



Explaining the size of the mutual fund industry around the world[☆]

Ajay Khorana^a, Henri Servaes^{b,c}, Peter Tufano^{d,e,*}

^a*College of Management, Georgia Institute of Technology, 800 West Peachtree Street NW,
Atlanta, GA 30332-0520, USA*

^b*London Business School, Regent's Park, Sussex Place, London NW1 4SA, UK*

^c*CEPR, 90-98 Goswell Road, London EC1V 7RR, UK*

^d*Harvard Business School, Soldiers Field, Boston, MA 02163, USA*

^e*NBER, Cambridge, MA 02138, USA*

Received 15 January 2004; received in revised form 2 July 2004; accepted 9 August 2004

Available online 23 May 2005

[☆] A previous version of this paper was entitled “The World of Mutual Funds.” We would like to thank an anonymous referee, Viral Acharya, Christa Bouwman, Marc Buffenoir (Morningstar) Sally Buxton (Cadogan Financial), Kurt Cerulli (Cerulli Associates), Elizabeth Corley (Merrill Lynch Investment Managers), Neil Fotherly (KPMG), Sylvester Flood (Morningstar), Julian Franks, David Gallagher, Michele Gambera (Morningstar), Francisco Gomes, Steven Kaplan, Diana Mackay (FERI Fund Market Information), Hamid Mehran, Wolfgang Mansfeld (Union Asset Management and FEFSI), Ben Phillips (Cerulli Associates), Stefan Rünzi, Michael Schill, Bill Schwert, Mark St. Giles (Cadogan Financial), Wanda Wallace, Rodney Williams (FERI Fund Market Information), and seminar participants at City University (London), College of William and Mary, HBS European Research Colloquium, London Business School, University of Gothenburg, Washington University, the 2003 European Finance Association Conference, the 2004 Financial Intermediation Research Society (Banking, Insurance, and Intermediation) Conference, the 2004 FMA European Conference, and the 2005 AFA Conference for their useful comments and suggestions, Katie Boggs, Stefano Rossi, Daniel Schneider, and Lei Wedge for valuable research assistance, and Michèle Chavoix-Mannato of the OECD for providing us with data. Financial support for this project was provided by the Division of Research of the Harvard Business School, the Research and Material Development Fund of London Business School, and the Wachovia Professor's Fund of Georgia Tech. Any opinions expressed are those of the authors and not those of any of the organizations which supported or provided information to this study.

*Corresponding author. Tel.: +1 617 495 6855; fax: +1 617 496 8443.

E-mail address: ptufano@hbs.edu (P. Tufano).

Abstract

This paper studies the mutual fund industry in 56 countries and examines where this financial innovation has flourished. The fund industry is larger in countries with stronger rules, laws, and regulations, and specifically where mutual fund investors' rights are better protected. The industry is also larger in countries with wealthier and more educated populations, where the industry is older, trading costs are lower and in which defined contribution pension plans are more prevalent. The industry is smaller in countries where barriers to entry are higher. These results indicate that laws and regulations, supply-side and demand-side factors simultaneously affect the size of the fund industry.

© 2005 Elsevier B.V. All rights reserved.

JEL classification: G23; G15; G18

Keywords: Mutual fund industry; Financial development; Law and economics; UCITs

1. Introduction

Over the past few decades, the mutual fund industry, both in the U.S. and elsewhere, has exploded. While the global fund industry has flourished, academic studies of mutual funds have remained geographically narrow. Almost all of the research has focused on the U.S., with the exception of a few insightful studies of national fund markets.¹ Even those who study the fund industry are generally unaware that U.S.-domiciled funds accounted for only 15% of the number of funds available globally and 60% of the world's fund assets in 2000 (see [Investment Company Institute, 2001](#)). Nor are they aware that the nation which is home to the second-largest fund industry (measured by fund assets) is Luxembourg, with 6.5% of world mutual fund assets—part of the large and growing so-called “offshore” market, or that France and Korea offer the second-largest number of mutual funds available worldwide (13% of the world total for each country).

The mutual fund industry is among the most successful financial innovations. In aggregate, as of 2001, mutual funds held assets worth \$11.7 trillion or 17% of our estimate of the “primary securities” in their national markets. There is a recognizable mutual fund “style” of intermediation in most countries, characterized by a transparent investment vehicle whose underlying assets are identifiable, with the value of the fund marked-to-market on a regular (usually daily) basis and reflected in the Net Asset Value of the fund, and with new shares created or redeemed upon demand. In contrast, in a relatively opaque financial intermediary (like a bank or insurance company), investors' claims are not contractually linked to the underlying asset, marked-to-market, or created/redeemed upon demand.

¹See, for example, Bams and Otten (2002), Blake and Timmermann (1998), Brown et al. (2001), Cai et al. (1997), Dahlquist et al. (2000), and Dermine and Röller (1992).

Open-end funds have been around and visible for quite a long time. The first open-end funds were created in the early twentieth century in America and were soon thereafter adopted in the Netherlands and the U.K.² The median national fund industry in our sample is 36 years old, but this innovation was adopted more quickly and vigorously in some countries than in others. By 2002, in some countries, the industry was a formidable force in the national economic landscape; in other countries, it was small or nonexistent. What explains the different rates of adoption of this innovation? In this paper, we study a combination of fundamental economic and regulatory forces that help explain where the open-end fund industry has flourished.

One set of hypotheses, drawn from the ample literature on law and economics, suggests that laws and regulations can explain differences in the pace of financial development. Applying this logic to the fund industry, we would expect that funds would prosper when laws and regulations make this sort of investment attractive to investors, for example by protecting investor rights. A second set of supply-side hypotheses focuses on competitive dynamics to explain different adoption rates. For example, a concentrated banking sector could plausibly encourage or discourage the formation of a strong fund industry, depending on whether banks saw the fund business as a complement or substitute to their traditional deposit-taking activities. A third set of demand-side hypotheses focuses on characteristics of the potential buyers of mutual funds in terms of, for example, their degree of wealth and education, to explain these differences. We might expect that more economically well-off and sophisticated national populations would be quicker to adopt the innovation in place of the older, more opaque methods of investing. Finally, the characteristics of the country's securities trading environment may be relevant in that the production technology available to fund promoters can influence the attractiveness of the ultimate investment vehicle. At the outset, it important to appreciate that these are not mutually exclusive classes of hypotheses—rather, all may help explain worldwide patterns in the fund industry.

Our goal is to study a broad sample of countries. We gather data for 56 nations and measure the size of each country's mutual fund industry relative to the country's assets in primary domestic securities (which includes equities, bonds, and bank loans). For completeness, we also examine the size of national fund industry assets relative to each country's GDP and population. We study the industry as a whole, and equity and bond funds separately, because certain hypotheses apply only to one of the two subsectors. We analyze the cross-sectional differences in the size of national fund industries in 2001, as well as the size and growth of national industries over the five-year window from 1996 to 2001.

²The first closed-end investment trust named *Eendragt Maakt Magt* came into existence in Holland in 1774. The *Massachusetts Investors Trust*, offered in the United States in 1924, was the first open-ended fund. The first British open-end fund structure was the *Foreign Government Bond Trust*, offered in 1934. For enlightening histories of the early global fund industry, see Merriman (1965), Day and Harris (1974), and Rouwenhorst (2003).

For the countries in our sample, the mutual fund industry holds 17% of the nations' primary financial assets, on average, with a median of 4%. This large difference between the mean and median is largely driven by two national outliers—the so-called offshore fund industries in Luxembourg and Ireland hold assets that are 484% and 82% of their country's domestic primary assets.³ The naïve inclusion of these countries in multivariate analyses can produce misleading results. However, given these are two interesting data points in our analysis, it would be inappropriate to just treat them as outliers. Hence, we analyze the drivers of the fund industry for the remainder of our countries and separately discuss the factors driving the growth of these two offshore hubs.

For “on-shore” industries, we find that laws and regulation are related to a more robust mutual fund sector, i.e., one that controls a larger fraction of the nation's primary securities. In general, countries with stronger judicial systems, and more specifically, nations with more stringent regulatory approval and disclosure requirements for funds, tend to have larger fund industries. This latter result indicates that stronger regulation that specifically protects fund investors may be beneficial to the fund industry. Furthermore, for equity funds, the enforcement of insider trading rules has an adverse effect on the size of the mutual fund industry, consistent with the view that failure to enforce these rules discourages investors from purchasing equities directly and encourages them to rely on professional intermediaries such as funds instead.

When considering supply-side factors, we study characteristics of the financial sector that would influence the speed of adoption of mutual funds. We examine the effect of bank concentration, restrictions placed on banks to enter the securities business, the number of distribution channels available for funds, the presence of an explicit deposit insurance system for banks, and the time and cost to set up a new fund. We find that nations that restrict banks from entering the securities business have smaller equity fund sectors, whereas countries with a more concentrated banking industry have smaller bond fund sectors. Nations whose barriers to entry are higher have smaller fund industries; in particular, the costs required to set up a new fund are negatively related to industry size.

When considering demand-side factors, we find that wealthier countries, as measured by GDP per capita, and countries with more educated populations have larger mutual fund industries. These effects are particularly pronounced for the equity funds, which may require a higher level of investor sophistication. Internet penetration is also positively related to the size of the mutual fund sector, but it is highly correlated with the other demand-side variables. In addition, mutual funds control more national assets in countries in which a larger fraction of pension plans are defined contribution plans. The age of the national fund industry is also positively related to its size and recent growth rate. Finally, we find that countries whose trading costs are lower have a more developed fund industry, which indicates

³The term “offshore” is loosely used in practice to describe financial centers which domicile fund complexes and sell funds in other countries. Some of these are indeed physically “off-shore” such as Bermuda, Cayman Islands, Guernsey and Jersey.

that the ability to offer liquidity at a low cost is important for the industry's growth. Overall, these results suggest that mutual funds thrive in more developed economies.

Our ability to draw sharp conclusions that distinguish among these various hypotheses is hampered by the high correlation among a number of the independent variables in our sample. For example, the correlations of GDP per capita with education level and judicial system quality are 0.63 and 0.89, respectively. Stepping back from the individual regressions, it appears that the fund industry is stronger in countries that are more economically developed (as measured by variables such as education and per capita GDP) and that have stronger legal systems. However, fund-specific investor protection plays an independent role in explaining national fund industry success.

We interviewed experts to explain the growth of Luxembourg and Ireland. Tiny Luxembourg grew to be a European mutual fund hub fueled by favorable bank secrecy and tax laws as well as its central location. Experts attribute the growth of Ireland (Dublin in particular) to its educated workforce and the tax advantage given to management companies. In particular, fund management companies set up before July 1998 pay a tax of only 10% on their income until 2005, substantially less than most other corporate tax payers, and they are allowed extra deductions for rental payments.

The remainder of this paper is organized as follows. Section 2 defines what we mean by a mutual fund in light of varying institutional arrangements used around the world. Section 3 describes the sources of our data on the world fund industry and provides a brief sketch of the industry. This descriptive part of the paper provides stylized facts about the industry. Section 4 discusses factors that might explain the differential penetration of the fund industry in different countries. Section 5 reports our findings, including a discussion of the robustness our results. Section 6 offers conclusions. Appendix A contains a description of both the variables employed and the associated data sources; Appendix B contains a list of the countries we study.

2. Mutual funds, UCITS, and collective investment schemes

In the U.S., the mutual fund industry is defined largely by regulation, and in particular by the Investment Company Act of 1940 (the '40 Act). The '40 Act, as interpreted over the years, empowers the SEC to oversee a variety of "investment companies," which include "mutual funds, closed-end funds, Unit Investment Trusts, Exchange Traded Funds, and interval funds," as well as variable insurance products, federally registered investment advisers, and public utility holding companies (SEC, Division of Investment Management Web Site, <http://www.sec.gov/divisions/investment.shtml> (June 28th, 2004)). The Act functionally defines the set of investment companies overseen by the SEC. Interestingly, the popular term "mutual fund" is neither defined nor used in the Act. While all of these investment companies are vehicles to pool savers' assets, they differ along various dimensions. American mutual funds are management companies that (1) invest in a diversified portfolios of assets, and (2) are "open-end" in that they redeem their shares at net

asset value (NAV) at any time upon shareholder request. A “management company” is a catch-all phrase used in the Act to designate all investment companies other than specifically defined ones.

In other countries, different names and definitions are used for similar businesses. The European Union, in an attempt to create a harmonized fund industry, has adopted a common definition of “Undertakings for Collective Investment in Transferable Securities,” or UCITS.⁴ Mirroring the U.S. definition of mutual funds above, UCITS are defined as undertakings that (1) are collective investments in transferable securities for the purpose of risk-sharing, and (2) are repurchased out of the assets of the fund at net asset value. Less frequently, funds are referred to as “collective investment schemes” or CIS. For example, the International Organization of Securities Commissions (IOSCO) defines a CIS as “an open end collective investment scheme that issues redeemable units and invests primarily in transferable securities or money market instruments.” (International Organization of Securities Commissions, Report on Investment Management, 1994. (Available online at <http://www.iosco.org/iosco.html>)).

Thus, mutual funds, while going by a variety of names, are fairly comparable around the globe. In this paper, we try to understand the circumstances under which the mutual fund model succeeds in attracting a large fraction of a country’s primary assets. Our analysis takes the country as the unit of observation. As is perhaps not a surprise, determining the nationality of a fund is complicated. A fund may be identified with many different countries. It may be legally domiciled (registered) in one country, invest in securities of a second country, and be sold to citizens of a third country. The first two geographical identities are fairly easy to ascertain, while in most instances, the third is not. For this paper, we identify funds’ nationalities by their legal domicile, from which follows the relevant regulation and the legal system. For countries that restrict the cross-border sales of funds, such as the U.S., this will also determine the nationality of its investors. In these instances, our country categorization also captures the nature of competition among potential rivals and savings patterns of potential investors. At the other extreme, in the offshore market—led by Luxembourg and Ireland—there is no link between observed fund domicile and unobserved investor nationality.

3. Sample construction and primer on the world fund industry

3.1. Data

We begin our sample construction with a list of the top 75 countries in the world based on GDP at the end of 2001. This list is matched with countries identified as

⁴For the first of many directives about UCITS, see <http://www.europefesco.org/DOCUMENTS/DIRECTIVES/Dir-85-611.PDF> (June 28th, 2004). As one might imagine, there has been ongoing refinement of the notion of UCITS, including new discussions of what assets may be held and what types of investment companies can manage them.

having a fund industry in publications of either the Investment Company Institute (ICI) or the Fédération Européenne des Fonds et Sociétés d'Investissement (FEFSI). As of 2001, FEFSI was an association of the mutual fund industry of the member states of the EU, the Czech Republic, Hungary, Norway, Poland, and Switzerland. We use ICI and FEFSI data on national fund assets, where available. The asset size for the countries not listed in the ICI and FEFSI data sources is gathered through web-based sources and discussions with industry experts. We are able to obtain a sample of 56 countries with data on the relative size of the open-end fund industry, measured as a fraction of the universe of primary securities at or close to the end of 2001. This sample includes five countries with no mutual fund industry. Unless we can obtain definitive evidence for a country, we do not assume the lack of a fund industry and instead chose to classify the country as having missing data.⁵ We also collect information on the size of the industry over the prior five-year period, but note that time-series data are available for only about 40 countries. We make every attempt to identify the size of the open-end mutual fund sector in each country. Some country-specific sources do not distinguish between open- and closed-end funds, however. This is the case for Bangladesh, China, Croatia, Pakistan, Slovakia, and Slovenia. For these countries, we include the size of the entire mutual fund sector. The findings we report subsequently in the paper continue to hold if we remove these countries from our analysis.

Mutual funds hold assets that are claims against companies and governments. To determine the size of a fund industry, we compare fund assets under management with the securities the funds might choose to hold, the nation's primary securities. Funds can and do hold sovereign debt, corporate equity, private sector bonds/notes, and/or commercial loans. Our measure seeks to determine what fraction of corporate and government liabilities are held via mutual funds. Therefore, we gather data on the size of the equity, bond, and bank loan market to calculate the size of the primary securities market for each country. We recognize that funds may hold assets outside the country, but aggregate holdings data are not available to measure this cross-border investing. In Section 5.2, we report some tests on measures of domestic holdings, constructed using fund level data for a subset of countries. In a later section of the paper, we also scale fund assets by GDP and population to test the robustness of our results.

In addition, we gather data on (1) local laws, taxes, and regulation, (2) the structure of the financial sector (supply-side), (3) characteristics of the retail investing public (demand-side), and (4) the trading costs and turnover of equity markets.

⁵We have data on the size of the fund industry for 62 countries. However, because our key measure is industry size relative to primary securities, we lose six countries: Bangladesh, Costa Rica, Hungary, Morocco, Saudi Arabia, and Taiwan. For seven of the remaining 13 countries, we can determine that an industry exists, but are unable to verify its size. These are Colombia, Egypt, Iran, Nigeria, Ukraine, Venezuela, and Zimbabwe. Four countries appear to have some mutual fund regulation, but we cannot establish with certainty that funds are actually in existence. These are Jordan, Kazakhstan, Kenya, and Vietnam. In Vietnam and Kazakhstan, the regulation is recent and we do not believe they had funds at the end of 2001. While we find no evidence of a fund industry in Cuba and Guatemala, we cannot definitively rule out its existence, so we exclude both countries from our analyses.

While we attempt to gather as many proxies as possible for the country characteristics, the lack of consistency in the set of countries included in various data sources and surveys reduces the number of data points we can employ in our specifications, especially in the multivariate analyses. Appendix A lists and describes the explanatory variables employed in this study along with the source of the data. Whenever possible, we use data from international sources that are comparable across countries (e.g., World Bank, IMF, United Nations, OECD, IOSCO), but in some cases we resort to country-by-country data collection. We also exploit information from global fund experts to obtain fund-specific data, e.g., estimates of the costs to set up new funds or categorizations of the types of fund regulations by country.

In Section 4, we discuss the hypotheses and the proxies used in greater detail, but we first turn to a description of the size of the fund industry across the world.

3.2. *Description of the world fund industry*

Table 1 provides a description of the size of the mutual fund industry across the world at the end of 2001. We report results for all countries for which data are available. For the main measure employed in our analysis, the size of the industry as a fraction of all primary securities, we have data on 56 countries. Appendix B provides a list of the countries we study, the size of the industry in each country at the end of 2001, and the year in which the industry was established.

At the end of 2001, the worldwide mutual fund industry held \$11.7 trillion in assets. The countries with the largest fraction of the global industry were the U.S. (60%), Luxembourg (6.5%), France (6.1%), Italy (3.1%), and Japan (2.9%). Countries with tiny, but existent, fund industries include Bangladesh, Romania, and Sri Lanka. In addition, we identify five countries with no apparent fund sector: Algeria, Burma, Libya, United Arab Emirates, and Yugoslavia (Serbia and Montenegro).

Median assets under management (AUM) as a function of the country's GDP are 9% with a high of 3991% for Luxembourg, followed by Ireland with 186% and a low of 0.011% for Bangladesh (after excluding the countries with zero mutual fund assets). When we measure assets under management relative to the universe of primary securities, the fund industry holds 4% of all primary securities in the median country, with Luxembourg once again at the high end with 485%, followed by Ireland with 82%. Finally, average mutual fund assets per capita are \$30,870, with a median of \$510.

Given the dramatic size, by any measure, of the mutual fund industry in Luxembourg and Ireland, additional discussion is warranted to explain this phenomenon. Favorable banking and tax laws have led to a transformation of Luxembourg into a major center for offshore mutual funds. This growth was partly fueled in 1992 when the German government decided to levy a 25% withholding tax on interest on investment assets and bank deposits. This led to a movement of capital to Luxembourg-based fund management subsidiaries of German banks. The benefit of Luxembourg as a tax haven has been further accentuated by the country's

Table 1

Size and growth of the mutual fund industry around the world

This table reports the total, mean, median, standard deviation, sample size, and the high and low values of various measures of the size of the mutual fund industry (referred to as assets under management (AUM)) and industry growth around the world. The assets under management are measured relative to a country's GDP, primary securities which include the equity markets + bond markets + bank loans, and population. AUM is also reported separately for equity funds (including balanced funds) and bonds funds (including money market funds). All asset size figures are those reported at and near the end of 2001 and are in U.S. dollars. Industry growth is measured as the change in the ratio of assets under management divided by GDP from 1996 to 2001.

	Total	Mean	Median	Standard Dev.	<i>N</i>	Low	High
Assets under management (AUM) (\$ billions)	11,749	189.50	9.31	889.46	62	0	6,974.98
AUM/GDP		0.82	0.09	5.06	62	0	39.91
AUM/primary securities		0.17	0.04	0.65	56	0	4.85
AUM/population (\$ 000s)		30.87	0.51	213.80	62	0	1,686.04
Number of funds (<i>N</i>)	55,160	1,000.47	285.00	1,911.64	55	0	8,307.00
Average size of fund (\$ millions)		90.52	46.61	134.38	50	0.42	839.65
Industry growth 1996–2001 (%)		7.87	5.05	8.08	34	−0.85	26.60
Equity AUM—including balanced (\$ billions)	5,925	144.52	8.92	535.47	41	0	3,430.94
Equity AUM—excluding balanced (\$ billions)	4,869	118.76	8.18	480.99	41	0	3,089.58
Bonds AUM—including money market (\$ billions)	5,415	132.07	13.69	501.16	41	0	3,200.08
Bonds AUM—excluding money market (\$ billions)	2,359	57.54	7.43	163.71	41	0	1,003.67
Equity AUM—incl. bal./domestic market cap.		0.56	0.11	2.43	36	0	14.67
Equity AUM—excl. bal./domestic market cap.		0.44	0.07	2.02	36	0	12.18
Bonds AUM—incl. money mkt/total credit market		0.17	0.06	0.54	34	0	3.17
Bonds AUM—excl. money mkt/bond market		9.05	0.06	53.53	36	0	321.29

stringent bank secrecy laws, which are among the toughest in Europe. Ireland's success has been driven by the establishment of an International Financial Services Center (IFSC) in Dublin which provided important incentives to fund operators in the form of a reduced tax of 10% on income earned for specific types of servicing and financing operations. In addition, fund operators received a double tax deduction for rents. Finally, the harmonization of regulations permitting funds to be sold throughout Europe facilitated the growth of these centralized hubs, as did their access to skilled workforces to administer fund operations.

As of the end of 2001, the \$11.7 trillion of world fund assets were held in 55,160 funds, with a median number of 285 funds per country. The U.S., which had the largest fund industry in terms of the share of assets held, was also the largest in terms of the number of available mutual funds (8,307 funds at the end of 2001). France and Korea were second and third with 7,144 and 7,117 funds, respectively. It is intriguing to note that there were over 55,000 different “products” available—a staggering number compared to almost any other industry.

The mutual fund industry shows signs of continued growth. Over the period from 1996 to 2001, the ratio of fund industry size to GDP increased by 7.9 percentage points on average (median = 5.1 percentage points). Not all countries' fund industries have grown at the same rate, with the slowest growth over this period being -0.9 percentage points (Japan) and the fastest being 26.6 percentage points (South Korea). We also measure the size of the mutual fund industry across various asset classes. The total size of the equity mutual fund industry (including balanced funds) is similar to that of the bond industry (including money market funds). At the end of 2001, worldwide equity and bond fund assets stood at \$5,925 and \$5,415 billion, respectively, with median country assets of \$8.9 and \$13.7 billion across the two sectors.

Median equity mutual fund assets (including balanced fund assets) as a percentage of the total domestic equity market capitalization of the domiciled country stand at 11% (mean is 56%). Bond and money market funds account for 6% of the domiciled country's primary fixed income investments in the median country (mean is 17%). This suggests that funds have been more successful—worldwide—in capturing a share of equity assets than of bond assets.

4. Why has the fund industry thrived in some countries more than in others? Possible explanations and summary statistics

The results in [Table 1](#) and the discussion above indicate that the fund industry is larger and growing faster in some countries than in others. Our goal is to explain the differences in the rate of adoption of funds as an investment vehicle. We identify four sets of factors that would favor fund investing: laws and regulation, supply-side considerations, demand-side considerations, and trading characteristics. [Appendix A](#) lists the explanatory variables and their data sources and [Table 2](#) provides descriptive statistics.

4.1. Laws and regulation

We identify three broad classes of legal and regulatory factors that can potentially influence the size of the industry.

Overall legal environment. There is a large body of literature documenting how differences in laws and regulations affect financial development. We leverage these prior studies to examine the impact of legal structure on the specific development of the fund industry. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (LLSV) (La Porta et al., 1998) show that the quality of the legal system is important for the enforcement of contracts and also captures the government's general attitude towards business. We hypothesize that individuals are more willing to invest, and in particular in a mutual fund, if the legal system is stronger. We use the five legal variables employed by LLSV to capture the legal framework of a country: (1) efficiency of the judicial system, (2) rule of law, (3) corruption, (4) risk of expropriation, and (5) risk of contract repudiation. These variables are constructed such that higher values imply a higher quality legal system. Because the legal variables are highly correlated, but each variable contains some unique information, we construct a new variable, called "judicial system quality," which sums these five measures.

A stronger legal system might promote investment in funds, but it could also encourage investors to hold securities on their own or to invest via more opaque intermediaries. To get at the differential protection afforded to various classes of investments, we look at other legal/regulatory variables. For example, when insider trading regulations are enforced, investors may be more willing to buy and hold individual securities directly; whereas when insider trading is not punished, they may be more likely to rely on professional intermediaries such as funds. Bhattacharya and Daouk (2002) note that it is not the mere presence of insider trading regulations, but their enforcement, which is economically important. Similarly, when accounting standards are lax, investors may be more likely to invest through professional intermediaries such as funds, who can collect superior information. These arguments are most relevant for equities because information asymmetries are more pronounced for equities than for bond and money market investments.

Fund regulation. Within the general context of laws and regulations, nations adopt specific laws and rules to regulate funds. We hypothesize that nations with stronger investor protections are likely to increase investor confidence and their willingness to invest in mutual funds. To measure the extent of transparency and regulation at the level of the mutual fund, we use several measures. In particular, we create dummies if the following conditions are met: (1) regulatory approval is required to start a fund, (2) regulatory approval is required before issuing a mutual fund prospectus, (3) custodians are required to be independent from the mutual fund family, and (4) mutual funds have to make eight or more fee and performance disclosures in advertising and fund information. We aggregate (1) and (2) into a single "approvals" variable. More investor protection—approvals, independent custodians, and disclosures—

Table 2

Descriptive statistics on explanatory variables

This table provides descriptive statistics on the various explanatory variables categorized across (i) legal, governance, and regulatory characteristics, (ii) supply-side characteristics, (iii) demand-side characteristics, and (iv) trading characteristics. This table includes only data for countries for which fund industry size is available. Appendix A provides a description of each of the variables along with the various data sources used.

	Mean	Median	Standard Dev.	N	Low	High
<i>Panel A: legal, regulatory, and governance characteristics</i>						
Efficiency of judicial system (higher implies more efficient)	7.77	8.00	2.17	42	2.50	10.00
Rule of law (higher implies better rule of law)	7.30	8.01	2.51	42	1.90	10.00
Corruption (higher implies less corruption)	7.28	7.80	2.23	42	2.15	10.00
Risk of expropriation (higher implies lower risk)	8.37	9.01	1.48	42	5.22	9.98
Risk of contract repudiation (higher implies lower risk)	7.91	8.65	1.68	42	4.68	9.98
Judicial system quality (sum of above)	38.62	39.54	9.30	42	20.42	49.96
Insider trading laws enforced (= 1 if Yes)	0.64	1.00	0.48	58	0.00	1.00
Accounting standards (higher implies better standards)	62.84	64.00	11.93	37	31.00	83.00
Regulatory approval to start fund (= 1 if Yes)	0.49	0.00	0.51	45	0.00	1.00
Regulatory approval for prospectus (= 1 if Yes)	0.98	1.00	0.15	45	0.00	1.00
Approvals (sum of above)	1.49	1.00	0.51	45	1.00	2.00
Custodians independent (= 1 if Yes)	0.44	0.00	0.50	48	0.00	1.00
High disclosures (= 1 if Yes)	0.53	1.00	0.51	17	0.00	1.00
Internal control requirements/industry best practice (= 1 if Yes)	0.77	1.00	0.43	26	0.00	1.00
Funds cannot have significant participation (= 1 if Yes)	0.92	1.00	0.27	26	0.00	1.00
Disclosure employed to deal with conflicts (= 1 if Yes)	0.78	1.00	0.42	27	0.00	1.00
Dealing with conflicts (sum of above)	2.44	3.00	0.71	25	1.00	3.00

Bearer securities allowed (= 1 if Yes)	0.49	0.00	0.51	45	0.00	1.00
Tax rate paid by mutual fund families (%)	29.29	30	7.87	57	0.00	45.00
<i>Panel B: supply-side characteristics</i>						
Bank concentration	0.68	0.73	0.21	35	0.20	0.99
Presence of deposit insurance (= 1 if Yes)	0.65	1.00	0.48	60	0.00	1.00
Securities business restrictions (= 1 if Yes)	0.19	0.00	0.40	42	0.00	1.00
Number of distribution channels	3.50	4.00	1.14	30	1.00	5.00
Time to set up new fund (days)	103.21	90.00	62.83	43	28.00	270.00
Setup time is 60 days or more (High setup time Dummy)	0.81	1.00	0.39	43	0.00	1.00
Cost of setting up a new fund (USD 000)	71.73	28.25	142.27	23	2.38	625.00
Setup cost/average fund size ($\times 1000$)	0.54	0.26	0.85	21	0.04	3.92
<i>Panel C: buyer characteristics</i>						
Per capita GDP (USD 000)	12.25	8.62	11.40	61	0.33	42.24
Population (millions)	77.34	20.12	206.41	62	0.45	1271.23
Literacy rate (%)	95.83	99.80	9.72	59	51.40	100.00
Education (years)	11.05	11.25	4.09	54	2.6	17.00
Newspaper circulation/population (%)	24.12	22.00	17.68	36	2.00	80.00
Number of internet users/population (%)	16.07	14.31	14.08	57	0.07	49.13
Industry age	31.90	36.00	20.70	50	1.00	77.00
Log (industry age)	3.20	3.58	0.85	50	0.00	4.34
Defined contribution funds/total pension funds (%)	43.81	39.25	33.42	36	0.00	100.00
<i>Panel D: trading characteristics</i>						
Share turnover (%)	74.78	56.73	79.37	52	3.40	475.46
Trading costs (%)	0.72	0.56	0.34	37	0.34	1.53

provide investors with a higher level of comfort in using mutual funds as an investment vehicle.⁶

In addition, we determine what procedures are in place to prevent conflicts of interest between the fund management company and the fund investor. Three dummy variables are used to capture the presence/absence of these procedures: (1) Are funds allowed to have a significant participation in companies in which they invest?⁷ (2) Is disclosure employed to deal with conflicts of interest? (3) Are there regulatory requirements or industry best practice standards regarding internal control? We combine these into a single “dealing with conflicts” measure.

While a certain level of regulation can be beneficial for fund investors, there can be substantial costs to overregulation in the form of greater entry barriers for mutual fund companies, and hence a stifling of competition within the industry. Excessive regulation can therefore hinder the development of the mutual fund industry and thereby potentially lead to the movement of fund management firms to less regulated financial markets.⁸ We capture this possible countervailing force by measuring the costs of fund startup, described later in the study.

Taxes. The public finance literature is replete with examples of how tax policy can affect investment decisions (see, e.g., [Poterba and Samwick, 2003](#)). We would expect that funds would grow stronger when tax rules make these investments more attractive relative to others. In addition, in countries in which fund management companies receive a more favorable tax treatment of their earned income (e.g., Ireland), one is likely to observe a larger mutual fund industry.

Unfortunately, data on the precise treatment of income from mutual fund investments across the world cannot be obtained for a large cross-section of countries. We therefore limit ourselves to two key tax policy variables. First, we obtain data on the tax rate paid by the fund management company—this is equal to the corporate tax rate in all countries, except Ireland. Second, we determine whether the country allows securities in bearer form; investors are more likely to be able to avoid taxation of investment income completely in countries in which bearer securities are allowed, because tracing income back to the investors is difficult. Therefore, if investing in the fund creates more of a paper trail, which could be tracked by tax authorities, investors may be more interested in buying the underlying securities themselves. Note that many countries that allow bearer securities require

⁶The actual number of disclosures is between four and ten, and half the countries require seven or fewer disclosures and half require eight or more. The reason for not including the actual level of disclosures is that this effect is unlikely to be linear. As soon as the number of disclosures is sufficient to understand actual fees charged and past performance, it is unlikely that additional disclosures would further enhance investor confidence.

⁷We obtain this information from a survey conducted by IOSCO for OECD countries. The term “significant participation” is not defined in the survey.

⁸It would be useful to include measures of the direct and indirect costs of regulation, but such data are not available for a large number of countries. [Franks et al. \(1998\)](#) compare the direct regulatory costs for the investment management industry across three countries. They find that the costs in the U.K. are twice as high as the U.S. and four times as high as in France.

taxes to be withheld at the source. This withholding tax can often be avoided, however, when the income is received outside the country.

Another related factor is whether the country is a tax haven for mutual funds in that no taxes are withheld from investments and there is bank secrecy. However, the lack of systematic data across countries prevents us from investigating this in more detail.

Data. Table 2, Panel A, includes summary statistics for the legal, regulatory, and governance variables described above. Note that insider trading laws are enforced in only 64% of the countries in our sample. For the legal and regulatory variables at the level of the mutual fund, we find that 49% of our sample countries require regulatory approval to start a fund and a large majority (98%) require formal approval of a fund's prospectus. In 44% of the cases, custodians are required to be independent from the fund management organization. Also, in half the countries, investors are allowed to hold bearer securities.

4.2. Supply-side considerations

Characteristics of the financial services sector, which we call the supply-side factors, can affect the size of the mutual fund industry. The costs and time involved in setting up a fund and obtaining the necessary regulatory approval can act as a barrier to entry for new funds and thereby lead to a smaller fund industry. From industry sources, we collect estimates of the barriers to entry. As shown in Table 2, Panel B, the median number of days to set up a new fund is 90 across all countries. The high is 270 days for Malaysia and Singapore, followed by 225 days for the U.S. and a low of 28 days for New Zealand. We also report set-up costs, which average \$71,730 per fund or 0.054% of average annual assets under management. We do not expect the relation between industry development and the time required to open a new fund to be linear. In fact, as long as the delay is not “unreasonable,” the time commitment may not have much of an impact on industry size. We therefore divide the sample into two groups using a cutoff of 60 days (high setup time dummy). This cutoff is somewhat arbitrary, but the qualitative nature of our results does not change for alternative cutoffs between 60 and 90 days.

One important player in the financial services sector—and the fund sector—is the banking industry. In the U.S., mutual fund growth (especially the growth of money market funds) came at the expense of the banking sector, whereas in Europe (outside of the U.K.), banks are the primary promoters and distributors of funds. These observations suggests that it is ambiguous whether a strong or concentrated banking sector would inhibit the growth of the fund industry or whether banks would use fund products as another way to collect household assets. Table 2, Panel B, shows that bank concentration, measured as the fraction of bank assets controlled by the five largest banks, has a median value of 0.73, suggesting a high level of concentration of bank assets.

Furthermore, restrictions placed on banks to enter the securities business may have a negative effect on their ability to offer mutual funds. Our measure of restrictiveness is based on Barth et al. (2001). They rank countries into four

categories measuring the restrictions imposed on banks when they seek to enter the securities business. Banks in category 1 countries face no restrictions and banks in category 2 also face no restrictions, except that they have to engage in securities activities through a subsidiary. Banks in category 3 countries face some restrictions while banks in category 4 countries are not allowed to engage in securities activities. We set an indicator variable equal to one if banks operate in category 3 or 4 countries, and zero otherwise. In our sample, there are restrictions in 19% of the countries.

Because a number of countries use the banking sector to distribute mutual funds, the presence of a deposit insurance system for the banking sector could also affect the size of the fund industry. On the one hand, the presence of a deposit insurance system (especially if mispriced) would favor insured deposits over uninsured money market mutual funds, inhibiting the growth of the mutual fund sector, in particular the bond and money market sector. However, if deposit insurance provides investors in bank-distributed funds a false sense of security, then this could lead to a larger fund sector. Two-thirds of the countries in the sample have a deposit insurance scheme.

A greater breadth of available distribution channels (i.e., banks, broker-dealers, direct sales, insurance companies, and sales via financial planners) through which fund companies can sell their products to retail investors is likely to have a positive influence on the size of the mutual fund sector. The average country in our sample has 3.5 distribution channels.

4.3. Demand-side considerations

In many countries, the mutual fund industry is a relatively recent financial innovation. A longstanding literature on the diffusion of innovation shows that the characteristics of consumers influence the speed of adoption (Rogers, 1995). Generally, older innovations have greater overall levels of adoption, so we measure the age of the industry in years since the first open-end fund was sold in the country. We identify the first open-end fund in the country through literature searches or through direct contacts with the national industry associations. In some cases, closed-end funds (or unit trusts) existed before the first open-end fund. Also, sometimes the first fund predated the existence of fund regulation. For example, the first U.S. open-end fund predated the passage of the 1940 Act by 16 years.

The adoption of an innovation typically depends on the willingness of potential customers to use it. We hypothesize that funds will be adopted—and the industry will be larger—when consumers are more sophisticated, have greater wealth (and hence investing experience), and have access to better information. We use the following measures to capture wealth and investor sophistication: per capita GDP, the literacy rate, and average years of education received.⁹ To capture access to

⁹In the specifications reported throughout the paper, we employ the level of per capita GDP and education as explanatory variables. Using the logarithm of both variables instead does not affect the results.

information, we include newspaper circulation divided by population and Internet penetration. Internet penetration can also measure distribution capabilities of a country, since many fund complexes use the Internet as a distribution channel. Table 2, Panel C, reports that in the median country in our sample, an individual receives 11.25 years of education (including part-time and adult education). The median country has a GDP per capita of \$8,620 and a 14% Internet penetration rate.

The size of the potential fund market would affect its attractiveness to fund vendors. We include the size of the population to capture this effect. A fund industry may be slower to emerge in countries with smaller populations because there are certain fixed costs in organizing the industry and setting up the legal framework.

Finally, while we implicitly describe the fund industry as a retail phenomenon, we recognize that pension policy has had an impact on the development of the industry. Defined contribution (DC) plan assets are sometimes invested in mutual funds. To capture this stimulus to the growth of mutual funds, we collect information on the relative proportions of DC and defined benefit (DB) pension plans by country. DC plans comprise about 40% of the number of pension plans in the median country in our sample.

4.4. Trading market characteristics

Mutual funds are intermediated products, and the production technology to create them is not unrelated to the underlying markets for the assets held by the funds. In particular, by definition, mutual funds stand ready to redeem shares at net asset value on a regular basis. This implies that the quality and reliability of the reported net asset values are important for fund complexes and investors. The more stale the observed market prices, the greater the scope for discretion on the part of the fund in setting the net asset values. This lowers the inherent transparency and hence desirability of mutual funds as investment vehicles. We use the frequency of trading (i.e., average share turnover on the domestic exchange) as a measure of the quality of the reported net asset value for equity funds, which could affect the attractiveness of funds to investors. Recent events in the U.S. remind us that stale or incorrect NAVs can affect the fundamental economics of a fund.

In addition, the trading costs paid by the funds may also have an impact on the development of the industry. If these costs are high, the industry may not develop—or it may flourish because individual investors would face even higher costs if they were to trade on their own. To measure trading costs, we add the commissions paid by institutional investors to the price impact of their trades (see Chiyachantana et al., 2004). Equity market turnover and equity trading costs are only directly relevant for studying the size of the equity mutual fund sector. However, it is not unreasonable to expect trading costs in the fixed income market to be correlated with trading costs for equities. We therefore also employ this measure when we study the industry as a whole.

As illustrated in Panel D of Table 2, institutional trading costs in the median country are 56 basis points, while the median share turnover is 57% per annum.

4.5. Correlations and caveats

Before turning to the analysis of the determinants of the development of the fund sector, we study the correlations among the explanatory variables in our sample. Selected correlations are reported in Table 3, after excluding Luxembourg and Ireland from the analysis. Before interpreting any regression results, it is useful to understand the implications of these correlations. First, wealth, education, literacy, newspaper circulation, and Internet penetration are all highly correlated. These results are perhaps not surprising, but they suggest that the variables in this group should not be included in the same regression. Second, there is also a strong correlation between the legal variables and the buyer characteristics; this confirms the findings by LLSV (1998), who report a strong relation between GDP per capita and the legal variables. This correlation is more problematic for our purposes, however, because it makes it difficult to distinguish between the effects of the legal environment and buyer characteristics. Third, all the general legal variables are highly correlated with each other (not reported in the table), with the quality of accounting standards, and with trading costs. As a result of these observations, we construct summary statistics (judicial system quality, approvals, and dealing with conflicts) as described above and use parsimonious sets of explanatory variables in our specifications.

Two limitations of our analyses need to be pointed out. First, we recognize that some of the explanatory variables employed in our analysis are endogenous. While the general laws and regulations in a country are unlikely to be affected by the fund industry, fund regulation may be influenced by the size of the sector. Also, the size of the fund sector may be influenced by the nature of the regulations in place. Finally and probably most realistically, factors such as regulation and industry size are intertwined as both evolve over time. Our paper, which is primarily cross-sectional in nature, identifies associations among important variables, and we are careful not to overinterpret causality. However, we do report some suggestive evidence (such as in the discussion of regulation) that may help the reader draw inferences about some of the likely directions of causality.

Second, data on each variable for each country are not always available. Given the small sample size (and the multicollinearity described above), we cannot include large sets of explanatory variables in any one analysis.

5. Results

5.1. Univariate regression results

For completeness, we first report in Table 4 univariate regressions of our measure of fund size (assets under management scaled by primary national securities) on the explanatory variables discussed previously. The models are estimated using ordinary least squares (OLS) using data for 2001 and all standard errors are corrected for

Table 3

Pairwise correlations across explanatory variables

This table reports pairwise correlations for the various explanatory variables categorized across (i) legal, governance, and regulatory characteristics, (ii) supply-side characteristics, (iii) demand-side characteristics, and (iv) trading costs. This table includes only data for countries for which fund industry size is available. Luxembourg and Ireland are excluded from the analysis. Appendix A provides a description of each of the variables along with the various data sources used.

Variable name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Judicial system quality	1	1.00																
Approvals	2	-0.05	1.00															
Insider trading enforced	3	0.29	0.22	1.00														
Accounting standards	4	0.59	0.09	0.32	1.00													
High disclosures	5	0.03	0.00	0.43	0.27	1.00												
Dealing with conflicts	6	0.11	0.00	0.09	0.12	0.46	1.00											
Bearer securities allowed	7	0.31	0.27	-0.04	0.07	-0.07	0.11	1.00										
Bank concentration	8	0.03	-0.50	-0.20	0.22	-0.22	-0.20	-0.19	1.00									
High setup time	9	0.35	-0.03	0.12	0.24	0.05	-0.24	0.11	-0.07	1.00								
Setup cost/avg. fund size	10	-0.13	-0.20	0.08	0.02	-0.01	-0.02	-0.42	0.16	-0.02	1.00							
Securities business restrictions	11	-0.10	-0.06	-0.03	-0.25	-0.36	-0.50	-0.16	-0.28	0.10	0.02	1.00						
Per capita GDP	12	0.89	0.05	0.43	0.47	0.05	0.18	0.20	-0.15	0.27	-0.22	0.03	1.00					
Literacy rate	13	0.42	-0.02	0.15	0.13	-0.09	0.21	0.30	-0.13	-0.01	-0.57	0.11	0.37	1.00				
Education	14	0.74	-0.02	0.23	0.37	0.01	-0.09	0.33	0.11	0.22	-0.37	-0.09	0.63	0.51	1.00			
Internet users/population	15	0.83	0.00	0.43	0.46	-0.22	0.14	0.01	-0.04	0.00	-0.24	0.03	0.87	0.40	0.65	1.00		
Log (industry age)	16	0.35	0.14	0.28	0.46	0.29	0.08	0.11	-0.17	-0.19	-0.25	-0.27	0.45	-0.10	0.30	0.37	1.00	
Def. contrib./tot. pension	17	0.04	0.26	0.21	0.10	0.56	-0.10	0.28	0.14	-0.04	-0.33	-0.08	-0.04	0.26	0.04	-0.09	0.10	1.00
Trading costs	18	-0.78	0.07	-0.02	-0.35	0.17	-0.14	-0.08	-0.08	-0.19	0.18	-0.02	-0.67	-0.39	-0.44	-0.63	-0.35	0.16

Table 4

Univariate regressions explaining the size of the mutual fund industry across countries

This table reports univariate OLS regressions explaining the relative size of the mutual fund industry across countries. The dependent variable is the size of the mutual fund sector as a fraction of the primary securities (equities, bonds, and bank loans) in each country. Separate regression results for equity funds (including balanced) and bond funds (including money market funds) are also reported. Industry size is measured at the end of 2001. The p -values are computed based on White standard errors. nm indicates that the analysis is not meaningful for the specific type of fund. Luxembourg and Ireland are excluded from the analysis. Appendix A provides a description of the explanatory variables along with the data sources used. We do not report equity and bond sector results for setup costs relative to average fund size, because average fund size data are only available for the entire mutual fund sector (na means not available and nm means not meaningful).

Name	All funds			Equity, including balanced			Bond and money market		
	Coefficient	p -value	Adj. R -sq	Coefficient	p -value	Adj. R -sq	Coefficient	p -value	Adj. R -sq
Judicial system quality	0.0033	0.00	0.14	0.0095	0.00	0.14	-0.0012	0.52	-0.02
Approvals	0.0576	0.02	0.11	0.1286	0.03	0.11	0.0616	0.01	0.19
High disclosures	0.0816	0.06	0.15	0.1192	0.13	0.08	0.0624	0.08	0.12
Insider trading laws enforced	0.0540	0.00	0.10	-0.0153	0.88	-0.03	0.0194	0.42	-0.02
Accounting standards	0.0018	0.07	0.05	0.0030	0.38	-0.01	-0.0008	0.49	-0.02
Custodians independent	-0.0266	0.26	0.01	-0.0517	0.35	-0.01	-0.0204	0.40	-0.01
Dealing with conflicts	0.0122	0.58	0.01	0.0762	0.13	0.05	nm	nm	nm
Bearer securities allowed	-0.0130	0.52	-0.02	0.0695	0.19	0.02	-0.0318	0.16	0.04
Tax rate paid by mutual fund families	0.0003	0.82	-0.02	0.0057	0.02	0.05	-0.0021	0.23	0.01
Bank concentration	-0.0597	0.31	-0.01	0.0033	0.98	-0.04	-0.1077	0.06	0.09
Presence of deposit insurance	0.0117	0.64	-0.01	-0.0911	0.36	0.01	-0.0004	0.99	-0.03
Security business restrictions	-0.0210	0.43	-0.01	-0.1148	0.07	0.03	-0.0135	0.63	-0.04
Number of distribution channels	0.0041	0.74	-0.04	-0.0022	0.92	-0.04	-0.0089	0.46	-0.02
High setup time	-0.0263	0.46	-0.01	0.0332	0.62	-0.03	-0.0378	0.30	0.02
Cost of setting up a new fund (USD 000s)	0.0003	0.01	0.01	-0.0002	0.24	-0.04	0.0002	0.05	-0.02
Setup cost/average fund size (\times 1000)	-0.1012	0.05	0.14	na	na	na	na	na	na
Log (industry age)	0.0339	0.00	0.13	0.0580	0.01	0.06	0.0127	0.26	-0.02
Per capita GDP (USD 000s)	0.0027	0.00	0.15	0.0056	0.01	0.09	0.0000	0.99	-0.03
Population (millions)	-0.0000	0.13	-0.01	-0.0003	0.60	-0.02	0.0004	0.03	0.08
Literacy rate (%)	0.0021	0.01	0.02	0.0155	0.00	0.05	-0.0013	0.84	-0.03
Education (years)	0.0070	0.02	0.12	0.0220	0.00	0.16	-0.0010	0.81	-0.03
Newspaper circulation/population (%)	0.0008	0.22	0.01	0.0020	0.08	0.01	-0.0003	0.63	-0.03
Number of internet users/population (%)	0.0020	0.00	0.20	0.0040	0.00	0.10	-0.0001	0.94	-0.03
Defined contribution funds/total pension funds (%)	0.0008	0.08	0.09	0.0013	0.19	0.03	0.0002	0.65	-0.03
Share turnover	0.0001	0.61	-0.01	0.0004	0.38	-0.01	nm	nm	nm
Lowest trading cost payable (basis points)	-0.0877	0.00	0.13	-0.1891	0.00	0.17	nm	nm	nm

heteroskedasticity.¹⁰ These simple regressions are not hampered by the lack of data on other explanatory variables nor by multicollinearity. We report findings for the entire industry as well as for equity and bond funds separately. In the analysis, balanced funds are combined with equity funds and bond funds include money market funds. For sake of brevity, we do not report the intercept, but just the coefficient on the explanatory variable, its *p*-value, and the adjusted *R*-squared. In addition, variables that are only expected to affect equity funds are not included in our analysis of the subsample of bond funds. We boldface the variables significant at the 10% level or better.

Luxembourg and Ireland are excluded from all specifications. Both countries are extremely important in the industry, but we have already discussed the factors that led to their success. In addition, both countries attract funds from across Europe, which implies that national characteristics are less relevant in explaining their development.

Laws and regulations matter. The results indicate that the mutual fund sector is larger in countries with a better legal environment, when new fund starts and fund prospectuses need to be approved, and when substantial fee and performance disclosures are required.

There is some evidence that the bond fund sector is smaller when the banking sector is more concentrated. Moreover, the industry is smaller in countries with higher fund setup costs relative to average fund size.

Not surprisingly, nations with a longer tradition of mutual funds have larger fund sectors. In addition, wealthier countries with a more educated population, higher Internet penetration, and a greater proportion of defined contribution plans also have larger fund sectors. Trading costs are negatively related to industry size. The results on country wealth, investor sophistication, and trading costs hold for the entire industry as well as for equity funds.

In terms of explanatory power, Internet penetration is the most important variable for the entire sector. For equity funds, education has the highest explanatory power, followed by judicial system quality and required approvals; the approvals variable has the highest explanatory power for bond funds.

Two results in Table 4 appear counterintuitive. First, we find that the industry is larger in countries in which insider trading is enforced, perhaps because insider trading enforcement proxies for the overall judicial quality of a country. Confirming this suspicion, we find that in multivariate analyses, in which we control for judicial quality, this result reverses. Second, the cost of setting up a fund is positively related to industry size, but as illustrated in the table, this result also reverses after we divide the setup cost by the average fund size.

¹⁰Because the dependent variable is a proportion, an alternative would be to use a logit transformation, where we replace industry size by $\log(\text{industry size}/(1-\text{industry size}))$ after setting industry size equal to a small number for countries with zero assets in the fund industry. All our results continue to hold if we perform this transformation; we report OLS results for ease of interpretation. Note that Tobit models may not be appropriate for this analysis because they assume that the dependent variable is truncated; however, our results also hold if we estimate Tobit models.

We also estimate logit models, where the dependent variable is one if a fund industry exists and zero otherwise (not reported in a table). This allows us to include a number of countries for which we can determine that an industry exists without being able to verify industry size. We find a positive relation between the presence of a fund industry and measures of economic development such as per capita GDP and literacy; however, the coefficients are not statistically significant. We suspect that this is the case because we only have five countries without a fund industry in our sample.

5.2. Multivariate regression results

Tables 5–11 contain various multivariate analyses explaining the size (and growth) of national fund markets. Table 5 reports various cross-sectional specifications, where the dependent variable is our preferred measure of fund industry size in 2001

Table 5

Explaining the size of the mutual fund industry as a fraction of primary securities

This table reports multivariate OLS regressions explaining the relative size of the mutual fund industry across countries. The dependent variable is the size of the mutual fund sector as a fraction of the primary securities (equities, bonds, and bank loans) in each country at the end of 2001. The figures in parentheses are *p*-values computed based on White standard errors. Luxembourg and Ireland are excluded from the analysis. Appendix A provides a description of the explanatory variables along with the data sources used.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
Constant	-0.132 (0.05)	-0.035 (0.25)	-0.094 (0.12)	-0.094 (0.04)	-0.121 (0.18)	0.069 (0.02)	0.007 (0.87)	0.001 (0.97)	0.011 (0.82)	0.026 (0.47)
Judicial system quality	0.003 (0.02)				0.002 (0.30)					
Approvals	0.067 (0.01)	0.055 (0.02)	0.063 (0.01)	0.045 (0.04)	0.072 (0.01)	0.061 (0.01)	0.079 (0.05)	0.051 (0.03)	0.101 (0.03)	0.047 (0.00)
High disclosures							0.075 (0.09)			
Bearer securities allowed										-0.036 (0.03)
High setup time								-0.048 (0.11)		-0.056 (0.03)
Setup cost/avg. fund size									-0.116 (0.04)	
Per capita GDP		0.002 (0.01)					-0.002 (0.17)	0.003 (0.00)		0.003 (0.00)
Education			0.007 (0.06)							
Log (industry age)				0.034 (0.01)						
Def. contrib./tot. pension					0.001 (0.07)					
Trading costs						-0.097 (0.00)				
Adjusted <i>R</i> -squared	0.23	0.22	0.22	0.20	0.29	0.27	0.21	0.25	0.40	0.40
<i>N</i>	32	40	38	38	28	32	15	36	16	34

Table 6

Explaining the size of the mutual fund industry as a fraction of GDP

This table reports multivariate OLS regressions explaining the size of the mutual fund industry as a fraction of a country's GDP at the end of 2001. The figures in parentheses are *p*-values computed based on White standard errors. Luxembourg and Ireland are excluded from the analysis. Appendix A provides a description of the explanatory variables along with the data sources used.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
Constant	-0.589 (0.00)	-0.210 (0.02)	-0.422 (0.00)	-0.407 (0.00)	-0.620 (0.01)	0.197 (0.01)	-0.199 (0.13)	-0.058 (0.63)	-0.003 (0.98)	0.003 (0.98)
Judicial system quality	0.013 (0.00)				0.010 (0.01)					
Approvals	0.209 (0.01)	0.171 (0.01)	0.204 (0.00)	0.141 (0.02)	0.216 (0.00)	0.187 (0.01)	0.241 (0.05)	0.143 (0.02)	0.283 (0.03)	0.122 (0.01)
High disclosures							0.119 (0.50)			
Bearer securities allowed										-0.058 (0.20)
High setup time								-0.165 (0.16)		-0.189 (0.12)
Setup cost/avg. fund size									-0.317 (0.04)	
Per capita GDP		0.011 (0.00)					0.006 (0.35)	0.014 (0.00)		0.014 (0.00)
Education			0.027 (0.00)							
Log (industry age)				0.123 (0.00)						
Def. contrib./tot. pension					0.003 (0.02)					
Trading costs						-0.344 (0.00)				
Adjusted <i>R</i> -squared	0.33	0.37	0.30	0.27	0.44	0.32	0.06	0.43	0.39	0.50
<i>N</i>	32	40	38	38	28	32	15	36	16	34

(assets under management scaled by primary national securities). Tables 6–9 provide various robustness checks, including an analysis of 2001 assets under management scaled by GDP as an alternative measure of size (Table 6), assets under management scaled by population (Table 7), a panel analysis using assets scaled by GDP and annual data from 1996 to 2001 for all countries (Table 8), and an analysis of the annual rate of growth of fund assets (Table 9). Tables 10 and 11 analyze the 2001 cross-section of equity and bond funds separately, scaling each nation's fund holdings of that type by the nation's primary securities of the same type. We also report a few additional robustness checks that use substantially limited samples, but have the virtue of normalizing mutual fund assets by national wealth or of comparing domestic investments by funds to domestic national assets.

Base case: fund assets scaled by primary national securities. While our sample size is nominally 56 countries, for any of the specific regressions in Table 5, data constraints

Table 7

Explaining the size of the mutual fund industry as a fraction of the population

This table reports multivariate OLS regressions explaining the size of the mutual fund industry as a fraction of a country's population at the end of 2001. The figures in parentheses are *p*-values computed based on White standard errors. Luxembourg and Ireland are excluded from the analysis. Appendix A provides a description of the explanatory variables along with the data sources used.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
Constant	-16.691 (0.00)	-5.772 (0.01)	-11.294 (0.00)	-9.872 (0.01)	-18.702 (0.00)	5.504 (0.02)	-8.670 (0.07)	-3.184 (0.27)	0.561 (0.90)	-2.087 (0.44)
Judicial system quality	0.381 (0.00)				0.348 (0.00)					
Approvals	4.277 (0.02)	3.330 (0.02)	4.265 (0.02)	2.681 (0.10)	4.197 (0.03)	3.720 (0.07)	4.434 (0.12)	2.797 (0.03)	6.293 (0.08)	2.406 (0.06)
High disclosures							2.211 (0.61)			
Bearer securities allowed										-1.028 (0.52)
High setup time								-2.893 (0.31)		-3.377 (0.26)
Setup cost/ avg. fund size									-7.842 (0.02)	
Per capita GDP		0.353 (0.00)					0.419 (0.04)	0.416 (0.00)		0.424 (0.00)
Education			0.770 (0.00)							
Log (industry age)				3.130 (0.00)						
Def. contrib./ tot. pension					0.082 (0.01)					
Trading costs						-8.613 (0.00)				
Adjusted <i>R</i> -squared	0.33	0.48	0.28	0.21	0.41	0.29	0.22	0.53	0.26	0.54
<i>N</i>	32	40	38	38	28	32	15	36	16	34

reduce the sample size considerably. In light of the limited degrees of freedom and the multicollinearity of the explanatory variables, our specifications tend to include just a few explanatory variables at a time. In addition, we do not report specifications using accounting standards because this variable is highly correlated with judicial system quality; we generally find the significance of accounting standards to be similar to that of judicial system quality. For the same reason, we do not report specifications using the literacy rate, newspaper circulation, and Internet penetration. These variables are highly correlated with per capita GDP and education, and have similar significance levels in unreported models.

Model (i) of Table 5 includes measures of both general and fund-specific laws and regulation, proxied by LLSV's judicial system quality measure and the approvals

Table 8
Panel analysis

This table reports clustered OLS regressions, where the country is defined as the cluster. The dependent variable is the annual national measure of fund size measured relative to a country's GDP over the 1996–2001 period. All models include year dummies. The figures in parentheses are *p*-values. Luxembourg and Ireland are excluded from the analysis. Appendix A provides a description of the explanatory variables along with the data sources used.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)
Constant	−0.482 (0.00)	−0.208 (0.01)	−0.567 (0.00)	−0.525 (0.00)	−0.416 (0.06)	0.098 (0.47)	−0.515 (0.06)	−0.020 (0.82)	−0.390 (0.00)
Judicial system quality	0.010 (0.00)		0.009 (0.00)	0.008 (0.00)	0.009 (0.04)		0.013 (0.01)		0.010 (0.00)
Approvals	0.138 (0.01)	0.110 (0.01)	0.125 (0.01)	0.159 (0.00)	0.139 (0.05)	0.111 (0.04)	0.149 (0.07)	0.089 (0.03)	0.037 (0.39)
High disclosures					0.114 (0.24)				
Bearer securities allowed								−0.081 (0.07)	−0.079 (0.10)
Bank concentration									−0.271 (0.06)
High setup time						−0.153 (0.07)		−0.140 (0.07)	
Setup cost/avg. fund size							−0.151 (0.03)		
Per capita GDP		0.008 (0.00)				0.007 (0.02)		0.011 (0.00)	
Log (industry age)			0.049 (0.02)						0.074 (0.02)
Def. contrib./tot. pension				0.002 (0.02)					
Trading costs						−0.130 (0.01)			
Adjusted <i>R</i> -squared	0.30	0.37	0.32	0.39	0.24	0.42	0.57	0.46	0.45
<i>N</i>	165	211	164	150	81	163	76	182	142

variable, respectively. Both are positively and significantly related to the size of the fund industry in 2001, suggesting that a stronger legal system benefits the fund industry. Furthermore, the fund industry is bigger in countries that provide stronger fund-specific investor protection (here measured by the approvals variable: the amount of regulatory approval required to start and operate a fund). This latter result is one of the most robust we observe over many specifications. We also repeat the analysis for countries whose relative industry size is above the median, and continue to find a significant effect (not reported in the table). If it were the case that countries with larger industries subsequently increase regulations (reverse causality), we would not expect to continue to find this effect, as they would all have stronger regulations. Thus, our results are more consistent with the interpretation that stronger regulation precedes a stronger industry, rather than vice versa.

Table 9

Explaining the growth of the mutual fund industry across countries

This table reports multivariate OLS regressions explaining the growth of the mutual fund industry over the 1996–2001 period. The dependent variable is the ratio of a country's size to GDP in 2001 minus the ratio of size to GDP in 1996. The figures in parentheses are *p*-values computed based on White standard errors. Luxembourg and Ireland are excluded from the analysis. Appendix A provides a description of the explanatory variables along with the data sources used.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
Constant	-0.148 (0.12)	-0.053 (0.18)	-0.071 (0.06)	-0.088 (0.17)	-0.098 (0.12)	0.033 (0.70)	0.072 (0.27)	0.030 (0.68)
Judicial system quality	0.003 (0.07)							
Approvals	0.064 (0.04)	0.053 (0.04)	0.039 (0.11)	0.065 (0.03)	0.063 (0.11)	0.044 (0.10)	0.048 (0.27)	0.051 (0.06)
High disclosures					0.109 (0.04)			
Bearer securities allowed								-0.043 (0.09)
High setup time						-0.088 (0.16)		-0.080 (0.13)
Setup cost/avg. fund size							-0.098 (0.04)	
Per capita GDP		0.003 (0.01)		0.003 (0.05)	0.001 (0.34)	0.003 (0.00)		0.004 (0.00)
Log (industry age)			0.032 (0.00)					
Def. contrib./tot. pension				0.001 (0.38)				
Adjusted <i>R</i> -squared	0.12	0.24	0.25	0.12	0.24	0.36	0.17	0.36
<i>N</i>	25	31	31	25	12	28	14	27

Not all the legal and regulatory variables are significant, however. In unreported models, we include a dummy if custodians have to be independent as well as the tax rate paid by fund companies. These variables are never statistically significant.

In models (ii)–(iv) of Table 5, we see that national fund industries are substantially stronger when the country is wealthier (measured by GDP per capita), its residents are more educated, and its fund industry is older. Model (v) shows that the industry is larger if a country's pension system is dominated by defined contribution plans (which can often invest in funds). The inclusion of these variables does not reduce the significance of the fund-specific regulation variable (approvals). This latter result is robust and economically important: according to model (v) of Table 5, nations demanding that regulators approve both fund starts and prospectuses have a fund sector that is 7.2 percentage points larger than countries that only require one of these approvals. By way of comparison, this figure is about the same magnitude as the mean industry size (computed after removing Luxembourg and Ireland).

Table 10
Explaining the size of the equity fund sector across countries

This table reports multivariate OLS regressions explaining the relative size of the equity mutual fund industry. The dependent variable is the size of the equity mutual fund sector (including balanced funds) as a fraction of the equity market capitalization in each country at the end of 2001. The figures in parentheses are *p*-values computed based on White standard errors. Luxembourg and Ireland are excluded from the analysis. Appendix A provides a description of the explanatory variables along with the data sources used.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)
Constant	-0.473 (0.01)	-0.118 (0.16)	-0.385 (0.01)	-0.221 (0.04)	0.110 (0.17)	-0.539 (0.01)	-0.477 (0.01)	-0.252 (0.19)	-0.081 (0.038)
Judicial system quality	0.010 (0.01)					0.014 (0.00)	0.011 (0.01)		
Approvals	0.149 (0.02)	0.125 (0.03)	0.148 (0.01)	0.113 (0.05)	0.117 (0.04)	0.183 (0.00)	0.184 (0.01)	0.185 (0.03)	0.169 (0.03)
Insider trading laws enforced						-0.165 (0.09)	-0.206 (0.09)	-0.255 (0.10)	-0.163 (0.10)
Dealing with conflicts								0.084 (0.05)	
Securities business restrictions									-0.128 (0.08)
Per capita GDP		0.005 (0.01)						0.007 (0.09)	0.008 (0.04)
Education			0.025 (0.00)						
Log (industry age)				0.063 (0.01)					
Def. contrib./tot. pension							0.002 (0.07)		
Trading costs					-0.175 (0.01)				
Adjusted <i>R</i> -squared	0.28	0.19	0.31	0.14	0.16	0.38	0.45	0.38	0.23
<i>N</i>	28	32	31	32	31	28	26	21	27

Thus, the fund industry holds a substantially larger fraction of a country's primary securities when investors are protected through a more elaborate approvals process.

A few comments are in order. To save space, we do not show specifications that combine the general legal environment with any of the demand-side factors. If we do include judicial system quality with any such factors, neither is significant, which reflects the strong correlation between the judicial system quality variable and the demand-side variables, as shown in Table 3. Thus, we are unable to tease apart the impact of general legal environment and a well-developed economy. However, the fund-specific regulatory measure remains significant and positive in these specifications. For example, when we include judicial system quality, education, and approvals in a regression, the coefficient on approvals is 0.074, with a *p*-value of 0.01.

Table 11
Explaining the size of the bond fund sector across countries

This table reports multivariate OLS regressions explaining the relative size of the bond mutual fund industry. The dependent variable is the size of the bond mutual fund sector (including money market funds) as a fraction of the bond and bank loan market in each country at the end of 2001. The figures in parentheses are *p*-values computed based on White standard errors. Luxembourg and Ireland are excluded from the analysis. Appendix A provides a description of the explanatory variables along with the various data sources used.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)
Constant	0.019 (0.85)	-0.012 (0.71)	-0.020 (0.79)	-0.033 (0.44)	-0.009 (0.77)	0.097 (0.23)	0.001 (0.99)	0.194 (0.00)	0.004 (0.89)
Judicial system quality	-0.001 (0.74)								
Approvals	0.060 (0.02)	0.062 (0.01)	0.062 (0.01)	0.060 (0.01)	0.061 (0.02)	0.033 (0.27)	0.061 (0.01)		0.064 (0.01)
Bearer securities allowed							-0.039 (0.06)	-0.048 (0.03)	-0.043 (0.05)
Bank concentration						-0.094 (0.18)		-0.146 (0.00)	
Sec. business restrictions					-0.024 (0.49)				-0.034 (0.30)
Per capita GDP		-0.001 (0.77)							
Education			0.001 (0.97)						
Log (industry age)				0.005 (0.63)					
Adjusted <i>R</i> -squared	0.14	0.16	0.16	0.16	0.24	0.14	0.23	0.28	0.18
<i>N</i>	27	30	30	30	27	24	29	25	26

The investor demand variables are also economically significant. Increasing GDP per capita from its 25th percentile (\$3,322) to its 75th percentile (\$23,258) increases the relative size of the industry by four percentage points (based on model (ii)). Increasing DC pension plans from its 25th percentile (12.5%) to its 75th percentile (80%) increases industry size by six percentage points (based on model (v)).

Model (vi) of Table 5 includes trading costs, measured as the sum of commissions and price impact. The negative coefficient indicates that the industry is smaller in countries with less liquid equity markets. Unfortunately, as illustrated in Table 3, there is a strong negative correlation between country wealth and trading costs (-0.67), which makes it difficult to disentangle this effect from a country wealth effect.

In model (vii), we include a second fund-specific regulatory variable: the high-disclosure dummy. Remember that this high-disclosure variable equals one if funds in the nation are required to make eight or more fee and performance disclosures in advertising and fund information; otherwise, it has a value of zero. Approvals

remains positively and significantly associated with the size of the industry, as does the high-disclosure measure. Nations that require fee and performance disclosures above the median have a fund sector that is 7.5 percentage points larger than nations that do not. Both variables are significant, suggesting that there are multiple types of investor protection that are positively associated with a stronger fund industry.

While we cannot determine the direction of causality, our discussion with practitioners leads us to believe that strong laws tend to precede strong fund industries. For example, this seems to have been the case in the U.S., where the primary governing law was passed in 1940, but the industry grew much later. It is interesting to note that when we include both measures of investor protection, our representative demand-side variable (GDP per capita) drops out, which suggests that it is not as important as fund-specific regulation. (Some caution is also required in interpreting this model, however, because we only have 15 data points in the analysis.)

In models (viii)–(x) of Table 5, we add measures of barriers to entry to our analysis. These supply-side variables, measured by a KPMG survey of practitioners, represent the time and expense of setting up a fund. These models indicate that the industry is smaller when barriers to entry are higher, and in particular when it takes 60 days or more to set up a fund (high setup time variable) and when setup costs are a larger fraction of average fund size. For example, nations with relative setup costs at the 25th percentile (0.015%) have a fund sector 4.6 percentage points larger than nations with relative setup costs at the 75th percentile (0.055%) (based on model (ix)). While higher barriers to entry are negatively related to industry size, the effect of strong fund-specific investor protection persists. In model (x), we include representative variables capturing investor protection (more required regulatory approvals for funds), potential demand (GDP per capita), and barriers to entry (high setup time). All remain significant and of the predicted sign. This regression also includes whether the country permits bearer shares, which is negatively associated with the development of the fund industry.

Note that we do not control for insider trading enforcement in these models—this variable is mainly relevant for the equity sector, which we study subsequently. For the same reason we do not include the variable measuring how the industry deals with conflicts of interest.

Two supply-side and one demand-side variable are never statistically significant and we do not include them in reported models: the number of distribution channels and the presence of deposit insurance on the supply-side, and the size of population on the demand-side. In addition, bank concentration and restrictions placed on banks when entering the securities market are not significant for the industry as a whole, and for the sake of brevity, we do not report models with these variables included. These variables are significant in some specifications for equity and bond funds and we report on these findings in subsequent sections.

Fund assets scaled by GDP. To test whether our results are sensitive to our measurement of primary assets, in Table 6 we use an alternative measure of industry size, namely, fund assets scaled by national GDP. While this measure has the

advantage of using an easily obtainable and verifiable scaling factor, it has the disadvantage of comparing a stock measure (the snapshot of mutual fund investments) to a flow measure (GDP), and hence is more difficult to interpret. However, given that it is used in many studies (see, e.g., La Porta et al., 1997; Beck et al., 2003), we report it as one measure of robustness.

Virtually all of the results we discuss above persist when we use this alternative way to scale industry size. National fund industries are larger (relative to GDP) in countries with stronger judicial systems, which provide for higher levels of investor protection for fund investors, where GDP is larger, the population is more educated, the industry is older, and defined contribution plans account for more of total pension activity. National fund industries are smaller in countries with higher barriers to entry, as measured by the expense to set up a fund, and in countries where institutional trading costs are high. The coefficients on the indicator variables for high disclosures and for bearer shares are actually larger in absolute terms than in Table 5, but they are estimated with less precision.

Fund assets scaled by population. To overcome the problem of comparing a stock measure with a flow measure, we normalize fund assets by the country's population and reexamine the robustness of our results. Our findings are reported in Table 7. They are very similar to those reported in Table 6, where industry size is scaled by GDP. All coefficients significant when the industry is scaled by GDP remain significant in these specifications. The effects of high disclosures and bearer shares are in the predicted direction, but they lack statistical significance.

Limited sample robustness check: aggregate wealth as a scaling measure. An additional scaling measure is the aggregate wealth level of the country. We are able to obtain data on country wealth from the OECD for a small subset of countries in our sample (17 countries). The measure of country wealth is defined as total financial assets of households and nonprofit institutions serving households. While this is not an exact measure of country wealth, this is the best available proxy we are able to find.¹¹ The correlation between our measure of AUM/primary securities and AUM/country wealth is very high ($\rho = 0.94$). We rerun our regression models using the new measure and find results consistent with those reported in Table 5, albeit they often lack statistical significance because the sample size is substantially reduced.¹²

Limited sample robustness check: domestic asset shares. One issue that arises in using primary domestic securities of a country as a deflator is that mutual funds often invest in nondomestic securities. To ascertain if this potentially biases our

¹¹We systematically attempt to collect these data from not only published sources, but also researchers in academia and in government research groups. We are grateful to Michèle Chavoix-Mannato for providing us with these data.

¹²While the OECD data contains aggregate wealth information for 17 countries, it only breaks out household holdings of mutual funds and other financial assets for 13 countries. Using the OECD's measure of fund holdings, we compute the fraction of total financial assets held in funds for these countries and relate this fraction to the explanatory variables employed previously. While the coefficients on the explanatory variables are generally in the same direction as in our other tests, the results are sometimes insignificant, likely because of the substantially reduced sample size.

measure of mutual fund assets scaled by primary securities, we use individual fund-level data which we obtain from Morningstar for 18 countries (Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland (Dublin), Italy, Japan, Luxembourg, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom, and the United States). We then use the investment objective of each fund to ascertain whether a fund can invest in foreign and/or domestic securities. If the fund can invest in domestic securities, or if a country of investment is not available, we assume all assets in the fund to be domestic. We use the assets in these “domestic funds” to compute the size of the mutual fund sector invested in domestic assets and normalize it by total mutual fund assets for the country under consideration. This variable captures the maximum fraction of domestic holdings in each country. Using this measure we then compute an adjusted measure of industry size as a fraction of the primary securities. The correlations between the unadjusted and adjusted measures of industry size are 0.85 for the industry as a whole and 0.95 for the equity fund sector, suggesting that our overall results are not likely to be affected by the fact that all mutual funds do not invest exclusively in the assets of their home country. When we repeat our analyses for this small subsample, we obtain results similar to those reported in Table 5 of the paper, but with reduced statistical significance.

We also employ an instrumental variables approach to address this issue. Typically, countries with a larger population have a greater fraction of fund assets invested in domestic securities. We use this relation to predict the domestic fraction of a country’s mutual fund assets for countries for which we do not have individual fund-level data. We use this predicted size of the mutual fund sector invested in domestic assets to adjust the ratio of AUM/primary securities and reestimate our regression models. All the coefficients in the regression models continue to remain statistically significant with one exception: the coefficient on the “fraction of defined contributions funds as a fraction of total pension funds” has a p -value of 0.16.

Panel analysis. In any cross-sectional analysis, one wonders whether the results are robust from year to year. In Table 8, we analyze a panel of fund size data (measured as fund industry assets divided by GDP) over the period 1996–2001. While our dependent variable changes from year to year, many of the explanatory variables remain unchanged, except for GDP per capita, the ratio of defined contribution plans to total pension plans, and trading costs. We have annual data for GDP per capita. For pension plans, we use 1998 data for the 1996–1998 period and the average of 1998 and 2003 for the 1999–2001 period. For trading costs, we use estimates over the 1996–1998 period for years up to 2000, and 2001 estimates for the final year. We estimate the model using clustered OLS, where the country is defined as the cluster; this procedure adjusts the standard errors to take into account the lack of independence of observations for the same country. All models also include year dummies, but we do not report the coefficients on these dummies for sake of brevity. The results we report in Table 5 persist in this panel analysis, and in some cases are even more pronounced. The fund industry is larger in nations with stronger judicial systems and which afford fund investors greater protection (through more required

regulatory approvals). It is larger in nations where GDP per capita is higher, the industry is older, and defined contribution plans predominate. It is smaller where barriers to entry and trading costs are higher and the country permits bearer securities. One new result, not present in our earlier analysis, is that the fund industry is smaller in countries with more concentrated banking sectors, consistent with the observation made by some businesspeople that the banking sector in many countries has been a barrier to fund distribution.

Analysis of industry growth rates. The fund industry is an important innovation; taken in this light, it is natural to study the characteristics of the economic environment that affect the rate of adoption (or diffusion) of this innovation. In Table 9, we analyze the growth rate in the fund industry from 1996 to 2001 as a function of the factors described above. Growth is measured as the change in the ratio of assets under management divided by GDP from 1996 to 2001.

The results are consistent with those we report earlier—growth is stronger in countries that have stronger judicial systems, that demand more regulatory approvals, and that have a higher GDP per capita (measured at the end of 1996). Growth is weaker where barriers to entry are higher. Finally, growth rates are higher in nations in which the industry is older, suggesting that most of the world fund industry is still relatively young and has not entered into the “flattening” phase of adoption, where growth slows with age. Trading costs are negatively related to industry growth, but the p -value is only 0.14 and we do not report this result in the table for sake of brevity.

Sector analyses. Tables 10 and 11 examine equity funds and bond/money market funds separately. We carry out these separate analyses because some factors should be more relevant for certain types of funds than others. For example, competition from banks is most pronounced in the money market and bond sector, where deposit products are a direct competitor to bond/money market funds. Or, certain types of investor protections—such as enforcement of insider trading laws—may be most pronounced in equity funds, where investors may face a structural information disadvantage.

Table 10 examines equity funds. The size of the equity fund sector is measured relative to the domestic stock market capitalization. The first four models mimic those of Table 5, and the findings are very similar to those reported in that table. The equity fund sector increases with the quality of the judicial system, the presence of more requirements for regulatory approval, GDP per capita, education, and industry age. Model (v) shows that the equity fund sector is larger in countries with lower institutional trading costs.

Models (vi)–(ix) contain a dummy variable to capture whether insider trading restrictions are enforced. This variable is consistently negative and significant: if insider trading restrictions are enforced, the equity mutual fund sector is less well developed, indicating that investors may be more willing to buy equities on their own rather than invest through a fund. This variable does not explain the relative size of the bond market sector (not reported in a table), consistent with the observation that insider trading is most relevant for equities. Model (vii) also shows that there is a positive relation between the size of the equity fund industry and the fraction of pension funds plans that are defined contributions.

Model (viii) includes our measure of the extent to which mutual fund regulation controls potential conflicts of interest between a fund and its investors. As mentioned previously, this variable is constructed by summing three indicators: (1) funds are not allowed to have a significant participation in companies in which they invest, (2) disclosure is employed to deal with conflicts of interest, and (3) there are regulatory requirements or industry best practice standards regarding internal control. These types of regulations may be most salient in the equity sector, as informational asymmetries may affect equity investors more than bond investors. The result indicates that in nations in which there are more mechanisms in place to deal with conflicts of interest, equity funds account for a larger share of national equities. That this result is only present for equities and not for bonds is consistent with the notion that some regulation differentially affects certain sectors. Note that the result for bonds is not reported in a table.

Finally, in model (ix) we include a dummy if banks are severely restricted from entering the securities business. The industry is 12.8 percentage points smaller when this is the case. Thus, the fund industry captures a larger fraction of the equity market when banks are less hindered in selling securities. This suggests that the U.S. model, where for a long while the industry developed at the expense of banks, is not typical.

In unreported models, we also include stock market turnover as a possible explanatory variable, but it is never significant.

Overall, the economic significance of the results is generally larger than what we observe in the earlier tables. For example, nations with GDP per capita at the 25th percentile have an equity fund sector 9.6 percentage points smaller than nations at the 75th percentile (based on model (ii)), compared to four percentage points in Table 5. The same change for DC plans leads to a 12.3 percentage point difference in industry size, compared to six percentage points in Table 5.

Table 11 focuses on bond funds. Again, we find that nations that demand additional regulatory approvals by the fund industry have larger bond fund sectors, although the magnitude of the coefficient is smaller than for equity funds. The coefficient on our measure of judicial system quality is insignificant. Likewise, for bond funds, GDP per capita, education, and the age of the industry are insignificant.

This is not to say that there are no factors associated with the vitality of a country's bond fund sector. In our discussions with practitioners, we were alerted to the competition between bond funds, bank products, and direct holdings of bearer bonds. Indeed, variables capturing the presence of these competitive products are associated with the size of the bond fund sector. In models (vii)–(ix) we find that countries that allow investors to own bearer securities have a smaller bond fund sector. Our discussions with industry experts provide a possible explanation for this result. The typical bond investor in many countries tends to purchase bonds at the time of issuance and holds them until maturity, relying on fixed coupon payments for income. Bearer bonds allow these investors to clip their bond coupons and redeem them for cash; if this happens outside the investor's home country, taxes are generally not withheld. In contrast, a bond fund purchase establishes a paper trail, which makes it more difficult to avoid income or estate taxes.

In models (vi) and (viii), we see that the concentration of the banking sector is negatively related to the size of the bond sector, and this effect is significant in model (viii).¹³ In nations where banks have greater market power, the bond fund sector has experienced more limited growth. This is not true for the equity sector. This difference is consistent with banks acting to protect their existing depository and fixed income products from the inroads of substitute bond and money market mutual funds. Finally, in models (v) and (ix), we include an indicator variable if banks face restrictions when entering the securities business. The coefficient on this dummy is negative in both specifications, but not statistically significant. We also find no significant relation between the presence of a deposit insurance scheme and the size of the bond fund sector (not reported in the table).

Summary. In this section we scale the assets under management of the fund industry in each country by primary domestic securities, GDP, population, and wealth. We study the recent growth rates of the national fund industries and analyze panel results over a five-year period. Finally, we separately analyze the equity and bond shares in each country. Remarkably, most of the key results persist through this battery of tests.

6. Conclusion

In this paper, we study the mutual fund industry around the world. Our sample of 56 countries controlled assets of \$11.7 trillion at the end of 2001, held in over 55,000 funds. For the median country, the industry comprises 9% of GDP and 4% of all primary securities. However, there is substantial cross-country variation in the development of the fund industry. Luxembourg and Ireland have the largest industries relative to the size of their economies. Both countries have engaged in domicile competition. Luxembourg has benefited tremendously from its stringent bank secrecy laws, whereas favorable tax treatment of fund management companies is responsible for the significant growth of Ireland. For the remaining countries, a combination of demand-side, supply-side, and legal and regulatory factors help explain why the fund industry is larger in some countries than in others.

Our results corroborate the findings from the law and economics literature that countries' rules and norms affect financial development. In particular, strong legal and regulatory factors have a positive impact on the size of the mutual fund industry, especially fund industry regulations addressing the process of approving fund starts, mandating fee and performance disclosures, and handling conflicts of interest between the fund management company and fund shareholders. Countries that more vigilantly protect fund shareholders' interests have larger industries. It is reassuring to see that this platitude is indeed true.

¹³This variable is highly correlated with the approvals variable, so that both variables are insignificant in the specification of model (vi).

The impact of investor protection is nuanced. While protecting mutual fund investors helps the industry, protecting individual equity investors apparently does not help the fund industry. Failure to enforce insider trading laws has a positive effect on the size of the equity fund industry, perhaps because fund investors are less confident of trading on their own against better informed insiders.

It appears that mutual funds are “advanced” financial products, flourishing in more developed economies. The fund industry is larger where per capita GDP is higher. Furthermore, investor wealth and education have a positive impact on industry size, at least for equity funds. Finally, like other innovations, fund adoption increases with the passage of time, as measured by industry age. These findings suggest that pushing funds in economies where development is at lower levels may not yield quick results. However, the result that the fund sector is larger in countries in which a greater proportion of pension funds are of the defined contribution type may suggest that there are ways to jump-start a fund industry.

As industrial economics considerations would suggest, barriers to entry affect industry size. The fund sector is smaller when it requires greater effort to set up a fund, measured by dollars or time. Also, the equity fund sector is smaller in countries where banks are restricted from entering the fund management business.

Finally, higher trading costs (as measured by the commissions paid by institutional investors and the price impact of their trades) have an adverse effect on the size of the mutual fund sector, suggesting that costly production technology available to fund promoters can diminish the attractiveness of mutual funds as an investment vehicle.

These results, while the product of a small number of country observations, seem robust to alternative measures of fund size and hold across the period 1996–2001. Furthermore, many of the same factors can explain the growth of the fund industry as well.

As we acknowledge elsewhere, these results are imperfect and cannot be interpreted recklessly. Our conclusions lay out working hypotheses rather than put issues to rest. For example, our finding that some types of regulation—typically, regulations that protect fund shareholder rights—lead to a larger fund industry needs additional study, probably in the form of detailed country-level analysis. Regulators are writing standards in the European Union and elsewhere to establish the appropriate forms of protection for fund investors. With literally trillions of dollars or Euros of wealth entrusted to the fund industry, nonpartisan scholarship should inform this debate. Furthermore, as the United States revisits its fund regulations, there is an opportunity to learn from the experience of other countries.

Appendix A

Definitions and sources of potential explanatory variables are given in Table A.1. (Names of variables used in the regression models have been italicized.)

Table A.1

Determinant	Variable	Source
<i>Panel A: legal, regulatory and governance characteristics</i>		
General investor protection	Efficiency of judicial system Rule of law Corruption Risk of expropriation Risk of contract repudiation (all these variables are scaled between 1 and 10, a higher number representing a better judicial system, less corruption, and lower risk of expropriation and repudiation) Summed-up value of above variables (<i>Judicial system quality</i>)	LLSV (1998)
Transparency of reporting	<i>Accounting standards</i> (Between 0 and 100—a higher number implies better standards)	LLSV (1998)
Insider trading	<i>Insider trading enforced</i> (= 1 if Yes)	Bhattacharya and Daouk (2002)
Mutual fund investor protection	Does fund startup require regulatory approval? (= 1 if Yes) Does the prospectus require regulatory approval? (= 1 if Yes) Summed-up value of above variables (<i>Approvals</i>) Do custodians need to be independent? (= 1 if Yes) (<i>Custodians independent</i>) Dummy if number of required fee and performance disclosures in fund advertising and prospectus is above the median (= 1 if Yes) (<i>High disclosures</i>)	KPMG (http://www.kpmg.ie/industries/fs/funds2002/index.htm), Thompson and Choi (2001), IOSCO (2002)
Taxation	<i>Tax rate paid by mutual fund families</i> Opportunity for tax evasion: Are bearer securities allowed? (<i>Bearer securities allowed</i>) (= 1 if Yes)	KPMG, EIU (2003)

Table A.1 (continued)

Determinant	Variable	Source
Potential conflicts of interest between the fund and fund investors	Are there regulatory requirements or industry best practice standards on internal control? (= 1 if Yes) The fund cannot have a significant participation in the company in which it invests? (= 1 if Yes) Can the fund use disclosure to deal with potential conflicts? (= 1 if Yes) Summed-up value of the above variables (<i>Dealing with conflicts</i>)	Thompson and Choi (2001)
<i>Panel B: characteristics of potential fund suppliers</i>		
Concentration of banking sector	Percentage of total banking assets held by top five banks (<i>Bank concentration</i>)	Cetorelli and Gambera (2001)
Breadth of distribution channels	Number of channels available to sell funds: banks, broker-dealers, direct sales, insurance companies, financial planners (<i>Number of distribution channels</i>)	IOSCO (2002)
Banks face serious restrictions from entering securities business	Indicator variable equal to one if banks are prohibited from entering securities business or banks and subsidiaries are restricted in their activities (<i>Securities business restrictions</i>)	Barth et al. (2001)
Ease of entry into the fund industry	<i>Cost of setting up a new fund</i> <i>Time required to set up a new fund</i> <i>Indicator variable which equals one if it takes more than 60 days to setup a fund</i> (<i>High setup time</i>)	KPMG
Presence of government-supported competitive financial products	<i>Existence of explicit deposit insurance for bank deposits</i> (<i>Presence of deposit insurance</i>) (= 1 if Yes)	Demirgüç-Kunt and Sobaci (2000)

Table A.1 (continued)

Determinant	Variable	Source
<i>Panel C: characteristics of potential fund buyers</i>		
Measures of economic development	<i>Per capita GDP</i>	World Bank (2003)
Market size	<i>Population</i>	World Bank (2003), EIU (2003)
Education and literacy of population	<i>Total years of education averaged for men and women (includes part-time education) (Education)</i> <i>Literacy rate (%)</i>	World Bank (2003)
Presence of information sources	<i>Newspaper circulation/population (%)</i> <i>Number of internet users/population (%)</i>	Dyck and Zingales (2004), World Bank (2003)
Industry age	<i>Age of the industry as of 2001 (in years)</i>	KPMG, Ernst & Young, Cadogan, Lexis-Nexis, Factiva, Country fund industry websites
Allocation of pension assets	<i>(Industry age)</i> Fraction of pension plans that are defined contribution <i>(Defined contribution funds/total pension funds) (%)</i>	Mercer Consulting (2003)
<i>Panel D: trading characteristics</i>		
Reliability of reported net asset value	Frequency of trading (annualized) <i>(Share turnover)</i>	World Bank (2003)
Cost of transacting in equity markets	Sum of explicit commissions and price impact (release price benchmark) <i>(Trading costs)</i>	Chiyachantana et al. (2004)

Appendix B

Countries in our sample are given in Table B.1.

Table B.1

This Appendix lists the 62 countries for which we report various measures of industry size in millions of dollars. A subset of 56 countries with data on our primary measure of industry size; assets under management (AUM) divided by a country's assets in "primary" domestic securities (equities, bonds, and bank loans) is used for our main empirical analysis. The data on industry size are as close to year-end 2001 as possible and are obtained from various sources. Data on the size of the equity and bond fund markets are obtained from FEFSI at the end of June 2002. For Belgium, France, and the Netherlands, we employ end of 2000 data because their stock exchanges merged and data on each country's stock market capitalization are not available for 2001. Data on the starting year of the open-end fund industry are obtained from various sources. For the Philippines and Chile, we use the first year for which we found a reference to the industry, but funds may have been available prior to that year. N/A implies that data on the sector size and/or deflator are not available, or that we cannot ascertain when the fund industry was established.

Country	Industry size	Equity sector size	Bond sector size	Industry/primary securities	Industry/GDP	Equity sector/stock market	Bond sector/credit market	Starting year
Algeria	0	0	0	0.000	0.000	N/A	N/A	N/A
Argentina	3,751	258	698	0.010	0.014	0.001	0.004	1960
Australia	334,016	252,330	111,092	0.378	0.934	0.673	0.218	1965
Austria	55,211	19,369	43,692	0.142	0.293	0.768	0.120	1956
Bangladesh	5	N/A	N/A	N/A	0.000	N/A	N/A	N/A
Belgium	70,313	61,106	12,112	0.099	0.306	0.336	0.023	1947
Brazil	148,189	8,499	113,240	0.213	0.295	0.046	0.223	1957
Burma	0	0	0	0.000	0.000	N/A	N/A	N/A
Canada	267,863	190,781	63,720	0.167	0.383	0.310	0.064	1932
Chile	5,090	344	5,949	0.042	0.077	0.006	0.094	1965
China	7,300	N/A	N/A	0.003	0.006	N/A	N/A	2001
Costa Rica	1,428	8	1,856	N/A	0.088	N/A	N/A	N/A
Croatia	384	N/A	N/A	0.024	0.019	N/A	N/A	1997
Czech Republic	1,778	1,101	1,720	0.041	0.031	0.120	0.051	1994
Denmark	33,831	16,688	21,845	0.075	0.209	0.196	0.060	1962
Ecuador	200	N/A	N/A	0.014	0.015	N/A	N/A	N/A
Finland	12,933	8,845	6,805	0.043	0.106	0.047	0.061	1987
France	721,973	394,113	435,309	0.212	0.550	0.272	0.223	1964
Germany	213,662	117,460	98,407	0.035	0.116	0.110	0.020	1949
Greece	23,888	9,264	13,696	0.108	0.205	0.110	0.100	1969
Hong Kong	170,073	152,119	45,637	0.203	1.051	0.301	0.138	1960
Hungary	2,260	314	3,070	N/A	0.044	0.030	N/A	1992
India	13,490	N/A	N/A	0.037	0.028	N/A	N/A	1964
Indonesia	764	N/A	N/A	0.007	0.005	N/A	N/A	1996
Ireland	191,840	N/A	N/A	0.823	1.856	N/A	N/A	1973
Israel	14,200	N/A	N/A	0.071	0.126	N/A	N/A	1936
Italy	359,879	164,962	210,490	0.128	0.330	0.245	0.098	1983
Japan	343,907	132,762	195,490	0.026	0.083	0.034	0.021	1965
Libya	0	0	0	0.000	0.000	N/A	N/A	N/A
Luxembourg	758,720	333,118	424,909	4.845	39.914	14.668	3.174	1959
Malaysia	10,180	N/A	N/A	0.040	0.115	N/A	N/A	1959
Mexico	31,723	2,775	29,068	0.090	0.051	0.022	0.130	1956

Table B.1 (continued)

Country	Industry size	Equity sector size	Bond sector size	Industry/primary securities	Industry/GDP	Equity sector/stock market	Bond sector/credit market	Starting year
Morocco	4,100	N/A	N/A	N/A	0.125	N/A	N/A	N/A
Netherlands	93,580	57,955	23,042	0.059	0.246	0.091	0.025	1929
New Zealand	6,564	4,577	1,415	0.071	0.132	0.257	0.019	1960
Norway	14,752	8,620	7,629	0.060	0.090	0.125	0.043	1993
Pakistan	375	N/A	N/A	0.013	0.006	N/A	N/A	1962
Peru	680	N/A	N/A	0.024	0.013	N/A	N/A	N/A
Philippines	211	45	306	0.003	0.003	0.002	0.005	1958
Poland	2,936	623	2,863	0.023	0.017	0.024	0.029	1992
Portugal	16,618	3,471	15,715	0.065	0.151	0.057	0.081	1986
Romania	10	0	21	0.001	0.000	0.000	0.004	1994
Russia	297	N/A	N/A	0.002	0.001	N/A	N/A	1996
Saudi Arabia	12,105	N/A	N/A	N/A	0.068	N/A	N/A	N/A
Singapore	7,538	6,546	848	0.016	0.088	0.056	0.002	1959
Slovakia	165	N/A	N/A	0.013	0.008	N/A	N/A	1992
Slovenia	1,538	N/A	N/A	0.131	0.082	N/A	N/A	1992
South Africa	14,561	8,924	6,677	0.076	0.129	0.101	0.065	1965
South Korea	119,439	55,085	84,314	0.165	0.283	0.237	0.172	1969
Spain	159,899	71,179	102,209	0.101	0.275	0.119	0.103	1958
Sri Lanka	44	N/A	N/A	0.008	0.003	N/A	N/A	1992
Sweden	65,538	53,776	7,563	0.129	0.313	0.231	0.027	1958
Switzerland	75,973	59,899	27,331	0.065	0.307	0.115	0.042	1938
Taiwan	49,742	9,434	51,904	N/A	0.176	0.032	N/A	1984
Thailand	8,430	N/A	N/A	0.052	0.071	N/A	N/A	1995
Tunisia	471	N/A	N/A	0.027	0.024	N/A	N/A	1991
Turkey	3,000	N/A	N/A	0.023	0.020	N/A	N/A	1986
United Arab Emirates	0	0	0	0.000	0.000	N/A	N/A	N/A
United Kingdom	316,702	288,210	44,347	0.061	0.222	0.134	0.014	1934
United States	6,974,976	3,430,935	3,200,076	0.193	0.683	0.245	0.144	1924
Uruguay	185	N/A	N/A	0.022	0.010	N/A	N/A	N/A
Yugoslavia	0	0	0	0.000	0.000	N/A	N/A	N/A

References

- Bams, D., Otten, R., 2002. European mutual fund performance. *European Financial Management* 8, 75–101.
- Barth, J.R., Caprio Jr., G., Levine, R., 2001. The regulation and supervision of banks around the world: a new database. World Bank Working Paper.
- Beck, T., Demirgüç-Kunt, A., Levine, R., 2003. Law, endowments, and finance. *Journal of Financial Economics* 70, 137–181.
- Bhattacharya, U., Daouk, H., 2002. The world price of insider trading. *Journal of Finance* 57, 75–108.
- Blake, D., Timmermann, A., 1998. Mutual fund performance: evidence for the U.K. *European Finance Review* 2, 57–77.
- Brown, S.J., Goetzmann, W.N., Hiraki, T., Otsuki, T., Shiraishi, N., 2001. The Japanese open-end fund puzzle. *Journal of Business* 74, 59–77.
- Cai, J., Chan, K.C., Yamada, T., 1997. The performance of Japanese mutual funds. *The Review of Financial Studies* 10, 237–273.
- Cetorelli, N., Gambera, M., 2001. Banking market structure, financial dependence, and growth: international evidence from industry data. *Journal of Finance* 56, 617–648.

- Chiyachantana, C.N., Jain, P.K., Jiang, C., Wood, R.A., 2004. International evidence on institutional trading behavior and price impact. *Journal of Finance* 59, 869–898.
- Dahlquist, M., Engstrom, S., Soderlind, P., 2000. Performance and characteristics of Swedish mutual funds. *Journal of Financial and Quantitative Analysis* 35, 409–423.
- Day, M.J., Harris, P.I., 1974. *Unit Trusts*. Oyez Publishing, London.
- Demirgüç-Kunt, A., Sobaci, T., 2000. Deposit insurance around the world: a database. Unpublished Working Paper, The World Bank.
- Dermine, J., Röller, L.H., 1992. Economies of scale and scope in french mutual funds. *Journal of Financial Intermediation* 2, 83–90.
- Dyck, A., Zingales, L., 2004. Private benefits of control: an international comparison. *Journal of Finance* 59, 537–600.
- Economist Intelligence Unit (EIU), 2003. CountryData database.
- Franks, J.R., Schaefer, S.M., Staunton, M.D., 1998. The direct and compliance costs of financial regulation. *Journal of Banking and Finance* 21, 1547–1572.
- Investment Company Institute, 2001. *Mutual Fund Fact Book*. Washington, DC.
- International Organization of Securities Commissions (IOSCO), 2002. Performance presentation standards for collective investment schemes.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W., 1997. Legal determinants of external finance. *Journal of Finance* 52, 1131–1150.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W., 1998. Law and finance. *Journal of Political Economy* 106, 1113–1155.
- Mercer Consulting, 2003. *Defined contribution retirement plans around the world: a guide for employers*.
- Merriman, O.C., 1965. *Mutual Funds and Unit Trusts: A Global View*. Pitman, London.
- Poterba, J.M., Samwick, A.A., 2003. Taxation and household portfolio composition: U.S. evidence from the 1980s and 1990s. *Journal of Public Economics* 87, 5–38.
- Rogers, E.M., 1995. *The Diffusion of Innovations*, fourth ed. Free Press, New York.
- Rouwenhorst, K.G., 2003. The origins of mutual funds. Unpublished Working Paper, Yale University.
- Thompson, J.K., Choi, S., 2001. Governance systems for collective investment schemes in OECD countries. OECD Financial Affairs Division, Occasional paper, No. 1.
- World Bank, 2003. *World Development Indicators Database*.