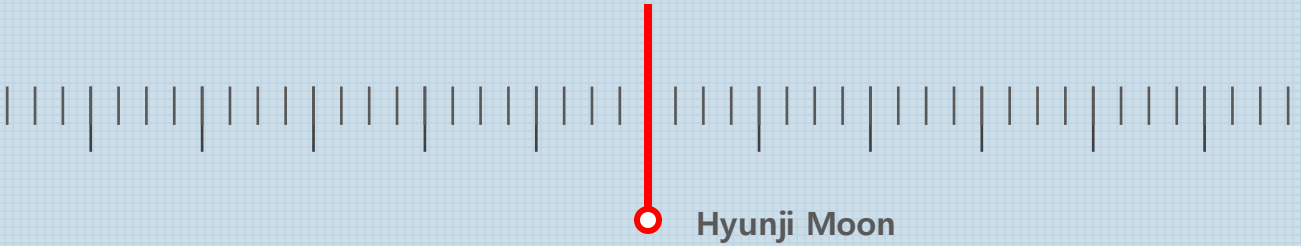
5.2 **Implication for strategy scholarship and practice**

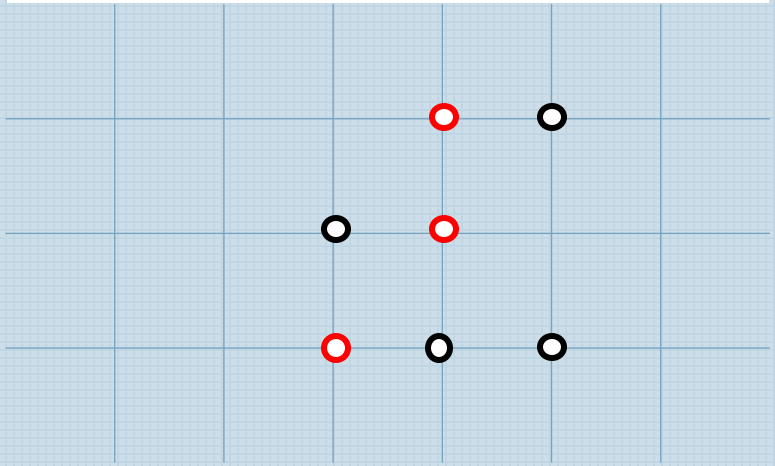
- Incorporating firm heterogeneity into the analysis of the effects of diversification could be assimilated into other topics.
- One example is governance and diversification and it was noted that poor governance does not affect the value of diversification.

Key Implications

- Mismatch between
  - ✓ **strategic management theory** (individual firms, resources and capabilities to maximize value)
  - ✓ **strategic management research methods** (average relationship models).

- Results should not be interpreted as a rule for riches suggesting that all firms should pursue this particular strategy.
- Overall **relationship between strategy and firm value** require strategic management for **new methodological approaches.**





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