

## International Evidence on the Size Effect

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The existence of a size effect, the tendency of small capitalization stocks to outperform large capitalization stocks, has been well documented in the United States (e.g., Banz 1981, Fama and French 1992 and 1993). The goal of this overview is to summarize the international evidence.<sup>1</sup>

There are numerous studies on the existence of a size effect in developed markets. A strong negative relation between average stock returns and firm size has been found in the United Kingdom (Corhay et al. 1988), Ireland (Coghlan 1988), Spain (Rubio 1988), Belgium (Hawawini et al. 1989), Japan (Hawawini 1991, Chan et al. 1991), Switzerland (Corniolay and Pasquier 1991), Germany and Sweden (Heston et al. 1995), and Greece (Leledakis et al. 2003). For France and Canada, earlier research (Hawawini and Viallet 1987, Calvet and Lefoll 1989) does not find a reliable size effect, whereas later research (Heston et al. 1995, Elfakhani et al. 1998) does.

There is also ample evidence that the size premium is positive for most developed markets (see Exhibit 1). Size premium is the difference in average returns between small and large stocks. Positive size premiums have been documented in Australia (Brown et al. 1983); Canada (Berges et al. 1984); Japan (Ziemba 1991); Ireland (Coghlan 1988); Spain (Rubio 1988); New Zealand (Gillan 1990); Singapore (Wong et al. 1990); France (Louvet et al. 1991); Switzerland (Corniolay and Pasquier 1991);

<sup>1</sup> Most of the literature published prior to 1996 is reviewed by Hawawini and Keim (2000).

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Germany (Stehle 1992); the United Kingdom (Strong and Xu 1997); Austria, Norway, the Netherlands, and Denmark (Heston et al. 1999); and Greece (Rouwenhorst 1999).

A negative size premium has been found in Italy (Heston et al. 1999) and Portugal (Rouwenhorst 1999). For Belgium, Hawawini et al. (1989) estimate a positive premium, whereas Heston et al. (1999) report a negative one. Heston et al. also look at an international sample of twelve European countries from 1978 to 1995 and find that the size premium for Europe is 29 basis points monthly, or 3.48% annualized (with a t-statistic of 3.67). Bauman et al. (1998) examine developed markets not only in Europe but around the globe. They report that the difference in average annual returns between the smallest-cap and largest-cap quartiles of non-US developed markets is 11.2% for 1986-1996. In addition, Liew and Vassalou's study (2000) confirms the existence of a size effect in developed markets when controlling for book-to-market and momentum effects.

The tendency of small stocks to have higher average returns than large stocks has also been documented in emerging markets. Herrera and Lockwood (1994) find that firm size is inversely related to average returns in Mexico for the 1987-1992 period. Chui and Wei (1998) report an inverse relation between stock returns and size in Hong Kong, Korea, Malaysia, Thailand, and Taiwan. The relation is reliable in all Pacific Basin markets except Taiwan.

Rouwenhorst (1999) examines the size effect for twenty emerging markets in Latin America, Europe, Africa, the Middle East, and Asia from as early as January 1982 to April 1997. Even though the size premium is not statistically reliable for many individual markets (probably due to short sample periods and high return volatility), an international portfolio of small stocks has outperformed an international portfolio of large stocks by an average of 69 basis points per month, or 8.28 percentage points annualized (with a t-statistic of 3.09). Adjusting for the book-to-market effect, Drew and Veeraraghavan (2001) provide evidence of a size premium in Korea, Hong Kong, Malaysia, and the Philippines. Using the same methodology, Drew et al. (2003) find a strong size premium in China. From 1994 to 2001, small companies outperformed large companies on the Shanghai stock exchange by an average of 93 basis points monthly, or 11.12 percentage points annualized (t-statistic = 2.38). For further information on the size premiums documented in emerging markets, see Exhibit 2.

To summarize, there is ample academic evidence that small stocks tend to have higher expected returns than large stocks not just in the United States but also in developed and emerging markets. Hence, the size effect is a reliable global phenomenon.

**Exhibit 1: The Size Premium in Developed Markets**

Country	Study	Period	Annualized Premium (%) <sup>1,2</sup>	Data Source	Coverage	Simple Definition	More Complicated Definition
Australia	Liew and Vassalou (2000)	1985-1996	5.88 (1.06)	Datastream	Large and small cap stocks		Three sequential sorts (book-to-market, size, and momentum) are used to form twenty-seven portfolios. Each sort splits stocks into thirds. Portfolios are rebalanced annually, semiannually, and quarterly. I report returns from annual rebalancing. SmB is the average return on nine small value-weighted portfolios minus the average return on nine large value-weighted portfolios. Size premium is the time series average of SmB.
Austria	Heston et al. (1999)	1978-1995	5.76 (2.23)	MSCI and small cap dataset	Top 60-90% of country's market capitalization	EW top 50% vs. EW bottom 50%	The securities in each country are sorted into two size groups (Small and Big). Stocks with market equity above the median are assigned to Big; stocks below the median are assigned to Small. SmB is the return on the small equally weighted portfolio minus the return on the big equally weighted portfolio. Size premium is the time series average of SmB.
Belgium	Heston et al. (1999)	1978-1995	-1.20 (-0.69)	MSCI and small cap dataset	Top 60-90% of country's market capitalization	EW top 50% vs. EW bottom 50%	Same as Austria
Canada	L'Her et al. (2003)	1960-2001	5.04 (2.96)	TSE-Western tape, Research Insight, Financial Post Database	About top 70% of country's market capitalization		Each June stocks are sorted into two size groups based on the median market equity. Independently, stocks are sorted into three book-to-market groups based on the 30th and 70th book-to-market percentiles. From the intersection of the two size groups and the three book-to-market groups, six value-weighted portfolios are formed. SmB is the difference between the average return on the three small portfolios and the average return on the three big portfolios. Size premium is the time series average of SmB.
Denmark	Heston et al. (1999)	1978-1995	3.48 (1.15)	MSCI and small cap dataset	Top 60-90% of country's market capitalization	EW top 50% vs. EW bottom 50%	Same as Austria

**Exhibit 1: The Size Premium in Developed Markets (continued)**

Country	Study	Period	Annualized Premium (%) <sup>1,2</sup>	Data Source	Coverage	Simple Definition	More Complicated Definition
France	Heston et al. (1999)	1978-1995	3.12 (1.73)	MSCI and small cap dataset	Top 60-90% of country's market capitalization	EW top 50% vs. EW bottom 50%	Same as Austria
Germany	Heston et al. (1999)	1978-1995	1.32 (0.97)	MSCI and small cap dataset	Top 60-90% of country's market capitalization	EW top 50% vs. EW bottom 50%	Same as Austria
Greece	Rouwenhorst (1999)	1982-1997	0.48 (0.07)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Each month stocks are ranked by country into three groups based on their market equity in US dollars: Big (top 30%), Medium (middle 40%) and Small (bottom 30%). Smb is the difference in returns between the equally weighted portfolios of small and big stocks. Size premium is the time series average of Smb.
Ireland <sup>3</sup>	Coghlan (1988)	1977-1986	5.64	N/A	N/A	N/A	N/A
Italy	Heston et al. (1999)	1978-1995	-0.24 (-0.11)	MSCI and small cap dataset	Top 60-90% of country's market capitalization	EW top 50% vs. EW bottom 50%	Same as Austria
Japan	Hawawini and Keim (2000)	1975-1994	4.20 (1.32)	MSCI	Top 85% of country's market capitalization	EW top 25% vs. EW bottom 25%	Each December stocks are sorted into size quartiles based on their market equity. The portfolios are equally weighted. Smb is the difference between the return on the smallest quartile and the return on the largest quartile. Size premium is the time series average of Smb.

**Exhibit 1: The Size Premium in Developed Markets (continued)**

Country	Study	Period	Annualized Premium (%) <sup>1,2</sup>	Data Source	Coverage	Simple Definition	More Complicated Definition
Netherlands	Heston et al. (1999)	1978-1995	3.48 (1.56)	MSCI and small cap dataset	Top 60-90% of country's market	EW top 50% vs. EW bottom 50%	Same as Austria
New Zealand <sup>3</sup>	Gillan (1990)	1977-1984	6.12	N/A	N/A		N/A
Norway	Heston et al. (1999)	1978-1995	5.64 (1.51)	MSCI and small cap dataset	Top 60-90% of country's market capitalization	EW top 50% vs. EW bottom 50%	Same as Austria
Portugal	Rouwenhorst (1999)	1989-1997	-8.88 (-1.44)	Emerging Markets Data Base	Top 70-80% of country's market capitalization		Same as Greece
Singapore	Wong et al. (1990)	1975-1985	4.92	Stock Exchange Singapore Companies' Handbook and Journal	N/A	EW top 33% vs. EW bottom 33%	Stocks are sorted into three groups (small, medium, and large) based on their market value. Portfolios are rebalanced annually and are equally weighted. Smb is the difference between the return on the small portfolio and the return on the large portfolio. Size premium is the time series average of Smb.
Spain	Heston et al. (1999)	1978-1995	9.00 (2.41)	MSCI and small cap dataset	Top 60-90% of country's market capitalization	EW top 50% vs. EW bottom 50%	Same as Austria
Sweden	Heston et al. (1999)	1978-1995	4.08 (1.44)	MSCI and small cap dataset	Top 60-90% of country's market capitalization	EW top 50% vs. EW bottom 50%	Same as Austria

## Exhibit 1: The Size Premium in Developed Markets (continued)

Country	Study	Period	Annualized Premium (%) <sup>1,2</sup>	Data Source	Coverage	Simple Definition	More Complicated Definition
Switzerland	Heston et al. (1999)	1978-1995	1.68 (0.96)	MSCI and small cap dataset	Top 60-90% of country's market capitalization	EW top 50% vs. EW bottom 50%	Same as Austria
United Kingdom	Dimson et al. (2003)	1955-2001	1.80 (0.91)	London Share Price Database, Datastream, Cambridge/DTI, official stock exchange yearbooks.	1955-1975: One third of all listed stocks on the LSE (but sample is fully representative), 1976-2001: all listed stocks on LSE.		Each June stocks are sorted into two size groups based on the 70th percentile of ranked market equity. Independently, stocks are sorted into three book-to-market groups based on the 40th and 60th book-to-market percentiles. From the intersection of the two size groups and the three book-to-market percentiles, six value-weighted portfolios are formed. Smb is the difference between the average return on the three small portfolios and the average return on the three big portfolios. Size premium is the time series average of Smb.
Europe	Heston et al. (1999)	1978-1995	3.48 (3.67)	MSCI and small cap dataset	Top 60-90% of country's market capitalization	EW top 50% vs. EW bottom 50%	The securities in each of twelve European countries (Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom) are sorted into two size groups (Small and Big). Stocks with market equity above the median are assigned to an equally weighted international portfolio B (big), stocks below the median to an equally weighted international portfolio S (small). Smb is the return on S minus the return on B. Size premium is the time series average of Smb.
Developed	Bauman et al. (1998)	1986-1996	11.20	Compustat Global Vantage	N/A	EW top 25% vs. EW bottom 25%	Stocks from Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Italy, Japan, Malaysia, the Netherlands, Norway, Singapore, Spain, Sweden, Switzerland, and the United Kingdom are assigned to quartiles based on size. Smb is defined as the spread in average annual returns between the smallest cap quartile and the largest cap quartile. Size premium is the time series average of Smb.

<sup>1</sup> T-statistics in parentheses.

<sup>2</sup> The size premium in Bauman et al. (1998) is annual, not annualized.

<sup>3</sup> Information from Hawawini and Keim (2000).

**Exhibit 2: The Size Premium in Emerging Markets**

Country	Study	Period	Annualized Premium (%) <sup>1</sup>	Data Source	Coverage	Simple Definition	More Complicated Definition
Argentina	Rouwenhorst (1999)	1982-1997	46.08 (2.40)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Each month stocks are ranked by country into three groups based on their market value of equity in US dollars: Big (top 30%), Medium (middle 40%), and Small (bottom 30%). Smb is the difference in returns between the equally weighted portfolios of small and big stocks. Size premium is the time series average of Smb.
Brazil	Rouwenhorst (1999)	1982-1997	15.84 (1.32)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Chile	Rouwenhorst (1999)	1982-1997	3.72 (0.56)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
China	Drew et al. (2003)	1994-2001	11.12 (2.38)	Great China Database	100% of the stocks on the Shanghai Stock Exchange (about 60% of China's total market capitalization)		At the end of each year stocks are assigned to two size groups based on whether their market equity is above or below the median. Independently, stocks are assigned to three book-to-market groups based on the breakpoints for the bottom 33.33% and top 66.67%. From the intersection of the two size groups and the three book-to-market groups, six portfolios are formed. Smb is the difference between the average return on the three small portfolios and the average return on the three large portfolios. Size premium is the time series mean of Smb.
Colombia	Rouwenhorst (1999)	1986-1997	-8.16 (-0.80)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Indonesia	Rouwenhorst (1999)	1990-1997	-5.52 (-0.77)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina

**Exhibit 2: The Size Premium in Emerging Markets (continued)**

Country	Study	Period	Annualized Premium (%) <sup>1</sup>	Data Source	Coverage	Simple Definition	More Complicated Definition
India	Rouwenhorst (1999)	1982-1997	-4.20 (-0.85)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Jordan	Rouwenhorst (1999)	1982-1997	-4.08 (-0.88)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Korea	Rouwenhorst (1999)	1982-1997	3.84 (0.58)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Malaysia	Rouwenhorst (1999)	1986-1997	5.16 (0.64)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Mexico	Rouwenhorst (1999)	1982-1997	28.68 (2.59)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Nigeria	Rouwenhorst (1999)	1986-1997	-7.08 (-0.61)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Pakistan	Rouwenhorst (1999)	1986-1997	-5.04 (-0.78)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Philippines	Rouwenhorst (1999)	1986-1997	2.76 (0.27)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Taiwan	Rouwenhorst (1999)	1986-1997	8.16 (0.85)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina

Exhibit 2: The Size Premium in Emerging Markets (continued)

Country	Study	Period	Annualized Premium (%) <sup>1</sup>	Data Source	Coverage	Simple Definition	More Complicated Definition
Taiwan	Rouwenhorst (1999)	1986-1997	8.16 (0.85)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Thailand	Rouwenhorst (1999)	1982-1997	-16.68 (-2.43)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Turkey	Rouwenhorst (1999)	1989-1997	8.64 (0.63)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Venezuela	Rouwenhorst (1999)	1986-1997	16.44 (1.49)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Zimbabwe	Rouwenhorst (1999)	1982-1997	22.20 (1.97)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina
Emerging	Rouwenhorst (1999)	1982-1997	8.28 (3.09)	Emerging Markets Data Base	Top 70-80% of country's market capitalization	EW top 30% vs. EW bottom 30%	Same as Argentina

Each month stocks from Argentina, Brazil, Chile, Colombia, Greece, Indonesia, India, Jordan, Korea, Malaysia, Mexico, Nigeria, Pakistan, the Philippines, Portugal, Taiwan, Thailand, Turkey, Venezuela, and Zimbabwe are ranked by country into three groups based on their market value of equity in US dollars: Big (top 30%), Medium (middle 40%), and Small (bottom 30%). Smb is the difference in returns between the equally weighted portfolio of small stocks and the equally weighted portfolio of large stocks in all twenty markets. Size premium is the time series average of Smb.

<sup>1</sup> T-statistics in parentheses.

## References

- Banz, Rolf W. 1981. The relationship between return and market value of common stocks. *Journal of Financial Economics* 9(1):3-18.
- Bauman, W. Scott, C. Mitchell Conover, and Robert E. Miller. 1998. Growth versus value and large-cap versus small-cap stocks in international markets. *Financial Analysts Journal* 54(2):75-89.
- Berges, Angel, John J. McConnell, and Gary G. Schlarbaum. 1984. The turn-of-the-year in Canada. *Journal of Finance* 39(1):185-92.
- Brown, Philip, Donald B. Keim, Allan W. Kleidon, and Terry A. Marsh. 1983. Stock return seasonality and the tax-loss selling hypothesis: Analysis of the arguments and Australian evidence. *Journal of Financial Economics* 12:105-27.
- Calvet, A., and J. Lefoll. 1989. Risk and return on Canadian capital markets: Seasonality and size effect. *Finance (Journal of the French Finance Association)* 10:21-39.
- Chan, Louis K. C., Yasushi Hamao, and Josef Lakonishok. 1991. Fundamentals and stock returns in Japan. *Journal of Finance* 46(5):1739-64.
- Chui, Andy C.W., and K.C. John Wei. 1998. Book-to-market, firm size, and the turn-of-the-year effect: Evidence from Pacific-Basin emerging markets, *Pacific-Basin Finance Journal* 6(3-4):275-93.
- Coghlan, H. 1988. Small firms versus large on the Irish stock exchange: An analysis of the performances. *Irish Business and Administrative Research* 9:10-20.
- Corhay, Albert, Gabriel Hawawini, and Pierre Michel. 1988. The pricing of equity on the London stock exchange: Seasonality and size premium. In *Stock market anomalies*, ed. E. Dimson. Cambridge: Cambridge University Press.
- Corniolay, C., and J. Pasquier. 1991. CAPM, risk premium seasonality and the size anomaly: The Swiss case. *Finance (Journal of the French Finance Association)* 12:23-44.
- Dimson, Elroy, Stefan Nagel, and Garrett Quigley. 2003. Capturing the value premium in the United Kingdom. *Financial Analysts Journal* 59(6):35-45.
- Drew, Michael, and Madhu Veeraraghavan. 2001. Explaining the cross-section of stock returns in the Asian region. *International Quarterly Journal of Finance* 1:205-21.
- Drew, Michael, Tony Naughton, and Madhu Veeraraghavan. 2003. Firm size, book-to-market equity and security returns: Evidence from the Shanghai stock exchange. *Australian Journal of Management* 28(2):119-39.
- Elfakhani, Said, Larry J. Lockwood, and Tarek S. Zaher. 1998. Small firm and value effects in the Canadian stock market. *The Journal of Financial Research* 21(3):277-91.
- Fama, Eugene F., and Kenneth R. French. 1992. The cross-section of expected stock returns. *Journal of Finance* 47(2):427-65.

- . 1993. Common risk factors in stock and bond returns. *Journal of Financial Economics* 33:3-56.
- Gillan, Stuart. 1990. An investigation into CAPM anomalies in New Zealand: The small firm effect and price-earnings ratio effects. *Asia Pacific Journal of Management* 7:63-78.
- Hawawini, Gabriel. 1991. Stock market anomalies and the pricing of equity on the Tokyo stock exchange. In *Japanese Financial Market Research*, ed. W. Ziemba, W. Bailey, and Y. Hamao. Amsterdam: North Holland.
- Hawawini, Gabriel, and Claude Viallet. 1987. Seasonality, size premium and the relationship between the risk and return of French common stocks. Working paper, INSEAD, Fontainebleau, France.
- Hawawini, Gabriel, Pierre Michel, and Albert Corhay. 1989. A look at the validity of the Capital Asset Pricing Model in light of equity market anomalies: The case of Belgian common stocks. In *A reappraisal of the efficiency of financial markets*, ed. R.C. Guimaraez, B.G. Kingsman, and S. Taylor. Springer-Verlag, NATO ASI Series.
- Hawawini, Gabriel, and Donald Keim. 2000. The cross section of common stock returns: a review of the evidence and some new findings. In *Security market imperfections in world wide equity markets*, ed. D. Keim and W. Ziemba. Cambridge: Cambridge University Press.
- Herrera, Martin J., and Larry J. Lockwood. 1994. The size effect in the Mexican stock market. *Journal of Banking and Finance* 18(4):621-32.
- Heston, Steven L., K. Geert Rouwenhorst, and Roberto E. Wessels. 1995. The structure of international stock returns and the integration of capital markets. *Journal of Empirical Finance* 2:173-97.
- . 1999. The role of beta and size in the cross-section of European stock returns. *European Financial Management* 5(1):9-27.
- Leledakis, George, Ian Davidson, and George Karathanassis. 2003. Cross-sectional estimation of stock returns in small markets: The case of the Athens Stock Exchange. *Applied Financial Economics* 13(6):413-26.
- Liew, Jimmy, and Maria Vassalou. 2000. Can book-to-market, size and momentum be risk factors that predict economic growth? *Journal of Financial Economics* 57:221-45.
- L'Her, Jean-Francois, Tarek Masmoudi, and Jean-Marc Suret. 2004. Evidence to support the four-factor model from the Canadian stock market. *Journal of International Financial Markets, Institutions and Money* 14(4):313-28.
- Louvet, P., and O. Taramasco. 1991. L'effet jour-de-la-semaine à la Bourse de Paris: Un effet transactionnel. *Journal de la Société Statistique de Paris* 133(2):50-76.
- Rouwenhorst, K. Geert. 1999. Local return factors and turnover in emerging stock markets. *Journal of Finance* 54(4):1439-64.
- Rubio, Gonzalo. 1988. Further international evidence on asset pricing: The case of the Spanish capital market. *Journal of Banking and Finance* 12:221-42.

- Stehle, Richard. 1992. The size effect in the German stock market. Unpublished manuscript, University of Augsburg.
- Strong, N., and X. Xu. 1997. Explaining the cross-section of UK expected returns. *British Accounting Review* 29(1):1-23.
- Wong, Kie Ann, and Meng Siong Lye. 1990. Market values, earnings' yields and stock returns. *Journal of Banking and Finance* 14(2-3):311-26.
- Ziemba, William. 1991. Japanese security market regularities: Monthly, turn-of-the-month and year, holiday and golden week effect. *Japan and the World Economy* 3(2):119-46.