

RESEARCH NOTES AND COMMENTARIES

GLOBAL EQUITY OFFERINGS, CORPORATE VALUATION, AND SUBSEQUENT INTERNATIONAL DIVERSIFICATION

IFTEKHAR HASAN,^{1*} NADA KOBEISSI,² and HAIZHI WANG³

¹ Rensselaer Polytechnic Institute, Troy, New York, U.S.A. and Bank of Finland, Helsinki, Finland

² College of Management, Long Island University-C.W. Post, Brookville, New York, U.S.A.

³ Stuart School of Business, Illinois Institute of Technology, Chicago, Illinois, U.S.A.

*Researchers have long wondered why U.S. firms offer their equity in multiple global capital markets even though they have access to a deep domestic capital market. Based on a propensity score-matching sample of IPOs for U.S. firms from 1990 to 2003, this paper offers some potential answers. We find strong evidence that issuers who choose global equity offerings experience higher valuations at the IPO stage, as measured by Tobin's *q*. Our evidence also shows that global equity offerings serve as a deliberate strategic tool to increase issuers' international visibility and their propensity to diversify operationally to international markets. Copyright © 2010 John Wiley & Sons, Ltd.*

INTRODUCTION

One of the most important decisions made in the life of a firm is the one to become a public company. Most notably, initial public offerings (IPOs) provide important financial capital that can largely enhance an issuing company's capability to expand its operations and support a long-term developmental strategy. Undertaking IPOs also presents a host of new responsibilities, oversight, and reporting requirements, as well as valuation challenges. These elements are further complicated when a

firm chooses to place its new equities in the global capital markets.

Despite their deep and broad access to the domestic capital market, U.S. companies are increasingly involved in global IPOs (Wu and Kwok, 2003). Because it entails extra cost and subjects issuers to stricter scrutiny under the requirements of multiple capital markets, the decision for entrepreneurial firms to become involved in global equity offerings is a crucial one. Up until now, researchers have proposed various rationales for global equity offerings. For example, some suggest that issuers may want to exploit a window of opportunity (Bayless and Chaplinsky, 1996). Others propose that global IPOs can attract more analyst coverage and market monitoring, and thus reduce asymmetric information problems (Wu and Kwok, 2002). Finally, others point out that

Keywords: global equity offerings; valuation; international diversification; initial public offerings

*Correspondence to: Iftexhar Hasan, Rensselaer Polytechnic Institute, 110 8th Street, Pittsburgh Building, Troy, NY 12180-3590, U.S.A. E-mail: hasan@rpi.edu

firms may use global IPOs to expand demand for their securities and reduce the price-pressure effect (Chaplinsky and Ramchand, 2000).

In this paper, we build a theoretical framework based on real option theory and signaling theory to examine another potential motive for global equity offerings that strategic management literature has virtually neglected. We posit that global IPOs could increase issuers' visibility in foreign markets and enhance their access to broad resources, including foreign institutions and investors, and enable the issuing companies to further expand their operations beyond the boundary of their home countries. In essence, global equity offerings could be an important antecedent and create a valuable real option for firms to exercise later. Furthermore, global equity offerings can be intentionally used by IPO firms to convey their private information to the market and signify their intention to diversify internationally, and, as such, they could have important implications for firms' valuations.

Using a propensity score-matching sample of newly public U.S. firms from 1990 to 2003, we explore two research questions: (1) do entrepreneurial firms choosing global equity offerings have higher valuations—as measured by Tobin's q —at the IPO stage; and (2) do issuers offering new equities globally have a higher tendency to diversify operationally to international markets?

We find supportive evidence that global IPO firms experience higher Tobin's q even after controlling for the endogenous choices the issuers make. Our finding reveals that issuers of both global offerings and domestic offerings positively self-select into their current issuing strategies. In other words, had the IPO companies chosen the other issuing strategy, they would have worsened performance (i.e., lower valuation). Note that our sample is constructed using propensity-score matching method based a set of observable characteristics. The finding of this paper strongly indicates that IPO companies' decisions on where to sell their new equities are driven by underlying unobservables, which further strengthen our predication that firms with private information have a strong incentive to signal to market through their strategic actions. We also find statistically and economically significant supportive evidence that firms selling stocks in multiple capital markets have a higher propensity to diversify internationally.

INSTITUTIONAL BACKGROUND, THEORY, AND HYPOTHESES

Institutional background of global equity offerings

Global IPOs involve a simultaneous issuance of shares at the same offer price in the United States capital market and one or more international capital markets. After registering with the Securities and Exchange Commission (SEC), the issuer prepares offering prospectuses with identical information for both foreign and domestic investors. Two separate syndicates of underwriters are employed; one underwrites a global tranche and one underwrites a domestic tranche. Senior managers and underwriters conduct a road show to introduce the issuer to potential investors and collect information about market demand of the new equity shares. It is not necessary for global offerings to cross-list shares on foreign exchanges, but when cross-listing does occur, foreign financial institutions register themselves as shareholders and then convert the registered stocks to depositary receipts (DRs). These DRs trade either on local stock exchanges or over the counter (Wu and Kwok, 2003).

Global offering, corporate valuation, and subsequent internationalization

The international business environment has changed dramatically during the past two decades, and international diversification has become an increasingly important strategic option available to firms seeking sustained competitive advantage. Traditional theories (Chandler, 1986; Stopford and Wells, 1972) are mostly based on large, mature firms and may not apply to the internationalization of our focus sample—small to medium-size entrepreneurial firms (SMEs). Given that they often lack certain managerial and financial resources, entrepreneurial firms typically conduct little international business. Recent theoretical development and empirical evidence suggest that for SMEs, internationalization can facilitate the acquisition of knowledge about foreign markets (Coviello and Munro, 1997), help a company gain access to and build value-creating resources (Oviatt and McDougall, 1994), and reduce uncertainty by exploiting and exploring existing and new knowledge (De Clercq, Sapienza, and Crijns, 2005).

Although globalization and rapid developments in information and transportation technology help entrepreneurial firms step over barriers, SMEs need to possess unique assets to achieve sustainable competitive advantage (Barney, 1991). Moreover, to create wealth, SMEs need to aggressively integrate entrepreneurship and strategic management (Hitt *et al.*, 2001). Hence, integrating research from multiple disciplines becomes necessary and important to shed further light on the complicated strategic process of international diversification of entrepreneurial firms (Hitt, Uhlenbruch, and Shimizu, 2006).

Though strategy literature almost exclusively focuses on the operational dimension of diversification, it practically ignores a crucial financial dimension (Hassel *et al.*, 2003). The financial dimension of internationalization emphasizes foreign ownership and international corporate governance (e.g., global equity offerings).¹ In this study, we propose a theoretical framework integrating real option theory and signaling theory, and posit that SMEs can use global equity offerings to facilitate their internationalization in order to gain strategic advantage, signal firm quality, and enhance firm valuation.

Strategic decisions usually involve choices regarding the investment of organizational resources (Schendel and Patton, 1978) given uncertainty about future outcomes (Bettis, 1982). Real option theory naturally extends to strategic management to provide an economic logic for the behavioral process of managerial decisions (Tong, Reuer, and Peng, 2008). Global equity offerings could be a deliberate strategy to create valuable, real options for issuing firms to exercise later. Inducing foreign ownership (Kronborg and Thomsen, 2009) is an effective way to seek intangible resources from a host country (Nachum and Zaheer, 2005). The resulting configurations of initial resources generate new options for future implementation (Bowman and Hurry, 1993). To be specific, global equity offerings allow issuers to test the market and gain access to a wide array of intangible strategic assets such as familiarity with foreign markets, institutions, potential investors, customers, and suppliers. Sequential strikes on the options chain produce other interrelated strategies (Bowman and Hurry, 1993). In other words, the

initial financial strategy of offering new equity in global capital markets actually links to a subsequent operational strategy.

Not all issuers choose global equity offerings and signaling theory can shed further light on the rationale behind such decisions (Francis *et al.*, 2010). Signaling theory is based on the need to resolve information asymmetry in decision making (Spence, 1974). This is particularly relevant to young and small entrepreneurial firms (Gulati and Higgins, 2003) lacking established public records. When such records are not present, investors tend to seek other reference points. In many cases, managers need to undertake certain activities to alleviate uncertainty, make potential investors aware of their firms' potential, and convey their superior and private information to the market.

Global equity offerings can signal high-quality issues and alleviate subjective uncertainty about the viability and future capabilities of the firm (Zimmerman, 2008). First, investors often view an investment bank's willingness to underwrite global equities as a certification of the issuing firms (Wu and Kwok, 2002). Second, global IPOs boost firms' visibility and name recognition. Through road shows, U.S. firms, their products, and their managements are introduced to both foreign and domestic investors. In turn, better name recognition leads to reduced information cost and lower barriers of entry into foreign markets (Chaplinsky and Ramchand, 2000). Third, global IPOs draw greater coverage from financial analysts (Wu and Kwok, 2002). This additional scrutiny reduces informational cost to foreign investors purchasing shares of U.S. firms. In addition, global issuers incur a significant amount of direct and ongoing costs, such as listing fees and promotional expenses in local and foreign markets. Global IPO firms may deliberately underprice their offerings to induce foreign investors (Welch, 1989), which significantly adds to the indirect cost of the issuance.² Therefore, global equity offerings are a very costly signal for imitators to utilize.

Building on real option theory and signaling theory, we posit that global equity offerings not only create a valuable option to facilitate subsequent international diversification but also serve

¹ Following convention, we refer to internationalization in the operational sense in the rest of this paper.

² We find this to be true in our data. Global IPO companies have a higher underpricing compared to domestic IPOs (50% vs. 34%). We also partition our sample into two subperiods: pre-bubble and bubble, and we find the pattern consistent.

as a valid signal of issuing companies' subsequent strategic action (i.e., internationalization). If capital markets recognize the information content of such a signal and factor the real option value into the pricing process, global issuers should receive pricing premiums and will be more likely to exercise the real options. Therefore, we propose two interrelated hypotheses as follows:

Hypothesis 1: Compared with firms conducting purely domestic offerings, firms choosing global equity offerings have higher valuations (as measured by Tobin's q) at the IPO stage.

Hypothesis 2: Compared with firms conducting purely domestic offerings, firms choosing global equity offerings have higher propensity to pursue operational internationalization subsequently after their IPOs.

METHODOLOGY

Sample, data collection, and time frame

We use Thomson Financial SDC Platinum (SDC) database as our primary information source on new issues made by U.S. firms. Our time frame extends from 1990 to 2003. Following conventions in IPO research, we exclude closed-end funds, rights offerings, unit offerings, and issues by financial institutions (standard industrial classification [SIC] code 6000–6999) and utility companies (SIC code 4900–4999). We further eliminate IPO companies with offering prices less than \$5. In order to reduce potential sources of noncomparability (Chaplinsky and Ramchand, 2000), we create a matching sample for global offerings in the same issuing year and industry (four-digit SIC code). It is plausible that only a few units in the nontreatment group (i.e., domestic offerings) are comparable to the treatment units (i.e., global offerings). We further use propensity-score matching method to select a subset of comparison units similar to the treatment units based on a set of observable covariates (Dehejia and Wahba, 2002; Rosenbaum and Rubin, 1983).³ The final sample comprises 778 new issues with 339 global offerings and 339 domestic offerings.

³ We thank an anonymous referee for pointing out this refined methodology. Also see the Appendix for details on the procedure of propensity-score matching method used to construct our final sample.

Measures

Dependent measures

Our intention is to examine whether global offerings are associated with higher valuations. Tobin's q is widely used as a measure of corporate valuation (Morck and Yeung, 1991) because it captures the market's perception of the current and potential profitability of a particular company (Carpenter, 2002). We measure Tobin's q for IPO firms by calculating the ratio of long-term debt plus the market value of equity (offer price multiplied by total number of shares outstanding after the IPO) to total book assets. The *international diversification* variable refers to a firm's expansion of its operations outside its home country (Ghoshal, 1987). In our probit model estimating a firm's propensity to conduct international diversification, we create a dummy variable, which takes the value 1 if a company has foreign sales/income in the year subsequent to its IPO, and 0 otherwise.

Main independent measures and control variables

Our main explanatory variable is an indicator of global equity offerings. It equals 1 if an issuing firm allocates sizable shares to be offered in the global capital markets at the IPO stage. If the issue is purely domestic, the indicator equals 0.

We include several controls in the regression analysis. We measure *firm age* as the logged number of years since the firm was founded.⁴ Other control measures include *price revision* during the book-building process, which is the percentage difference between the final offer price and the midpoint of the initial filing range. Price revision is widely used to capture the amount of information obtained during the road show, which may affect the issue's valuation. We also measure *asset tangibility* as the ratio of advertising expenses plus research and development (R&D) expenditures to total assets. Additionally, we add two dummies, *TECH* and *VCBACK*. *TECH* is a dummy variable that equals 1 if a high-tech company makes the IPO and 0 otherwise (Loughran and Ritter, 2004). *VCBACK* is a dummy variable that equals 1 if venture capital backs the issuer and 0 otherwise.

⁴ We obtained founding dates from Jay Ritter's Web site: <http://bear.cba.ufl.edu/ritter/> (11 October, 2007)

RESULTS

Summary statistics and pairwise correlations among research variables are shown in Table 1. Table 2 presents the regression results relating corporate valuation to the choice of global equity offerings. In the basic model specification shown in Column 1 of Table 2, the global offering dummy is significantly related to Tobin's *q* at the IPO stage ($p < 0.05$) with an adjusted *r*-squared of 22 percent. We enter the global offering dummy with a set of control variables in Column 2. After controlling for firm characteristics and issuing characteristics, we still find a significant relationship between

corporate valuation and a firm's choice of global offering ($p < 0.01$). For all regression models, we use robust standard errors to control for the possibility of nonspherical error variances, which are reported in parentheses. Our results in Columns 1 and 2 reveal that global equity offerings are significantly associated with higher corporate valuation.

We are also interested in the direction of self-selection when issuing companies make the strategic decisions in the IPO process. We follow the method proposed by Hamilton and Nickerson (2003) and perform a switching regression analysis. In the first step, we estimate a probit model and calculate the inverse Mills ratios to recover

Table 1. Summary statistics and correlations

	Variable	Mean	St. dev	1	2	3	4	5	6	7
1	Tobin's <i>q</i> at IPO	3.95	1.95	1						
2	Global offering dummy	0.50	0.50	0.11	1					
3	Price revision	0.12	0.29	0.26	0.03	1				
4	VCBACK	0.57	0.50	0.21	-0.05	0.21	1			
5	TECH	0.46	0.50	0.33	-0.05	0.27	0.31	1		
6	LogAge	2.29	1.02	-0.12	0.01	-0.19	-0.34	-0.26	1	
7	Internationalization dummy (<i>t</i> +1)	0.18	0.38	-0.03	0.04	-0.06	-0.16	0.01	0.22	1

Table 2. Regression relating Tobin's *q* at IPO stage to the strategy of global offerings

Independent variables	Dependent variable: Tobin's <i>Q</i> at IPO stage			
	OLS		Switching regression	
	Full sample		Global offering subsample	Domestic offering subsample
Global offering dummy	0.295** (0.146)	0.374*** (0.140)		
LogAge		0.118 (0.082)	0.025 (0.141)	0.165 (0.119)
VCBACK		0.407** (0.165)	0.641** (0.286)	0.117 (0.244)
Price revision		0.884*** (0.253)	0.653* (0.426)	0.876* (0.505)
TECH		0.772*** (0.238)	0.691* (0.426)	0.144*** (0.296)
Inverse Mills ratio			0.730* (0.465)	1.058*** (0.347)
Constant	1.628*** (0.591)	1.538*** (0.719)	2.936*** (0.617)	4.944*** (4.476)
Industry dummies (two-digit SIC)	YES	YES	YES	YES
Year dummies	YES	YES	NO	NO
Number of observations	788	777	306	302
Adjusted <i>r</i> -squared	0.222	0.265	0.297	0.324

* indicates $p < 0.10$, two-tailed.

** indicates $p < 0.05$, two-tailed.

*** indicates $p < 0.01$, two-tailed.

Table 3. Global offering and the probability of subsequent internationalization: probit model

Independent variable	Dependent variable: internationalization dummy					
	Full sample				Subsample without prior internationalization experience	
	Coefficients	Marginal effect	Coefficients	Marginal effect	Coefficients	Marginal effect
Global offering dummy	0.307**	0.092**	0.317**	0.092**	0.352*	0.065*
	(0.146)		(0.151)		(0.199)	
Assets intangibility	−0.490	−0.147	−0.656	−0.190	−0.61	−0.112
	(0.578)		(0.629)		−0.705	
ROA (t+1)	0.615	0.184	0.426	0.123	0.612*	0.112*
	(0.455)		(0.462)		(0.339)	
LogAge	0.297***	0.089***	0.258***	0.075***	0.193**	0.035**
	(0.081)		(0.082)		(0.099)	
Foreign manager dummy	−0.063	−0.019	0.058	0.016	−0.210	−0.038
	(0.242)		(0.254)		(0.284)	
Prior internationalization experience			0.805***	0.239***		
			(0.158)			
Constant	5.251***		5.623***		0.184	
	(0.993)		(0.914)		(1.147)	
Industry dummies (two-digit SIC)	YES	YES	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES	YES	YES
Number of observations	512		512		390	
McFadden's pseudo r-squared	0.221		0.263		0.178	

* indicates $p < 0.10$, two-tailed.** indicates $p < 0.05$, two-tailed.*** indicates $p < 0.01$, two-tailed.

the structure of the error variances. We then estimate performance equations for two subsamples by plugging in the appropriate inverse Mills ratios to correct for the self-selection bias. The coefficients of the inverse Mills ratios contain important information about the motives for IPO firms to choose one strategy over the alternative. We report our results in Columns 3 and 4 of Table 2. The coefficients of inverse Mills ratios are significant in both regressions, and the signs indicate that both groups of IPO companies *positively self-select* into their current strategies. In other words, had they chosen the other issuing method, the issuing companies should have experienced worse performance.⁵ This

evidence adds strong support to Hypothesis 1, and indicates that firms with private information will have incentive to signal to the market through their strategic actions.

The results also support Hypothesis 2, which states that issuers conducting global equity offerings have higher propensity to pursue internationalization after their IPOs. We use a probit model to test our hypothesis. The dependent variable is a dummy capturing international diversification of issuing companies subsequent to their IPOs as defined previously. In Column 1 of Table 3, we report regression results based on the full sample. In Column 3, we further control for issuing companies' prior internationalization experience. In both model specifications, we find global equity offering is significantly associated with higher propensity of international diversification subsequent to the

⁵ In the first-stage probit regression, we enter firm size, age, venture capitalist involvement, industrial technological attribute, prior international exposure, listing exchange, and year dummies as independent variables (McFadden's pseudo r-squared: 0.101)

new issuances ($p < 0.05$). We also report the associated marginal effect of global equity offerings in Columns 2 and 4 to ensure the coefficients are economically significant as well. For robustness check, we exclude issues that have prior foreign sales at the time of IPO and reestimate our model specification, and find consistent results (Column 5). Our findings lend strong support to Hypothesis 2 and further reinforce the results in Table 2. It appears that entrepreneurial firms with the intention to expand their business beyond the boundary of their home countries can intentionally choose to implement certain financial strategies to explore an increased opportunity set and signal to the market.⁶

CONCLUSION AND DISCUSSION

The relationship between capital markets and product markets has been underexplored. Although there is clear evidence that a firm's strategic decisions will have financial consequences (Scharfstein, 1988), it is still unclear whether a firm's financial decisions have any strategic consequences (Chevalier, 1995). Built on a theoretical framework integrating real option theory and signaling theory, this study demonstrates that firms conducting IPOs in global capital markets receive higher valuations than their domestic counterparts and that the global IPOs have higher propensity of subsequent international diversification.

We know that the motives for issuing equity in multiple markets are not purely financial (Chaplinsky and Ramchand, 2000). Our empirical investigation provides strong indication that the way a firm finances its future investments also serves as a strategic tool to increase its visibility in the global capital markets. The benefit of increased name recognition (Yang, Wansley, and Lane, 1985) and expanded network with foreign stakeholders greatly increases a firm's visibility in the global markets, and, in turn, creates a valuable real option

for future global expansion. Global equity offerings also signal confidence and serious intentions of subsequent internationalization. More important, capital markets appear to recognize this deliberate strategy and give global issuers higher valuations at the IPO stage. Issuers that place their new equity in the global capital markets are significantly more likely to expand their operations internationally.

Our study ultimately provides strong evidence that financial decisions and strategic decisions are indeed integrated, offering some new avenues for future research. In the United States, the total cross-border flows of capital between local residents and foreign countries amounts to more than \$3.5 trillion. As capital markets increasingly integrate globally, firms are also more likely to operate on a multinational scale. Although this paper focuses more on the strategic choice of selling new securities in a global setting and subsequent operations, future studies could explore other potential benefits from integrating financial and strategic decisions.

REFERENCES

- Barney J. 1991. Firm resources and sustained competitive advantage. *Journal of Management* 17(1): 99–120.
- Bayless M, Chaplinsky S. 1996. Is there a window of opportunity for seasoned equity issuance? *Journal of Finance* 51(1): 253–278.
- Bettis RA. 1982. Risk considerations in modeling corporate strategy. *Proceedings of the Annual Meeting, 1982* (42nd edn). Academy of Management: Briarcliff Manor, NY; 22–25.
- Bowman EH, Hurry D. 1993. Strategy through the option lens: an integrated view of resource investments and the incremental-choice process. *Academy of Management Review* 18(1): 760–782.
- Carpenter MA. 2002. The implications of strategy and social context for the relationship between top management team heterogeneity and firm performance. *Strategic Management Journal* 23(3): 275–284.
- Chandler AD Jr. 1986. The evolution of modern global competition. In *Competition in Global Industries*, Porter ME (ed.) Harvard Business School Press: Boston, MA; 405–448.
- Chaplinsky S, Ramchand L. 2000. The impact of global equity offerings. *Journal of Finance* 55(6): 2767–2789.
- Chevalier JA. 1995. Capital structure and product-market competition: empirical evidence from the supermarket industry. *American Economic Review* 85(3): 415–435.
- Corwin SA, Harris JH. 2001. The initial listing decisions of firms that go public. *Financial Management* 30(1): 35–55.

⁶ We also perform an additional robustness check. We focus on those IPO companies without any international exposure prior to the IPO events, and reconstruct a matching sample based on propensity-score matching method. We calculate the foreign sales to total assets ratio one year after the IPO as a measure of intensity of internationalization. Conditional on zero prior internationalization for the sample IPOs, we find that those global IPO companies tend to have higher intensity of internationalization in the post-IPO stage controlling for other variables.

- Coviello N, Munro H. 1997. Network relationships and the internationalisation process of small software firms. *International Business Review* **6**(4): 361–386.
- De Clercq D, Sapienza HJ, Crijns H. 2005. The internationalization of small and medium-sized firms: the role of organizational learning effort and entrepreneurial orientation. *Small Business Economics* **24**(4): 409–419.
- Dehejia RH, Wahba S. 2002. Propensity score-matching methods for nonexperimental causal studies. *Review of Economics and Statistics* **84**(1): 151–161.
- Francis BB, Hasan I, Lothian JM, Sun X. 2010. Signaling hypothesis revisited: evidence from foreign IPOs. *Journal of Financial and Quantitative Analysis* **45**: 81–106.
- Ghoshal S. 1987. Global strategy: an organizing framework. *Strategic Management Journal* **8**(5): 425–440.
- Gulati R, Higgins MC. 2003. Which ties matter when? The contingent effects of interorganizational partnerships on IPO success. *Strategic Management Journal* **24**(2): 127–144.
- Hamilton BH, Nickerson JA. 2003. Correcting for endogeneity in strategic management research. *Strategic Organization* **1**(1): 51–78.
- Hassel A, Hopner M, Kurdelbusch A, Rehder B, Zugehor R. 2003. Two dimensions of the internationalization of firms. *Journal of Management Studies* **40**(3): 705–723.
- Hitt MA, Ireland RD, Camp SM, Sexton DL. 2001. Strategic entrepreneurship: entrepreneurial strategies for wealth creation. *Strategic Management Journal*, June–July Special Issue **22**: 47–491.
- Hitt MA, Uhlenbruck K, Shimizu K. 2006. The importance of resources in the internationalization of professional firms: the good, the bad, and the ugly. *Academy of Management Journal* **49**(6): 1137–1157.
- Hoetker G. 2007. The use of logit and probit models in strategic management research: critical issues. *Strategic Management Journal* **28**(4): 331–343.
- Hsu DH. 2004. What do entrepreneurs pay for venture capital affiliation? *Journal of Finance* **59**(4): 1805–1844.
- Kronborg D, Thomsen S. 2009. Foreign ownership and long-term survival. *Strategic Management Journal* **30**(2): 207–219.
- Leuven E, Sianesi B. 2003. PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing. <http://ideas.repec.org/c/boc/bocode/s432001.html> (11 October 2007).
- Loughran T, Ritter J. 2004. Why has IPO underpricing changed over time? *Financial Management* **33**(3): 5–37.
- Morck R, Yeung B. 1991. Why investors value multinationality. *Journal of Business* **64**(2): 165–187.
- Nachum L, Zaheer S. 2005. The persistence of distance? The impact of technology on MNE motivations for foreign investment. *Strategic Management Journal* **26**(8): 747–767.
- Oviatt BM, McDougall PP. 1994. Toward a theory of international new ventures. *Journal of International Business Studies* **1**: 45–64.
- Rosenbaum PR, Rubin DB. 1983. The central role of the propensity score in observational studies for causal effects. *Biometrika* **70**(1): 41–55.
- Scharfstein D. 1988. Product-market competition and managerial slack. *RAND Journal of Economics* **19**(1): 147–155.
- Schendel D, Patton GR. 1978. A simultaneous equation model of corporate strategy. *Management Science* **24**(15): 1611–1621.
- Spence MA. 1974. *Market Signaling: Information Transfer in Hiring and Related Screening Processes*. Harvard University Press: Cambridge, MA.
- Stopford J, Wells L. 1972. *Managing the Multinational Enterprise*. Basic Books: New York.
- Tong TW, Reuer JJ, Peng MW. 2008. International joint ventures and the value of growth options. *Academy of Management Journal* **51**(5): 1014–1029.
- Welch I. 1989. Seasoned offerings, imitation costs, and the underpricing of initial public offerings. *Journal of Finance* **44**(2): 421–449.
- Wu C, Kwok CCY. 2002. Why do U.S. firms choose global equity offerings? *Financial Management* **31**(2): 47–65.
- Wu C, Kwok CCY. 2003. The pricing of global and domestic initial public offerings by U.S. companies. *Journal of Banking & Finance* **27**: 1167–1184.
- Yang HC, Wansley JW, Lane WR. 1985. Stock market recognition of multinationality of a firm and international events. *Journal of Business Finance and Accounting* **12**(2): 263–274.
- Zimmerman MA. 2008. The influence of top management team heterogeneity on the capital raised through an initial public offering. *Entrepreneurship Theory and Practice* **32**(3): 391–414.

APPENDIX A

In observational studies, it can be problematic to make causal inference by simply comparing a treatment group (e.g., global IPOs) with a non-experimental comparison group (e.g., domestic IPOs) because of issues such as self-selection bias. Propensity score-matching method is especially useful to pair treatment and nontreatment groups on a set of observable characteristics to remove relevant differences. As shown by Dehejia and Wahba (2002), propensity score-matching method provides a natural weighting scheme that yields unbiased estimates of the treating impact.

We start with a matching sample ('initial sample' hereafter) of global IPOs and domestic IPOs based on issuing year and industry (four-digit SIC) which comprises 2,235 new issues with 389 global offerings and 1,846 domestic offerings. We then employ Stata code 'PSMATCH 2' (Leuven and Sianesi, 2003) to adjust for pretreatment observable differences and perform a one-to-one match to construct our final sample. The propensity score, the conditional treatment probability of conducting a global offering, is estimated by the program using a probit model on a multidimensional set of pretreatment characteristics. Building on existing theories and empirical evidence, we include offering size, company age, venture capital involvement, an indicator of listing exchanges (New York Stock Exchange (NYSE)=1 and 0 otherwise), technology attribute of affiliated industries and prior internationalization experience to calculate the propensity score for each IPO company in the initial sample. For example, firms with large offer size may choose global offerings to reduce the price pressure effect (Chaplinsky and Ramchand, 2000). Venture capitalists may use their existing network to introduce IPO firms to international investors (Hsu, 2004). Firms listed in prestigious exchange (i.e., NYSE) will benefit from the certification effect and are more likely to place their shares to international investors (Corwin and Harris, 2001). Firms with prior internationalization experience are more likely to choose global offerings to enhance the 'name recognitions' effect (Wu and Kwok, 2002).

The first-stage probit model result is reported in Table 4. We find that large offer size, venture capital involvement, NYSE listing, and prior internationalization experience are significantly associated with the likelihood of global equity offerings. The model has a log-likelihood of -755.84

Table 4. Propensity score-matching: first stage probit model

Offer size	LogAge	VCBACK	TECH	NYSE	Assets intangibility	Prior internationalization experience	Constant	Obs	Log- likelihood	Chi- square	McFadden's pseudo R-squared
0.821*** (0.056)	-0.014 (0.039)	0.352*** (0.083)	0.088 (0.080)	0.346*** (0.114)	0.250 (0.244)	0.462*** (0.077)	-16.054*** (0.962)	2,235	-755.84	554.57***	0.2684

* indicates $p < 0.10$, two-tailed.

** indicates $p < 0.05$, two-tailed.

*** indicates $p < 0.01$, two-tailed.

($p < 0.01$) and a McFadden's pseudo r-squared of 0.2684. Moreover, the model has a fraction of 87.30 percent correctly predicted, which is a 29 percent improvement over blind guess (Hoetker, 2007) given that 82 percent of IPO companies in our initial sample choose domestic offerings. The above test statistics indicate the appropriateness of the choice of independent variables and the overall fit of our model. At the second stage, according to the calculated propensity score, we find the closest

match for each of our global offering companies and construct the control group. Our final sample includes 778 new issues with 339 global offerings and 339 domestic offerings.⁷

⁷In order to check robustness of our findings, we also try several other model specifications at the first stage of matching procedure. However, different models do not change our result in a material way.