THE IMPACT OF CORPORATE GOVERNANCE ON INVESTMENT RETURNS IN DEVELOPED AND DEVELOPING COUNTRIES*

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We shed light on three conundrums in the literature on investment: why investments out of different sources of finance earn different returns, why different studies report different patterns of returns across sources of finance, and why companies in developing countries make greater use of external equity capital to finance their investment than do companies in developed countries. We show that the strength of corporate governance systems affects the preferred source of financing, which in turn helps to explain why investments financed in different ways exhibit significantly different rates of return. We find considerable differences between developed and developing countries in the effectiveness of corporate governance systems in aligning managers and shareholders' interests.

In this article we develop several hypotheses to explain (1) why contrary to standard neoclassical theory investments out of different sources of finance can earn significantly different rates of return, and (2) why different studies can record such dramatic differences in estimates of returns from the three main sources of finance, internal cash flows, new debt, and new equity. Our explanations for these differences rest on three assumptions: (1) that firms have different investment opportunities, (2) that managers pursue different objectives when undertaking investments, and (3) that managers are subject to different constraints in their pursuit of these goals. In particular, we shall emphasise the importance of various legal and other institutional constraints on managers that fall under the broad heading of *corporate governance structures*.[1]

In addition to clearing up several questions in the literature regarding returns on investment, we shall also provide at least a partial explanation for a puzzle first documented by Ajit Singh (1994) – the greater use of external finance and in particular, the greater use of equity to finance investment in some developing countries[2]

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[1] The recent literature on corporate governance stresses two conflicts of interest: the manager-shareholder and the large-small shareholder conflict: see among others Shleifer and Vishny (1997) and Gugler (2001). The main determinant of the presence of either conflict is ownership concentration. In those firms characterised by a dispersed ownership structure (e.g. in many Anglo-Saxon firms), the former conflict is more likely, in those firms where a large and dominant shareholder is present (e.g. in Continental Europe or Asia), the latter conflict is more likely. Thus, we use the term 'manager' synonymously to manager or owner-manager.

[2] Singh's findings are based on data from the 100 largest manufacturing companies listed on stock exchanges in Brazil, India, Jordan, Malaysia, Mexico, Pakistan, South Korea, Thailand, Turkey and Zimbabwe over the 1980–90 period. The financing ratios – internal finance (retained profits, net of depreciation), equity and long-term debt (bond issues and long-term bank loans) are calculated as a proportion of the growth of net assets. See Singh and Hamid (1992) for an earlier study and also Singh (1995) as a robustness check. Cobham and Subramaniam (1998) present a different methodology and competing results for India.

than occurs in the developed countries. Studies in the US and UK, which have tried to explain the strong preference for internal funds to finance corporate investments, have cited factors like transaction costs (Duesenberry, 1958), asymmetric information (Fazzari *et al.*, 1988; Myers and Majluf, 1984), and agency problems (Grabowski and Mueller, 1972). But, if the transaction costs of using external capital markets are so high that they prevent firms in developed countries like the US and Switzerland from investing when they lack the internal cash flows to finance these investments, then one expects cash flow to be an even more important source of finance in developing countries like Mexico and Indonesia, since the transaction costs of raising capital externally must be higher in these developing countries.[3] If external capital markets have difficulty gauging the returns on investment in countries like the UK and Germany with well-established stock markets and banking sectors, how difficult it must be for the rather undeveloped financial sectors in countries like Pakistan and South Korea to make these evaluations. Nor is it obvious why agency problems – one of the explanations for a hierarchy of finance – should be more serious in the major developed countries of the world, than in developing countries. Singh's finding of greater popularity for external finance in developing countries seems to contradict the various hypotheses about why a hierarchy of finance exists. The hypotheses developed and tested in this article both help to explain the greater use of equity markets to finance investment by some firms in developing countries and the differences in patterns of returns across firms and countries.

In particular, corporate governance institutions appear to be weaker in developing than in developed countries and thus provide less of a check on managers in developing countries who wish to issue equity to finance low return investments. Managers who wish to undertake low return investments in countries with strong corporate governance systems accordingly prefer to rely on internal cash flows to finance these investments, managers making similar investments in countries with weak corporate governance systems are freer to use the equity market as a source of finance. Thus, differences in corporate governance structures will be seen to explain both differences in the sources of finance for investment across countries and differences in the returns on investment.

We proceed as follows: Section 1 briefly reviews past studies regarding the existence of a hierarchy in returns on investment. The logic underlying our main hypotheses follows in Section 2. Section 3 discusses the methodology used to test these hypotheses. The data used are briefly discussed in Section 4 with our main findings presented in Section 5. Section 6 is devoted to testing hypotheses about the relative importance of different sources of finance across countries. It is followed by a brief concluding section.

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[3] Glen and Pinto (1994) argue that transaction costs of raising external finance can be exceptionally high in developing countries. They report that issuance costs amount to 20% of small issues (issues less than $1 million) and of 6% of large issues (exceeding $66 million). These numbers are about 50% higher than corresponding issues for the US (Smith, 1977).

1. Background

A stylised fact in the investment literature is that there exists a *hierarchy of finance* (Hubbard, 1998). Firms first resort to internal cash flows to finance their investments, secondly to issuing debt and last of all to the equity market.

Evidence of a similar hierarchy of finance can also be found in the literature measuring the *returns on investment*. Baumol *et al.* (1970) (hereafter BHMQ) estimated rates of return on the reinvested cash flows of large US companies in the 1950s and 1960s over a range between 3.0 and 4.6%. These estimates were both much lower than the costs of capital for large companies in the 1950s and 1960s, and than BHMQ's estimates of returns on investment out of new debt and equity issues (see Table 1). The ordering of BHMQ's estimates corresponds to that postulated in the hierarchy of finance literature. BHMQ accounted for their low estimates of returns on investment out of cash flows as evidence of the exercise of managerial discretion in the pursuit of growth.

BHMQ's article sparked several subsequent studies. Space precludes a thorough review of this literature but some comments seem in order. The results for the studies estimating separate returns on different sources of funds are summarised in Table 1.[4] Friend and Husic (1973) claimed that BHMQ's results were spurious because, for among other reasons, BHMQ measured returns for a sample that included many firms that issued neither debt nor equity. When the sample was restricted to firms issuing debt and equity, differences in the returns out of the three sources of funds disappeared (see Table 1). BHMQ countered (Baumol *et al.*, 1973) by showing that the returns on reinvested cash flows for companies issuing no debt and equity *were even lower* than their original estimates.

Both Brealey *et al.* (1976) and McFetridge (1978) rejected BHMQ's conclusion that reinvested cash flows earn lower returns than investments out of other sources of finance, because the differences in returns that they estimated were often not statistically significant. As can be seen in Table 1, by comparing the midpoints of the ranges of McFetridge's most preferred specification, however, the differences in estimated returns are often *economically* significant. The lack of statistical significance between these estimated returns is obviously due to the large standard errors associated with each estimate. But this in itself implies both considerable heterogeneity across firms and that some firms in the sample must be earning returns on reinvested cash flows that are substantially below the estimates reported.[5]

Where the early literature relied entirely on accounting data, some more recent work employs both accounting and stock market data to estimate returns on investment. This methodology allows one to calculate what is essentially a *marginal* Tobin's q, namely the ratio of the returns on a company's investment, r, to its cost of capital i. This methodology is employed in this study and is described below.

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[4] We report only the main or most representative findings from each study. For further discussion, see Mueller (1987), pp. 36–41.

[5] Whittington's (1972, 1978) methodology differed so much from that employed by the other studies that his results are difficult to compare with theirs. Little and Raynor (1966) is another alternative approach confined to the return on retained earnings.

Table 1

Previous Estimates of Returns on Investment Out of Different Sources of Funds
(r = return on investment, i = cost of capital)

Study	Country (Legal Origin)	Time Period	Measure of Returns	Cash Flow	New Debt	New Equity
BHMQ (1970)	US	1949–63	r	3.0 – 4.6	4.2 – 14.0	14.5 – 20.8
Friend and Husic (1973)	US	1951–63	r	1.0 – 17.2	1.4 – 14.9	1.1 – 17.5
BHMQ (1973)	US	1952–63	r	−10.1 – −2.1		
Brealey *et al.* (1976)	UK	1949–63	r	6.1 – 6.6	6.1 – 6.5	6.1 – 6.7
McFetridge (1978)	Canada	1961–70	r	4.7 – 10.8	6.9 – 12.0	11.9 – 14.4
Mueller and Reardon (1993)	US	1969–88	r/i	0.56	0.92	0.65
Mueller and Yurtoglu (2000)	English	1985–96	r/i	0.69	1.05	1.15
	Scandinavian			0.93	1.02	1.42
	German			0.40	1.06	1.16
	French			0.42	0.98	0.97

It was developed and first employed by Mueller and Reardon (1993). Their main finding was that 8 out of 10 of the 699 large US corporations in their sample had returns on investment less than their cost of capital over the period 1969 to 1988. They also estimated returns from different sources of funds (Table 1). As did BHMQ, Mueller and Reardon estimated returns on investment out of cash flows far below company costs of capital ($r/i = 0.56$). In contrast, returns on investment out of new debt issues were both significantly greater than for investments out of cash flows and nearly equal to their costs of capital ($r/i = 0.92$). Unlike BHMQ's estimates, however, they found significantly *lower* returns on investment financed through new equity issues than from new debt. This at first surprising result is accounted for below.

The recent study by Mueller and Yurtoglu (2000) comes closest to ours. They employ the Mueller/Reardon methodology to estimate separate marginal qs for countries grouped according to the origins of their legal systems as classified by La Porta *et al.* (hereafter LLSV) (1997). As can be seen in Table 1, the same hierarchy of finance posited in the determinants of investment literature, and observed in BHMQ's estimates of returns on investment, reappears in some, but not all, of the estimates of Mueller and Yurtoglu.

2. Hypotheses

Agency problems can exist in any country. For these problems to manifest themselves as low returns on investment, two conditions must be satisfied: (1) Managers must feel secure enough in their positions to be able to undertake low-return investments without losing their jobs. (2) They must be able to obtain the funds to finance the investments. The first condition is related to corporate governance structures. Where they align managerial and shareholders' interests, *ceteris paribus*, firms will earn higher returns on investment out of all sources of funds. We shall define a corporate governance system that brings about such an alignment as being *strong*, and formulate

HYPOTHESIS 1. *In countries with strong corporate governance systems the average* $q_{mI} \geq 1$, *where* q_{mI} *is the ratio of the returns on a company's total investment to its cost of capital.*

A weak corporate governance system might simply be defined as the converse to a strong system. Here, however, one must recognise that some firms have attractive investment opportunities in countries with weak corporate governance systems. No conflict over investment policies for these companies may exist, as both the managers and the shareholders wish to see the firm exploit its investment opportunities. Since we test our hypotheses over large groups of countries, however, it seems reasonable to assume that the average firm has normal investment opportunities and, thus, if its managers take advantage of the weakness of its corporate governance system, they will overinvest. This leads to

HYPOTHESIS 2. *In countries with weak corporate governance systems the average* $q_{mI} < 1$.

We hasten to add, however, that Hypothesis 2 is consistent with the existence of individual firms in a country with a weak corporate governance system having a $q_{mI} \geq 1$ and even with entire countries with weak corporate governance systems having average $q_{mI}s \geq 1$.

We employ two criteria for classifying countries by the strengths of their corporate governance systems – the nature of their legal system and their level of development. LLSV (1997, 1998) have examined the content and historical development of legal institutions in different countries and presented evidence that *common* law systems offer shareholders greater protection against managerial abuse of their position than do *civil* law systems.[6] This categorisation has also been successfully employed by Mueller and Yurtoglu (2000) in their study of investment performance as already noted.[7] Our first criterion for distinguishing between corporate governance systems is, therefore, by the origin of their legal systems.[8]

HYPOTHESIS 3. *Countries with English-origin legal systems have strong corporate governance systems, while countries with civil-law legal systems have weak corporate governance systems.*

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[6] One referee suggested that managers may be held in check in continental European countries by the presence of large block shareholdings. Indeed, both large block shareholdings and thin equity markets are likely to be consequences of weak corporate governance institutions. Our results can thus be viewed as tests of the efficacy of large block holders as substitutes for strong legal institutions as protection for shareholders.

[7] Recent studies which also employ the LLSV classification include Himmelberg *et al.* (2000) and Demirgüç-Kunt and Maksimovic (2000).

[8] Within the civil-law systems LLSV also have distinguished among French, German and Scandinavian systems, as did Mueller and Yurtoglu. Our interest in this paper, however, is directed more toward the distinction between developed and developing countries. No Scandinavian country can be classified as developing, and only two of the German-origin countries in LLSV's schema (South Korea and Taiwan) fall into this category. Thus, we have limited our attention to the broader English versus civil law distinction.

The countries falling into each category are identified in Table 2, where we also present summary statistics for the variables used in this study.

We think that it is also reasonable to assume that holding legal institutions fixed, developing countries have weaker corporate governance systems than do developed countries. Law enforcement agencies are often underfunded in developing countries and their personnel more willing to accept bribes. Judges are often poorly trained and paid in developing countries. For these reasons, we believe that the laws and regulations covering corporate governance will be more vigorously and consistently enforced in developed countries than in developing countries.

HYPOTHESIS 4. *Developed countries have stronger corporate governance systems than developing countries.*

The countries, which we categorise as developed and developing, are also identified in Table 2. Most of these categorisations are uncontroversial. Some might argue, however, that a country with as high of a *per capita* income as Singapore should no longer be thought of as developing, and for the same reason perhaps that Greece should be. Singapore, Taiwan and South Korea are often referred to as 'emerging markets', however, and included in mutual funds of emerging-market countries (Kaminsky *et al.*, 2001). We thus are willing to defend our choices on this basis.

As noted at the beginning of this Section, to invest in a project with a return less than the firm's cost of capital, its managers must not only possess the discretion afforded by a weak corporate governance system but also the funds to undertake the investment. The allocation of a company's internal cash flows is entirely at the discretion of the managers, and this source of funds will be preferred by managers of firms with $q_{mI} < 1$. Contrary to the usual reasoning in the hierarchy of finance literature, however, we hypothesise that the next preferred source of finance for managers investing in low returns projects is *equity* rather than debt. The decision to issue equity or not lies with the firm's management. Additional funds beyond those available from internal cash flows can always be raised by going into the equity market. In contrast, an application for a loan to a bank may be turned down. Moreover, even if the loan is granted, it will contain specific interest obligations and perhaps include a claim on certain assets of the firm in case it defaults. Debt holders can under certain conditions force firms into bankruptcy. For all these reasons, debt is a much less attractive source of funds for managers making poor investments than either internal cash flows or new equity.[9] Thus, within a sample of companies with $q_{mI} < 1$, we expect the firms with the lowest returns on investment to favour internal cash flows and new equity as sources of finance. This leads us to

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[9] Lang *et al.* (1996) find that the existence of debt curtails investment by firms with poor prospects. Our argument is similar. Firms with poor prospects prefer to finance them with equity rather than debt because, in the language of Hart (2001), creditors are a 'tougher' source of capital for low return firms.

Table 2
Summary Statistics and Sample Composition by Country

Country	Sample period	Number of firms	Accounting standards	Creditor rights	Contract enforceability	$\Delta M_t/M_{t-1}$		Investment$_t$/ M_{t-1}		CF_t/M_{t-1}		$\Delta D_t/M_{t-1}$		$\Delta E_t/M_{t-1}$	
						Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Australia	1985–2000	346	75	1	3.04	0.127	0.508	0.154	0.250	0.040	0.128	0.015	0.147	0.060	0.152
Bermuda	1985–2000	215	na	na	na	0.087	0.519	0.148	0.264	0.048	0.149	0.008	0.172	0.040	0.109
Canada	1985–2000	1,478	74	1	3.27	0.165	0.528	0.165	0.244	0.050	0.121	0.025	0.164	0.057	0.137
Cayman Islands	1985–2000	42	na	na	na	0.169	0.602	0.154	0.273	0.058	0.202	0.019	0.193	0.049	0.131
Great Britain	1985–2000	1,331	78	4	3.42	0.116	0.434	0.180	0.241	0.063	0.087	0.016	0.122	0.049	0.159
HongKong*	1985–2000	127	69	4	na	0.090	0.464	0.132	0.232	0.045	0.104	0.020	0.159	0.042	0.127
India*	1988–2000	246	57	4	1.94	0.084	0.487	0.152	0.211	0.057	0.058	0.002	0.103	0.041	0.131
Ireland	1985–2000	63	na	1	3.16	0.183	0.512	0.201	0.276	0.061	0.086	0.038	0.166	0.057	0.144
Israel*	1985–1999	56	64	4	2.97	0.271	0.708	0.171	0.228	0.028	0.122	0.033	0.153	0.042	0.114
Malaysia*	1985–2000	381	76	4	2.28	0.192	0.564	0.137	0.237	0.045	0.083	0.024	0.145	0.034	0.135
New Zealand	1985–2000	66	70	3	na	0.058	0.361	0.110	0.246	0.053	0.077	0.000	0.169	0.023	0.101
Pakistan*	1993–2000	46	na	4	1.66	−0.047	0.302	0.236	0.349	0.097	0.135	−0.013	0.168	0.013	0.060
Singapore*	1985–2000	208	78	4	3.17	0.125	0.504	0.126	0.188	0.049	0.070	0.014	0.127	0.031	0.100
South Africa*	1985–2000	118	70	3	2.70	0.098	0.511	0.154	0.185	0.091	0.089	0.007	0.101	0.025	0.089
Thailand*	1986–2000	243	64	3	2.23	0.054	0.463	0.181	0.285	0.068	0.124	0.017	0.162	0.047	0.176
US	1985–2000	8,591	71	1	3.54	0.124	0.510	0.149	0.234	0.040	0.129	0.023	0.156	0.026	0.115
English	1985–2000	13,557	71	3.5	3.00	0.127	0.504	0.155	0.237	0.046	0.122	0.022	0.152	0.035	0.127
Denmark	1985–2000	101	62	3	3.27	0.055	0.371	0.199	0.249	0.085	0.073	0.006	0.118	0.032	0.149
Finland	1985–2000	79	77	1	3.00	0.107	0.414	0.159	0.210	0.089	0.076	−0.004	0.141	0.024	0.102
Norway	1985–1999	103	74	2	3.44	0.113	0.464	0.178	0.243	0.070	0.090	0.017	0.158	0.039	0.120
Sweden	1985–2000	156	83	2	3.31	0.136	0.437	0.192	0.271	0.078	0.067	0.004	0.141	0.052	0.192
Scandinavian	1985–2000	439	64	2	3.29	0.104	0.424	0.184	0.248	0.080	0.077	0.006	0.140	0.038	0.150
Austria	1985–2000	82	54	3	3.30	0.024	0.368	0.215	0.287	0.107	0.105	0.019	0.165	0.031	0.149
Germany	1985–2000	425	62	3	3.39	0.056	0.350	0.233	0.263	0.107	0.112	0.011	0.133	0.026	0.111
Japan	1985–2000	2,219	65	2	3.12	0.064	0.343	0.111	0.147	0.035	0.046	0.022	0.102	0.018	0.061
South Korea*	1988–1999	82	62	3	2.20	0.310	0.487	0.316	0.329	0.066	0.152	0.138	0.277	0.032	0.058
Switzerland	1985–2000	160	68	1	3.59	0.109	0.375	0.205	0.260	0.099	0.092	0.003	0.140	0.025	0.127
Taiwan*	1988–1999	126	65	2	2.53	0.067	0.453	0.154	0.190	0.041	0.047	0.026	0.089	0.062	0.148

Table 2
Continued

Country	Sample period	Number of firms	Accounting standards	Creditor rights	Contract enforceability	$\Delta M_t/M_{t-1}$ Mean	SD	Investment$_t$/ M_{t-1} Mean	SD	CF_t/M_{t-1} Mean	SD	$\Delta D_t/M_{t-1}$ Mean	SD	$\Delta E_t/M_{t-1}$ Mean	SD
German	1985–2000	3,094	63.5	2.5	3.21	0.067	0.351	0.138	0.188	0.050	0.071	0.021	0.114	0.021	0.080
Argentina*	1989–2000	24	45	1	2.07	0.046	0.361	0.257	0.318	0.128	0.188	0.055	0.154	0.030	0.180
Belgium	1985–2000	79	61	2	3.27	0.082	0.359	0.234	0.319	0.101	0.078	0.012	0.153	0.020	0.095
Brazil*	1989–2000	133	54	1	2.02	0.127	0.624	0.120	0.317	0.058	0.203	−0.006	0.107	0.021	0.156
Chile*	1988–1999	73	52	2	2.42	0.082	0.426	0.160	0.167	0.086	0.074	0.030	0.106	0.028	0.090
Colombia*	1989–1999	15	50	0	1.93	−0.009	0.530	0.175	0.215	0.100	0.119	0.017	0.119	0.031	0.105
France	1985–2000	495	69	0	2.46	0.085	0.370	0.227	0.271	0.101	0.094	0.005	0.147	0.032	0.115
Greece	1988–1999	49	55	1	2.33	0.560	0.679	0.443	0.453	0.086	0.065	0.038	0.139	0.286	0.433
Indonesia*	1989–1999	132	na	4	1.73	0.136	0.551	0.185	0.305	0.044	0.134	0.044	0.181	0.055	0.182
Italy	1985–2000	150	62	2	2.06	0.066	0.351	0.183	0.252	0.096	0.082	0.006	0.170	0.027	0.105
Luxembourg	1986–2000	12	na	na	na	0.126	0.450	0.190	0.185	0.094	0.088	0.046	0.144	0.028	0.120
Mexico*	1986–1999	81	60	0	1.83	0.094	0.464	0.198	0.247	0.105	0.125	0.025	0.136	0.029	0.121
Netherlands	1985–2000	174	64	2	3.27	0.101	0.373	0.221	0.233	0.101	0.075	0.018	0.124	0.036	0.143
Netherlands Antilles	1985–2000	19	na	na	na	0.083	0.392	0.134	0.206	0.050	0.099	0.028	0.128	0.029	0.099
Panama*	1985–2000	4	na	na	na	0.100	0.356	0.072	0.117	0.052	0.038	0.002	0.115	0.001	0.024
Peru*	1992–2000	20	38	0	1.73	0.073	0.522	0.279	0.376	0.239	0.304	−0.005	0.126	0.014	0.057
Philippines*	1985–1999	83	65	0	1.81	0.079	0.526	0.140	0.259	0.057	0.126	0.022	0.220	0.036	0.097
Portugal	1988–1999	49	36	1	1.91	0.115	0.413	0.248	0.327	0.100	0.083	0.023	0.159	0.044	0.165
Spain	1985–1999	117	64	2	2.56	0.099	0.390	0.207	0.298	0.087	0.087	0.010	0.153	0.064	0.210
Turkey*	1990–1999	29	51	2	1.99	0.402	0.814	0.415	0.418	0.216	0.212	0.038	0.121	0.128	0.274
Venezuela*	1991–2000	10	40	na	1.69	−0.121	0.323	0.106	0.200	0.085	0.129	−0.039	0.164	0.024	0.063
French	1985–2000	1,748	54.5	1	2.02	0.100	0.429	0.210	0.281	0.093	0.109	0.014	0.150	0.039	0.150
Transition Countries*	1994–1999	85	na	na	na	0.030	0.309	0.210	0.241	0.126	0.123	−0.008	0.146	0.013	0.029
African Countries*	1994–1999	17	na	na	na	−0.032	0.285	0.142	0.123	0.115	0.061	−0.002	0.080	0.009	0.018
China*	1994–1999	70	na	na	na	0.034	0.498	0.279	0.368	0.125	0.167	0.046	0.218	0.022	0.124
All	1985–2000	19,010	64	2	2.54	0.113	0.474	0.156	0.234	0.051	0.114	0.021	0.146	0.033	0.122

*indicates that the country is classified as a developing country. The group of transition countries includes 85 firms from Czech Rep., Estonia, Croatia, Hungary, Lithuania, Poland, Romania, Russia, and Slovakia. The group of African countries includes 17 firms from Gabon, Ghana, Kenya, Liberia, and Zambia.

HYPOTHESIS 5. *For companies with* $q_{mI} < 1, 1 > q_{mD} > q_{mCF}$, *and* $q_{mD} > q_{mE}$, *where* q_{mCF}, q_{mD} *and* q_{mE} *are the marginal qs on reinvested cash flows, new debt and new equity.*

We assume that the legal rights of debt holders in all countries are sufficiently strong for Hypothesis 5 to hold.

It should be stressed that Hypothesis 5 is consistent with both the existence of rational expectations on the part of shareholders, *and the purchasers of new equity earning a normal return on their investment.* To see this assume that the market expects today's assets for a company to generate a permanent profit stream, π. It has N_0 shares outstanding and a cost of capital of i. Then today's share price, P_0, must be such that $\pi/i = P_0 N_0$. Now suppose that the firm decides to issue M shares to finance an investment of I, which will earn a return of r, $r < i$. Under the efficient capital market assumption, as soon as the company announces its intention to finance this investment its share price falls to P_1, where $(\pi + rI)/i = P_1(N_0 + M)$. The managers of the firm must obviously select M such that $P_1 M = I$. The purchasers of the newly issued shares will earn a normal return on their purchase, just as the old shareholders will – based on the new, lower share price. The old shareholders will bear all of the capital loss from the managers' decision to invest at an $r < i$. Of course, the new shareholders must consider that the managers may issue equity again in the future, and thus factor any likely future capital losses into the price they are willing to pay today for the firm's shares. But, so long as the firm pays some dividends now or in the future, there will be a positive price for shares issued today, and the management can raise funds for investment.

Consider now firms with $q_{mI} \geq 1$. Unlike those with $q_{mI} < 1$, these companies appear to be maximising shareholder wealth or at least trying to do so. In a frictionless world with a perfect capital market, a firm which maximised its shareholders' wealth would equate its marginal return on investment, mrr_I, to its cost of capital, i. Two possible situations are depicted in Figure 1. On the left is a firm whose optimal level of investment, I^*, is less than its internal cash flows, F. This firm issues no debt or equity and pays out $F - I^*$ in dividends. The marginal q that we estimate equals the ratio of a firm's return on its total investment, r, relative to its cost of capital, i.[10] Thus, for the firm in Figure 1(a), $q_{mI} = q_{mCF} = r/i = (a + b)/b > 1$.

The optimal investment for the firm in Figure 1(b) exceeds its cash flows, and this firm maximises shareholder wealth by paying no dividends and issuing debt or equity equal to $I^* - F$. If we assume that it issues $I^* - F$ in debt, then we have, $q_{mCF} = (c + d)/d > q_{mD} = (e + f)/f > 1$.

In a neoclassical world where the costs of external and internal capital are the same for all forms of capital, $I^* - F$ for the firm in Figure 1(b) might be financed out of new debt or equity, and would be expected to have a lower return than the investment out of cash flow in either case. In the real world, however, the choice between debt and equity can be expected to depend on other factors. Companies

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[10] We call this ratio a *marginal q* because it is marginal to the firm's total capital stock, and thus is marginal in comparison to Tobin's *q* which equals the ratio of the firm's returns on its total assets to its cost of capital. See discussion in the next Section.
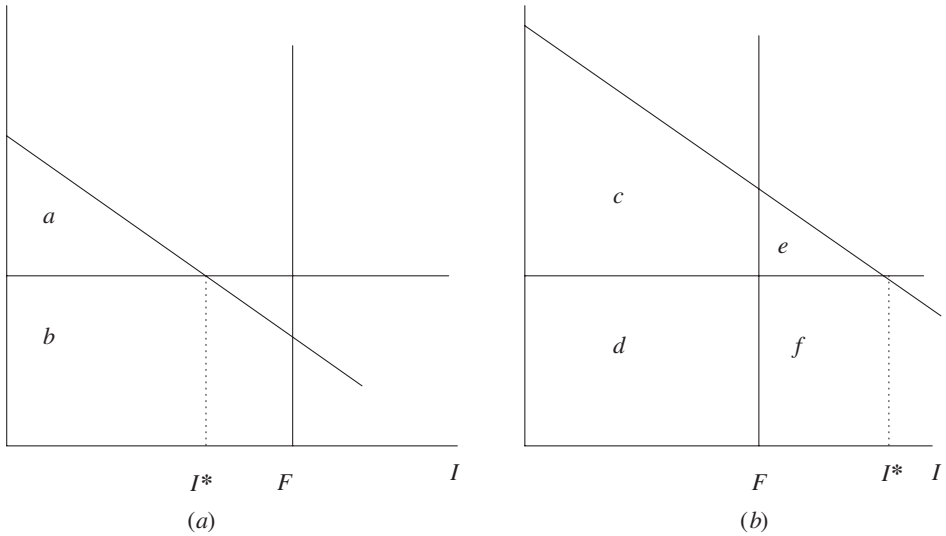
Fig. 1. *Returns on Investment Out of Different Sources of Funds*

with investment opportunities as depicted in Figure 1(*b*) are often young firms with potentially attractive investment opportunities, but also often with high risks associated with these investments. These firms may find it difficult to obtain loans from banks, and may be unwilling to constrain their future actions by issuing debt. Entering into the equity market may be the most attractive course of action once all internal cash flows have been exhausted. These considerations lead us to expect both higher mean returns and higher variances around these returns for $q_{mI} \geq 1$ firms issuing equity, and thus to

HYPOTHESIS 6. *For companies with $q_{mI} \geq 1$, $q_{mCF} > q_{mD} \geq 1$.*

And a bit more tentatively

HYPOTHESIS 7. *For companies with $q_{mI} \geq 1$, $q_{mE} > q_{mD} \geq 1$.*

With the accompanying

HYPOTHESIS 8. *For companies with $q_{mI} \geq 1$, the variance around q_{mE} exceeds the variance around q_{mD}.*

The reader will have observed that *none* of our hypotheses postulates the pattern of returns first observed by BHMQ, $q_{mCF} < q_{mD} < q_{mE}$. Hypotheses 5–7 imply that such a pattern might be observed, however, in a sample that *mixes* companies with $q_{mI} \geq 1$, and companies with $q_{mI} < 1$. If, for example, most companies with $q_{mI} < 1$ do not issue any debt or equity, while the firms issuing debt and equity tend to have $q_{mI} \geq 1$, then the ordering of q_{mCF} and q_{mD} is likely to correspond to

hypothesis 5, while the ordering of q_{mD} and q_{mE} matches Hypothesis 7. This leads us to formulate

HYPOTHESIS 9. *When the pattern $q_{mCF} < q_{mD} < q_{mE}$ is observed, it will only be for samples that include companies with both $q_{mI} \geq 1$ and $q_{mI} < 1$.*

Hypotheses 5–7 and 9, if confirmed, would account for the somewhat perplexing patterns of returns observed in previous studies estimating separate returns on investments out of different sources of finance (see Table 1). It is our contention that the decision to enter the external capital market, the choice between debt and equity and the returns earned on each depend on whether the firm is behaving like the standard firm of neoclassical theory ($q_{mI} \geq 1$), or one subject to agency problems ($q_{mI} < 1$). Although it is possible that the pattern $q_{mCF} < q_{mD} < q_{mE}$ will be observed, whether it is or not will depend on the relative sizes of the two groups of firms and the proportions of companies in each group that do or do not issue debt and equity.

The categorisations 'English-origin', 'developed' etc. encompass a broad range of institutional features that affect corporate governance structures. As a further test of the importance of legal institutions, therefore, we shall examine the impact of three specific types of institutions.

Shareholders should be able to protect themselves better against self-serving managers and to make better decisions regarding the purchase of new equity issues, the better the quality of accounting information at their disposal. *The Center for International Financial Analysis and Research* (Bavishi, 1993) has ranked a large sample of countries according to the number of desirable pieces of information each country's accounting standards require to be published. The scale of this index for the countries in our study runs from a low of 36 for Portugal to a high of 83 for Sweden with a median of 64. We have classified any country with a score of 64 or more as having a strong set of accounting standards, with a score of less than 64 as having weak accounting standards.[11] Using this classification we shall test

HYPOTHESIS 10. *In countries with strong accounting standards, q_{mCF} and q_{mE} are higher than in countries with weak accounting standards.*

It is possible, of course, that an improvement in equity's performance comes to some extent at the expense of debt holders, and not simply from a reduction of managerial discretion and an improvement in investment performance. We shall also be interested, therefore, in seeing whether strong accounting systems are associated with *lower* returns on investment financed through new debt issues.

When managers renege on their side of the contractual bargain, investors and creditors must appeal to the courts. A particularly important institutional difference across countries for investors, therefore, concerns the efficacy of a county's legal institutions in enforcing contracts. Using data from *Business Environmental Risk Intelligence* (*BERI*) Knack and Keefer (1995) have constructed an index of the relative degree to which contractual agreements are honoured and complications

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[11] Our breakdown of the countries into the two categories is given in Table 2.

in contracting arise due to language and mentality differences. This index takes on values ranging from 0 to 4, with higher scores for superior quality. In our sample the index runs from a low of 1.66 for Pakistan to a high of 3.59 for Switzerland with a median of 2.54. We have classified countries with a score of 2.54 or more as having strong contract enforceability, with a score of less than 2.54 as having weak enforceability. We shall test

HYPOTHESIS 11. *In countries with strong contract enforcement, q_{mCF} and q_{mE} are higher than in countries with weak enforcement.*

Note that there is no reason to expect strengthened contract enforcement, unlike stronger accounting standards, to favour shareholders over debt holders. Indeed, debt holders are also likely to benefit from strong contract enforcement.

LLSV (1998) have examined the rights of creditors in different countries and ranked them on a scale of zero to four, with four representing the strongest rights. Using this index we have classified any country with a score of 3 or 4 as having strong creditor rights, with a score less than 3 as having weak creditor rights.[12] We anticipate superior performance on investments made out of new debt issues in countries with strong creditor rights, and possibly poorer performance for investments financed out of cash flows or new equity issues in these countries.

HYPOTHESIS 12. *In countries with strong creditor rights, q_{mD} is higher than in countries with weak creditor rights.*

We turn now to a discussion of the methodology used to test these hypotheses.

3. Methodology

Let I_t be a firm's investment in period t, CF_{t+j} the cash flow this investment generates in $t + j$, and i_t the firm's discount rate in t. The present value of this investment, PV_t, is then

$$PV_t = \sum_{j=1}^{\infty} \frac{CF_{t+j}}{(1 + i_t)^j}.$$ (1)

We can then take PV_t from (1) and the investment I_t that created it, and calculate the ratio of pseudo-permanent return r_t to i_t, a ratio that we call q_{mt}

$$PV_t = \frac{I_t r_t}{i_t} = q_{mt} I_t.$$ (2)

If the firm had invested the same amount I_t in a project that produced a permanent return r_t, this project would have yielded the exact same present value as the one actually undertaken. The ratio of r_t to i_t is the key statistic in our analysis. If a firm maximises shareholder wealth, then it undertakes no investment for which $q_{mt} < 1$.

[12] Our breakdown of the countries into the two categories is again given in Table 2.

The market value of the firm at the end of period t can be defined as

$$M_t = M_{t-1} + PV_t - \delta_t M_{t-1} + \mu_t, \tag{3}$$

where δ_t is the depreciation rate for the firm's total capital as evaluated by the capital market, and μ_t is the market's error in evaluating M_t. Subtracting M_{t-1} from both sides of (3) and replacing PV_t with $q_{mt}I_t$ yields

$$M_t - M_{t-1} = q_{mt}I_t - \delta_t M_{t-1} + \mu_t. \tag{4}$$

That q_{mt} is a marginal q can easily be seen from (2) and (4) by contrasting it with Tobin's q. Tobin's q is the market value of the firm divided by its capital stock and thus is an average return on capital. Marginal q is the change in the market value of a firm divided by the change in its capital stock (investment) that caused it.

If $\delta_t = 0$ and a firm invests 100 at an $r_t > i_t$, then (4) implies that its market value increases by more than 100. Conversely, if $\delta_t = 0.05$ and $M_{t-1} = 1000$, then the firm must invest 50 at an $r_t = i_t$ just to keep its market value unchanged.

Two additional features of q_{mt} are worth noting. First, its use as a measure of performance obviates the need to calculate company costs of capital. Equations (2) and (4) define the *ratio* of a company's return on investment to its cost of capital, which is precisely the statistic needed to test hypotheses about agency problems and the effects of corporate governance on investment performance. Second, the procedure for calculating q_{mt} allows for different degrees of risk across companies. The stock market will demand a greater future stream of cash flows from an investment of 100 before it raises the market value of a high risk company by 100, than it demands of a low risk company.

The assumption of capital market efficiency implies that the error term in (4) has an expected value of zero, and thus that (3) can be used to estimate both δ_t and q_{mt} under the assumption that they are either constant across firms or over time, or both. Dividing both sides of (4) by M_{t-1} yields

$$\frac{M_t - M_{t-1}}{M_{t-1}} = -\delta + q_{mI}\frac{I_t}{M_{t-1}} + \frac{\mu_t}{M_{t-1}}. \tag{5}$$

Equation (5) is favoured over other possible rearrangements of (4), because it does not involve a lagged dependent variable and in cross-section regressions is less likely to be subject to heteroscedasticity owing to the deflation of all error terms by M_{t-1}.[13]

To estimate (5) we need data on the market value of each firm and its investments. A firm's market value at the end of year t, M_t, is defined as the market value

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[13] Although both the market value of the firm, M, and its investment, I, carry a t subscript, (5) does not suffer from a simultaneous equation bias. M_t is a company's market value at the *end* of year t, while I_t is the investment flow over year t. Thus, I_t is measured *before* M_t and can be treated as exogenous. A possible bias in estimating the returns on investment relative to the cost of capital using (5) arises, if the market anticipates the investments to be made in the future *and* the returns on them. Equation (5) accurately estimates q_{mI} even if the market correctly anticipates these investments at $t-1$, if the expected returns on future investments equal a company's cost of capital ($r = i$). The methodology will yield lower (higher) estimates of q_{mI} and δ, if at $t-1$ the market correctly anticipates investment at t with returns $r > i(r < i)$. See Mueller and Yurtoglu (2000) for a detailed discussion and evidence that there is no systematic bias in our estimates. Thus, when we test hypotheses about agency problems including firms with $r < i$, we are likely to *under* estimate agency problems.

of its outstanding shares at the end of t plus the value of its outstanding debt. Since this number reflects the market's evaluation of the firm's total assets, we wish to use an equally comprehensive measure of investment. Accordingly we define investment as

$$I = CF - Dividends + \Delta D + \Delta E + R\&D + ADV \tag{6}$$

where CF is the sum of income before extraordinary items and depreciation, and ΔD and ΔE are the net additions to investment funds from changes in outstanding debt and equity. Since $R\&D$ and advertising expenditures (ADV) are also forms of investment that can produce 'intangible capital' which contributes to a company's market value, we add them to our measure of total investment to obtain a measure of the firm's additions to its total capital.

The marginal qs on reinvested cash flows (q_{mCF}), new debt (q_{mD}) and new equity (q_{mE}) are obtained by substituting I in (5) by its components in (6) and estimating separate coefficients.

4. The Data

The financial data are taken from the 1996–2001 versions of the *Global Vantage* and 1997 version of the *Compustat* databases of *Standard & Poors*. These data sets contain accounting and stock price data on companies with listed stocks from virtually every country in the world starting in 1985. We exclude banks and financial companies and some service industries (SICs 6000 to 6999 and above 8100), because the nature of capital and investment in these industries is not comparable to those of non-financial firms. We also exclude corporations reporting data that are not credible (negative sales and negative debt). To minimise the weight of outliers, we cap our basic variables at both the 1st and 99th percentiles of each country sample. After this procedure we are left with 19,010 companies. In many countries and for many companies data were not available for all 16 years. Table 2 reports the number of firms, time period coverage and total number of observations for each of the 46 countries, which we group according to the LLSV classification, and for China, nine transition countries and five African countries. It also reports the means and standard deviations of the main variables used in our analysis. The definitions of the variables used are detailed in the Appendix.

5. The Relationships between Institutions and Investment Performance

5.1. *The Impact of Strong Corporate Governance*

Since our interest is in differences in investment performance across country groups, we first present estimates in which we constrain the coefficients on investment to be the same for all firms in a given country group. The intercept in (5) is an estimate of the depreciation rate, the fall in a company's market value in a given year that is expected to occur, if the firm makes no investments. Depreciation rates can be expected to vary across companies depending on the kinds of

capital they invest in. To allow for these differences, we assign each company to a two-digit SIC industry and estimate a separate depreciation rate (intercept) for each industry. Stock markets are notoriously volatile and this volatility is likely to reduce the efficiency of our estimates. To remove some of this volatility, therefore, we have measured each variable in each year as a deviation from the sample mean. This adjustment is equivalent to including a set of country-specific time dummies.

Table 3 presents the estimates using all available data for each country for the period 1985 to 2000. The numbers of observations for each industry and country group are also reported. The industry dummies and annual company investments explain 23% of the changes in company market values. Turning first to the estimates of depreciation, we see that 17 of the 25 industry dummy variables have the predicted negative coefficients, with 16 of these falling in the plausible interval between zero and 10%. Most of the positive intercepts are near zero. Both the communications and pharmaceuticals industries experienced fairly sizeable upward drifts in their market values, however, over the last 15 years of the 20th century.

The coefficients on investment have been first estimated by country group in accordance with the legal system schema of LLSV (1997, Table II). This grouping allows us to conduct a joint test of hypotheses 1, 2 and 3. The coefficient on investment for the countries with common law (English-origin) legal systems is slightly greater than 1.0 and significantly greater than the coefficient for the civil-law system countries. The average company in a civil-law system country earned a return on its investment that was only 68% of its cost of capital.

The second set of estimates of q_{mI} in Table 3 provide a joint test of hypotheses 1, 2 and 4. Here and throughout the rest of the paper we omit the estimates for depreciation by industry, since they vary almost not at all between regressions. On average companies in developed countries earned a return on investment roughly equal to their cost of capital. On average companies in developing countries earned a return on investment some 23% below their cost of capital. Developed countries appear to have stronger corporate governance systems than developing countries.

Table 4 presents estimates of q_m for total investment (I) and for investments out of the different sources of finance. For ease of presentation, we have grouped estimates from different equations together. This makes it difficult to report numbers of observations and R^2s for each set of estimates. The numbers of observations for the country categories are as in Table 3. The differences in R^2s are discussed below. Consider first the results in the first four columns for which q_{mI} is not constrained.

Examining first the I-rows we see that Hypotheses 1 and 2 are again confirmed except for the sample of developed countries, when the US is excluded. Our estimate of q_{mI} for this sample is 0.85 and is significantly less than one.[14] Within the English-origin countries, on the other hand, Hypothesis 1 is confirmed with or

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[14] Our sample is so large that our estimate of q_{mI} for the developed countries including the US, 0.97, is also significantly less than 1.0, but it is so close to one that we believe Hypothesis 3 should be accepted for this sample.

Table 3

Estimates of Depreciation (δ) by Industry and Returns on Total Investment (q_{mI}) by Country Group

Industry	SIC	$-\delta$	t-value	Category	q_{mI}	t-value	$(q_{mI} \neq 1)$*	Obs.	Firms	R^2
Agriculture, Forestry, Com. Fishing	100	−0.000	−0.03	English Origin	1.02	111.32	0.03	82,463	13,553	0.23
Metal Mining, Oil and Gas Extraction	10–14	0.049	8.70	Civil Law	0.68	47.51	0.00	30,096	5,457	
Construction	15–17	0.012	2.68							
Food, Kindred Products & Tobacco	20–21	−0.031	−7.31	Developed	0.97	114.84	0.00	101,875	16,327	0.23
Textiles & Apparel	22–23	−0.025	−4.63	Developing	0.77	32.84	0.00	10,684	2,683	
Lumber, Wood & Furniture and Fixtures	24–25	−0.008	−1.04							
Paper, Allied Prdcts & Printing, Publishing	26–27	−0.003	−0.61							
Chemicals (Without Pharmaceuticals: 283)	28	−0.148	−28.32							
Pharmaceuticals	283	0.082	8.33							
Petroleum Refining and Related Ind.	29	−0.005	−0.64							
Rubber and Misc. Plastics Products	30	−0.011	−1.55							
Leather and Leather Products	31	−0.043	−2.72							
Stone, Clay, Glass, Concrete Products	32	−0.010	−1.69							
Primary Metal Industries	33	−0.006	−1.17							
Fabricated Metals	34	−0.015	−2.51							
Industrial & Com. Machinery, Com. Eq.	35	−0.007	−1.49							
El. Machinery, Other Electrical Eq.	36	0.009	1.72							
Transportation Equipment	37	−0.020	−3.99							
Measurement Instruments	38	0.014	2.13							
Misc. Manufacturing	39	−0.022	−1.96							
Transportation	47	−0.013	−2.94							
Communications	48	0.105	12.55							
Electric, Gas, Sanitary Services	49	0.006	1.83							
Durable Goods-Wholesale	50–59	−0.000	−0.14							
Services	70	0.014	3.03							

*indicates the significance level of a Wald test that the estimated q_{mI} is different from 1.00.

Table 4

Estimates of Returns on the Sources of Investment by Legal System

		ALL Firms				Companies with $q_{mI} \geq 1$				Companies with $q_{mI} < 1$			
		All	Developed	Developed Non-US	Developing	All	Developed	Developed Non-US	Developing	All	Developed	Developed Non-US	Developing
Full Sample	I	0.95	0.97	0.85	0.77	1.52	1.54	1.43	1.38	0.52	0.53	0.52	0.44
		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CF	0.82	0.83	0.81	0.80	1.48	1.46	1.38	1.80	0.37	0.38	0.38	0.33
		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ΔD	1.08	1.09	1.04	0.99	1.35	1.35	1.30	1.34	0.78	0.79	0.79	0.71
		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ΔE	1.23	1.29	1.05	0.78	1.91	1.95	1.76	1.40	0.56	0.58	0.58	0.45
		0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
English Origin	I	1.02	1.04	1.01	0.81	1.55	1.57	1.49	1.39	0.54	0.55	0.57	0.46
		0.03	0.00	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CF	0.87	0.87	0.87	1.01	1.49	1.47	1.36	1.89	0.36	0.36	0.45	0.36
		0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ΔD	1.09	1.10	1.06	1.00	1.35	1.36	1.30	1.28	0.76	0.77	0.74	0.70
		0.00	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ΔE	1.36	1.42	1.24	0.80	1.99	2.01	1.86	1.52	0.62	0.64	0.62	0.47
		0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Civil Law	I	0.67	0.67		0.68	1.33	1.32		1.37	0.46	0.47		0.43
		0.00	0.00		0.00	0.00	0.00		0.00	0.00	0.00		0.00
	CF	0.71	0.77		0.52	1.62	1.62		1.62	0.47	0.54		0.29
		0.00	0.00		0.00	0.00	0.00		0.00	0.00	0.00		0.00
	ΔD	1.00	1.00		1.00	1.34	1.30		1.51	0.83	0.85		0.73
		0.61	0.78		0.74	0.00	0.00		0.00	0.00	0.00		0.00
	ΔE	0.71	0.75		0.63	1.39	1.44		1.06	0.40	0.40		0.39
		0.00	0.00		0.00	0.00	0.00		0.62	0.00	0.00		0.00

without the US in the sample. All estimates of q_{mI} for developing and civil-law countries are significantly less than 1.0 in accordance with Hypothesis 2. Since the samples include companies with both $q_{mI} \geq 1$ and $q_{mI} < 1$, it is possible that the pattern $q_{mCF} < q_{mD} < q_{mE}$ is observed as stated in Hypothesis 9, and this pattern is indeed observed in the six samples that include both the English-origin and developed countries, that is in the samples for which the average q_{mI} is usually ≥ 1.

The results in the next four middle columns are for samples with $q_{mI} \geq 1.0$. Hypothesis 6 is confirmed in all 11 samples. Our estimates of q_{mCF} always exceed those for q_{mD} for companies with returns on total investment greater than their costs of capital. For these companies with attractive investment opportunities, it would appear that debt is resorted to as a source of finance only after all cash flows have been exhausted and thus the returns on these investments come closer to company costs of capital.

Hypothesis 7 is confirmed in 10 of the 11 samples. Among the companies with returns on total investment greater than their costs of capital, those that resort to the equity market for additional funds appear to have more attractive investment opportunities than those issuing debt in both the developed and the developing English-origin countries, and in the developed, civil-law countries. Only in the developing, civil-law countries is our estimate of $q_{mD} > q_{mE}$. Indirectly the results for firms with $q_{mI} \geq 1$ also confirm Hypothesis 9. In none of the 11 samples do we find the pattern $q_{mCF} < q_{mD} < q_{mE}$.

The results presented in the last four columns of Table 4 confirm Hypothesis 5 in all 11 samples. Our estimates of q_{mD} always exceed those for both q_{mCF} and q_{mE} for companies with returns on total investment less than their costs of capital. Among this set of companies it is only those with returns on investment that come close to covering their costs of capital which choose to incur additional debt. Those with the lowest returns on investment resort to the equity market, if they choose to raise external capital. The results for firms with $q_{mI} < 1$ also confirm Hypothesis 9. We again do not find the pattern $q_{mCF} < q_{mD} < q_{mE}$ in any of the 11 samples.

Hypothesis 8 predicts less variability in returns for firms with $q_{mI} \geq 1$, which choose debt as a source of external finance as opposed to those choosing equity. The first two columns in Table 5 confirm this prediction. All nine standard errors of our estimates of q_{mD} are significantly less than for q_{mE} at the 1% level. (Here and throughout the rest of the paper we do not report results omitting the US, since this omission never changes our conclusions.)

The last six columns in Table 5 report the R^2s from the regressions run over the different samples that produced the estimates of q_ms reported in Table 4. In addition to describing how well the equations fit the data for each sample, they further confirm our interpretation of the behaviour of company managers. When returns on investment are greater than or equal to companies' costs of capital ($q_{mI} \geq 1$), managers appear to be attempting to maximise shareholder wealth. Their marginal returns on investment should equal their costs of capital, and differences in our estimated q_ms should reflect differences in infra-marginal returns and should, presumably, vary over a fairly narrow range. In contrast, firms having $q_{mI} < 1$ appear to suffer from agency problems. The extent of managerial

Table 5

Standard Errors of Estimates (σ) of q_{mD} and q_{mE} for Firms Having $q_{mI} \geq 1$.
R^2s for Different Equations

| | | | Adjusted R^2s | | | | | |
| | | | All Firms | | $q_{mI} \geq 1$ | | $q_{mI} < 1$ | |
Sample	σ for q_{mD}	σ for q_{mE}	q_{mI}	3 Sources	q_{mI}	3 Sources	q_{mI}	3 Sources
Full	0.015	0.027	0.23	0.24	0.35	0.35	0.15	0.18
English Origin	0.016	0.031	0.24	0.26	0.36	0.35	0.16	0.17
Civil Law	0.018	0.036	0.18	0.22	0.32	0.32	0.16	0.21
Developed	0.015	0.029	0.23	0.25	0.35	0.35	0.15	0.18
Developing	0.052	0.078						
English-origin, developed	0.017	0.032	0.25	0.26	0.37	0.36	0.16	0.17
English-origin, developing	0.055	0.097						
Civil Law, developed	0.034	0.056	0.19	0.22	0.32	0.32	0.16	0.21
Civil Law, developing	0.100	0.117						

discretion, and the degree to which different managers exploit the discretion that they have, can vary greatly across companies. Thus, we expect and observe a far closer fit to the data for $q_{mI} \geq 1$ samples than for $q_{mI} < 1$ samples. The range of R^2s for the former is between 0.32 and 0.36 – double the R^2s for $q_{mI} < 1$ samples.

5.2. *The Impact of Strong Accounting Standards*

Table 6 reports the results when the sample is split by legal system, level of development, q_{mI} and the strength of country accounting standards.[15] The numbers under the coefficients for weak and strong standards are the p-values for a test for a significant difference from 1.0. A boldfaced entry for strong implies a significant difference (5% level) from the corresponding coefficient for weak standards.

Perhaps the most striking feature of Table 6 is that there are no entries for weak accounting standards in developed, English-origin countries. *All* developed, English-origin countries have strong accounting standards. Hypothesis 10 predicts

[15] An alternative to dividing countries into two groups on the basis of the strength of their accounting standards, creditor rights and contract enforcement would be to use a four-part break down, or treat accounting standards etc. as continuous variables. We have chosen not to go these routes in the presentation of our results for two reasons. First, a four-part breakdown would double the size of Tables 6–8 and make them much more difficult to read and discuss. We have made such breakdowns and the general conclusions that we draw from the two-way breakdowns also hold for the four-way breakdowns, as for example, estimates of marginal qs for cash flows and changes in equity are consistently higher for the two strongest accounting-standards categories than for the two lowest categories.

To treat the scores assigned to countries for creditor rights and contract enforcement as continuous variables places too much weight on their accuracy and on the impact of differences in these indexes across countries. Our estimates of the impact on q_m of differences in accounting standards, creditor rights and contract enforcement, on the other hand, will not be affected by errors in measurement – so long as the errors are not so great as to move a country across the median. Nevertheless, the conclusions drawn in the text with respect to the impact of accounting standards, creditor rights and contract enforcement on investment performance, are reconfirmed when these institutions are treated as continuous variables, and included as additional interaction terms between these variables and the various investment variables in our basic models.

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Table 6

The Impact of Accounting Standards on the Returns on Investment

		Accounting standards	All Firms		$q_{mI} \geq 1$		$q_{mI} < 1$	
			Developed	Developing	Developed	Developing	Developed	Developing
Full sample	CF	Weak	0.58	0.39	1.19	1.38	0.53	0.20
			0.00	0.00	0.22	0.03	0.00	0.00
	CF	Strong	**0.84**	**1.08**	**1.48**	**1.93**	**0.37**	**0.44**
			0.00	**0.22**	**0.00**	**0.00**	**0.00**	**0.00**
	ΔD	Weak	1.03	0.96	1.33	1.35	0.87	0.81
			0.45	0.55	0.00	0.01	0.00	0.00
	ΔD	Strong	1.09	1.05	1.35	1.34	**0.78**	0.73
			0.00	0.24	0.00	0.00	**0.00**	0.00
	ΔE	Weak	0.72	0.51	1.24	1.05	0.43	0.28
			0.00	0.00	0.01	0.71	0.00	0.00
	ΔE	Strong	**1.32**	**1.82**	**1.99**	**1.48**	**0.60**	**0.46**
			0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
English origin	CF	Weak		1.29		2.90		0.62
				0.32		0.00		0.02
	CF	Strong	0.86	1.06	1.48	1.92	0.35	0.43
			0.00	0.38	0.00	0.00	0.00	0.00
	ΔD	Weak		0.85		1.30		0.60
				0.37		0.32		0.00
	ΔD	Strong	1.11	1.02	1.36	1.27	0.77	0.73
			0.00	0.66	0.00	0.00	0.00	0.00
	ΔE	Weak		0.77		1.25		0.28
				0.15		0.17		0.00
	ΔE	Strong	1.42	0.78	2.02	1.51	0.64	0.45
			0.00	0.00	0.00	0.00	0.00	0.00
Civil law	CF	Weak	0.57	0.31	1.24	1.19	0.52	0.17
			0.00	0.00	0.11	0.22	0.00	0.00
	CF	Strong	**0.90**	**1.39**	**1.78**	**2.29**	0.56	**0.65**
			0.04	**0.11**	**0.00**	**0.00**	0.00	**0.05**
	ΔD	Weak	1.03	0.99	1.33	1.32	0.87	0.86
			0.54	0.83	0.00	0.01	0.00	0.03
	ΔD	Strong	1.00	**1.35**	1.29	**1.80**	0.83	0.73
			0.79	**0.02**	0.00	**0.00**	0.00	0.01
	ΔE	Weak	0.72	0.34	1.24	0.74	0.43	0.26
			0.00	0.00	0.01	0.20	0.00	0.00
	ΔE	Strong	0.73	**1.20**	**1.57**	**1.32**	0.39	**0.59**
			0.00	**0.16**	**0.00**	**0.03**	0.00	**0.06**

higher returns on investments financed out of either cash flows or new equity in countries with strong accounting standards. Thirty comparisons of pairs of coefficients on these two variables can be made. In 25 of them the coefficient for a strong-accounting-system country is larger than the corresponding coefficient for a weak-system country, 20 of the 25 differences are significant (5% level, one-tailed test). Only the coefficient on cash flow for all developed countries with strong accounting standards is significantly lower than the corresponding coefficient for weak-system countries.

There is also some indication in Table 6 that the improvement in investment performance caused by strong accounting standards comes in part at the cost of debt holders. As we have seen, when $q_{mI} \geq 1$ investments out of all sources of finance earn returns above the costs of capital. For companies in this category,

strong accounting standards do not adversely affect debt holders. For companies with $q_{mI} < 1$, however, all five coefficients on q_{mD} are lower for the countries with strong accounting standards, than for the corresponding weak-standards countries, three times significantly so. These results imply that the quality of accounting standards can have a significant impact on both a country's returns on investment, and how these returns are shared by equity and debt holders.

5.3. *The Impact of Strong Contract Enforcement*

Table 7 presents results controlling for differences in the strength of contract enforcement across countries. The Table should be read in exactly the same way as Table 6. Again the first thing that is apparent are missing entries in two columns.

Table 7
The Impact of Contract Enforceability on the Returns on Investment

Sample		Contract enforcement	All firms		$q_{mI} \geq 1$		$q_{mI} < 1$	
			Developed	Developing	Developed	Developing	Developed	Developing
Full Sample	CF	Weak	0.70	0.77	1.13	1.71	0.61	0.36
			0.00	0.00	0.55	0.00	0.00	0.00
	CF	Strong	0.84	**1.41**	**1.47**	**2.43**	0.37	0.40
			0.00	**0.00**	**0.00**	**0.00**	0.00	0.00
	ΔD	Weak	1.00	1.00	1.37	1.34	0.82	0.72
			0.93	0.83	0.00	0.00	0.00	0.00
	ΔD	Strong	**1.09**	1.02	1.34	1.33	0.79	0.88
			0.00	0.85	0.00	0.00	0.00	0.00
	ΔE	Weak	0.55	0.68	1.16	1.24	0.37	0.43
			0.00	0.00	0.31	0.01	0.00	0.00
	ΔE	Strong	**1.32**	**1.16**	**1.97**	**1.88**	**0.60**	0.60
			0.00	**0.12**	**0.00**	**0.00**	**0.00**	0.00
English Origin	CF	Weak		1.00		1.81		0.43
				0.98		0.00		0.00
	CF	Strong	0.86	**1.41**	1.48	**2.44**	0.35	0.39
			0.00	**0.04**	0.00	**0.00**	0.00	0.00
	ΔD	Weak		0.98		1.24		0.73
				0.61		0.00		0.00
	ΔD	Strong	1.11	1.02	1.36	1.33	0.77	0.88
			0.00	0.89	0.00	0.00	0.00	0.00
	ΔE	Weak		0.71		1.33		0.44
				0.00		0.00		0.00
	ΔE	Strong	1.42	**1.16**	2.02	**1.87**	0.64	0.61
			0.00	**0.33**	0.00	**0.00**	0.00	0.00
Civil Law	CF	Weak	0.70	0.56	1.22	1.62	0.60	0.31
			0.00	0.00	0.34	0.01	0.00	0.00
	CF	Strong	0.79		**1.55**		0.53	
			0.00		**0.00**		0.00	
	ΔD	Weak	1.09	1.03	1.91	1.50	0.75	0.72
			0.37	0.69	0.00	0.00	0.00	0.00
	ΔD	Strong	0.00		−0.08		0.03	
			0.72		0.00		0.00	
	ΔE	Weak	0.55	0.63	1.16	1.05	0.36	0.41
			0.00	0.00	0.31	0.69	0.00	0.00
	ΔE	Strong	**0.78**		**1.51**		0.40	
			0.00		**0.00**		0.00	

No developed, English-origin country has weak contract enforcement. *No* developing, civil-law country has strong contract enforcement. These missing entries in Table 6 and 7 go a long way toward explaining the differences in investment performance across the different groups of countries.

For 21 of the possible 24 comparisons of coefficients on cash flow and new equity, the coefficient is higher where contract enforcement is strong, 14 of these 21 differences are significant. In none of the three cases where the coefficient on the strong variable is smaller is the difference from the coefficient for weak enforcement statistically significant. Hypothesis 11 receives strong support. As noted above, debt holders should not be harmed by stronger contract enforcement and might be helped. There is some indication in Table 7 that this is also the case. Only one difference between the coefficients on new debt for the strong and weak enforcement countries is significant – and it is *positive*.

It is also worth emphasising that the differences associated with strong accounting standards and contract enforcement are often not only statistically significant but also economically significant. For example, while the returns on investment out of cash flows for the full sample of developing countries with weak accounting standards averaged only 39% of company costs of capital, in developing countries with strong standards they *exceeded* the costs of capital (see Table 6).

5.4. *The Impact of Strong Creditor Rights*

In Table 8 the results are presented controlling for differences in creditor rights. The Table can again be read as with Table 6. Again we find some missing entries, but interestingly enough, they are in the *weak* row for the *developing* countries of English origin. All developing countries with English-origin legal systems have strong creditor rights.

The estimates of q_{mD} in the first four columns are all equal to or greater than 1.0, and thus there is not much scope for improvement and no significant increases in the coefficient on q_{mD} are observed. Only one significant increase occurs in the last two columns (developed, civil-law countries). The results for the developed, common-law countries are also interesting, however. The coefficient on q_{mD} is not significantly different between the countries with strong and weak creditors' rights. The coefficient on q_{mE} is significantly *lower* for the countries with strong creditors' rights, however. One gets the impression from these results that the existence of strong creditor rights in English-origin countries leads those firms wishing to make poor investments to make greater use of the equity market. We shall test this conjecture in the next Section.

6. The Relationships between Corporate Governance and the Sources of Finance

The results in Tables 3–8 lend strong support for the 12 hypotheses put forward in Section 2. In formulating and testing these hypotheses, we have focused on predictions about the returns from investments out of different sources of finance. The reasoning leading up to these hypotheses has implications, however, not only

Table 8

The Impact of Creditor Rights on the Returns on Investment

Sample		Creditor rights	All Firms		$q_{mI} \geq 1$		$q_{mI} < 1$	
			Developed	Developing	Developed	Developing	Developed	Developing
Full Sample	CF	Weak	0.84	0.44	1.47	1.61	0.36	0.22
			0.00	0.00	0.00	0.00	0.00	0.00
	CF	Strong	0.83	**0.99**	1.58	1.89	**0.59**	**0.43**
			0.00	**0.95**	0.00	0.00	**0.00**	**0.00**
	ΔD	Weak	1.09	1.05	1.35	1.58	0.79	0.79
			0.00	0.47	0.00	0.00	0.00	0.00
	ΔD	Strong	1.07	1.00	1.36	1.31	0.76	0.71
			0.01	0.90	0.00	0.00	0.00	0.00
	ΔE	Weak	1.40	0.61	2.04	1.12	0.63	0.31
			0.00	0.00	0.00	0.37	0.00	0.00
	ΔE	Strong	**0.84**	0.76	**1.48**	**1.42**	**0.45**	0.45
			0.00	0.00	**0.00**	**0.00**	**0.00**	0.00
English origin	CF	Weak	0.87		1.48		0.34	
			0.00		0.00		0.00	
	CF	Strong	1.00	1.04	1.65	1.95	**0.66**	0.42
			0.97	0.52	0.00	0.00	**0.00**	0.00
	ΔD	Weak	1.12		1.36		0.77	
			0.00		0.00		0.00	
	ΔD	Strong	1.09	1.00	1.38	1.28	0.76	0.72
			0.02	0.97	0.00	0.00	0.00	0.00
	ΔE	Weak	1.56		2.10		0.71	
			0.00		0.00		0.00	
	ΔE	Strong	**0.86**	0.78	**1.52**	1.47	**0.46**	0.44
			0.00	0.00	**0.00**	0.00	**0.00**	0.00
Civil Law	CF	Weak	0.87	0.44	1.70	1.65	0.58	0.22
			0.00	0.00	0.00	0.00	0.00	0.00
	CF	Strong	**0.55**	**0.78**	1.39	1.55	0.49	0.66
			0.00	**0.18**	0.02	0.11	0.00	0.00
	ΔD	Weak	0.99	1.05	1.29	1.56	0.83	0.79
			0.55	0.51	0.00	0.00	0.00	0.00
	ΔD	Strong	1.07	1.01	1.32	1.49	**0.91**	0.66
			0.16	0.95	0.00	0.00	**0.03**	0.01
	ΔE	Weak	0.71	0.61	1.49	1.13	0.39	0.31
			0.00	0.00	0.00	0.31	0.00	0.00
	ΔE	Strong	0.78	0.59	1.32	0.72	0.37	0.52
			0.01	0.00	0.00	0.47	0.00	0.00

with respect to the returns on investment, but with respect to the choice of sources of funds. It is beyond the scope of this paper to develop a full model of these choices, but before closing we shall test three additional hypotheses that follow directly from our analysis.

Hypothesis 1 asserts that strong corporate governance systems constrain managers from undertaking low return investments. Even within countries with strong corporate governance systems managers have some discretion to undertake low return investments, particularly when they are able to finance them out of their internal cash flows. The greater information available to shareholders and means for disciplining managers in these countries should make the issue of new equity to finance low return projects rather unattractive. We therefore predict that companies resorting to the equity market in countries with strong corporate

governance systems tend to have attractive investment opportunities. Defining $\Delta E/I$ as the fraction of total investment financed through net new equity, we have

HYPOTHESIS 13. *In countries with strong corporate governance systems, $\Delta E/I$ is higher for companies with $q_{mI} \geq 1$ than for companies with $q_{mI} < 1$.*

In countries with weak corporate governance systems, on the other hand, managers have more discretion to pursue their objectives using both new equity issues and internal cash flows. For the reasons given in Section 2, we expect debt to be a less attractive source of external finance than equity for managers of firms with $q_{mI} < 1$. Defining $\Delta D/I$ as the fraction of total investment financed through net new debt, we have

HYPOTHESIS 14. *In countries with weak corporate governance systems, $\Delta E/I > \Delta D/I$ for companies with $q_{mI} < 1$.*

Finally, the differences in constraints on managers across corporate governance systems lead us to put forward

HYPOTHESIS 15. *For companies with $q_{mI} < 1$, $\Delta E/I$ is greater in countries with weak corporate governance systems than in countries with strong corporate governance systems.*

Table 9 presents the relevant comparisons for testing each hypothesis.[16] A $\approx$ sign between two entries implies that they are not significantly different from one another, an inequality implies a significant difference at the 5% level. Hypothesis 13 is supported for both categories of strong corporate governance systems. In both English-origin and developed countries, companies with $q_{mI} \geq 1$ finance

Table 9

External Sources of Funds as a Fraction of Total Investment

Hypothesis		$\Delta E/I$ for		
		$q_{mI} \geq 1$		$q_{mI} < 1$
13	English Origin	0.217	>	0.152
	Developed	0.218	>	0.145
		Firms with $q_{mI} < 1$		
		$\Delta E/I$		$\Delta D/I$
14	Civil Law	0.170	$\approx$	0.169
	Developing	0.228	>	0.110
		Firms with $q_{mI} < 1$		
15	$\Delta E/I$	English Origin		Civil Law
		0.152	$\approx$	0.170
	$\Delta E/I$	Developed		Developing
		0.145	<	0.228

[16] The ratios $\Delta E/I$ and $\Delta D/I$ are calculated for each firm over the whole sample period. We define I as the sum of internal funds (Income before extraordinary items + Depreciation − Dividends) and external funds (funds raised through new equity issues, ΔE, and through new debt issues, ΔD). The numbers in Table 9 are not directly comparable to Singh (1994, p. 129), who expresses the external financing ratios as a fraction of the growth of the net assets of emerging market companies.

about 22% of their total investment out of new equity, while companies with $q_{mI} < 1$ in these countries resort to the equity market for only around 15% of their investment funds.

For companies with $q_{mI} < 1$, $\Delta E/I > \Delta D/I$ as predicted by Hypothesis 14 for both civil-law and developing countries. The difference is statistically significant only for the developing countries, however. Companies making low return investments in developing countries prefer financing them out of new equity rather than debt by a ratio of more than two to one.

Both comparisons at the bottom of Table 9 are as predicted by Hypothesis 15 but only the difference in $\Delta E/I$ between developed and developing countries is statistically significant. Companies making low return investments in developing countries raise a significantly higher fraction of their investment funds in the equity market than do similar companies in developed countries. This comparison helps explain the riddle of why companies in developing countries finance higher fractions of their investments out of external capital than do companies in developed countries. The weaker corporate governance institutions in developing countries allow managers greater freedom to use the equity market to finance bad investments. In this connection it should be noted that firms with good investment performance *do not* have significant differences in their $\Delta E/I$ ratios. The $\Delta E/I$ for firms with $q_{mI} \geq 1$ in developed countries is 0.218, while this ratio for developing countries is 0.193.[17]

7. Conclusions

We set out in this paper to shed light on three conundrums in the investment literature: why investments out of different sources of finance earn different returns, why different studies report different patterns of returns, and why companies in developing countries make greater use of external capital to finance their investment than do companies in developed countries. Our answer to the first question rests in part on the assumption that firms have different investment opportunities, and part on the assumption that managers face different constraints when pursuing their own goals via their investment policies. In particular, managers who wish to undertake low return investments in countries with strong corporate governance systems prefer to rely on internal cash flows to finance these investments, managers making similar investments in countries with weak corporate governance systems are freer to use the equity market as a source of finance. At the same time we postulated that managers with very attractive investment opportunities will often favour equity over debt as a source of external capital. These considerations help explain why investments financed in different ways can exhibit significantly different rates of return.

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[17] Our findings and conclusions are quite consistent with those recently reported by Domowitz *et al.* (2001). They present evidence that (1) there was a huge increase in the case of equity finance in emerging markets in the 1980s and 1990s, (2) domestic equity is a more important source of finance in emerging markets, (3) the use of equity finance in emerging markets declines as accounting standards improve.

We made quite different predictions as to the patterns of returns on investments out of the three sources of finance depending on whether a firm's returns on its total investment exceed or fall short of its cost of capital. When $q_{mI} < 1$ we expect investments financed by new debt to earn the highest returns. When $q_{mI} \geq 1$ they should earn the lowest returns. Both predictions were largely confirmed. The confirmation of these two sets of predictions accounts for the differences in findings in previous studies. When companies with $q_{mI} \geq 1$ and with $q_{mI} < 1$ are both included in a sample, the pattern of results depends on the fractions of each in the sample and their relative use of internal and external sources of funds. As postulated in Hypothesis 9 and confirmed in our results, the pattern $q_{mCF} < q_{mD} < q_{mE}$ can be observed only for samples containing companies with $q_{mI} \geq 1$ and with $q_{mI} < 1$ as was true for both the BHMQ and Mueller and Yurtoglu (2000) studies. Mueller and Reardon (1993) did not observe this pattern for a sample containing companies with $q_{mI} \geq 1$ and $q_{mI} < 1$, but 8 out of 10 companies in their sample had a $q_{mI} < 1$, and thus it came close to fulfilling the premise of Hypothesis 5, and accordingly its pattern of returns matched the predictions of this hypothesis.[18]

Finally, our results help to explain why some companies in developing countries make more use of the equity market than do companies in developed countries. Corporate governance institutions appear to be weaker in developing than in developed countries and thus provide less of a check on managers in developing countries who wish to issue equity to finance low return investments.

In closing it is perhaps worth pointing out exactly what our findings do and do not imply. First, they do not imply that countries with weak corporate governance systems will necessarily exhibit poor economic performance measured in terms, say, of growth rates in income per capita. Many developed countries in civil-law-system countries like Germany, Italy and Japan had impressive growth rates over much of the post-World War II period, as did developing countries like Korea and Indonesia. As we have emphasised, when companies have attractive investment opportunities, conflicts between owners and managers over investment policies are less likely to arise, and agency problems will not hurt company, and by implication macroeconomic, performance. Now that Japan, Germany and Italy have rebuilt their economies and 'caught up' to the United States, however, their investment opportunities are less attractive than before. The kind of misallocation of investment funds that our results highlight might be a hindrance to future growth in these countries.

One of the consequences of having a weak corporate governance system is that a country tends to have a thin equity market (Modigliani and Perotti, 1997). Our results regarding investment performance are thus a better indicator of how the US economy performs than, say of Italy, since a far smaller fraction of Italian companies are listed on the Milan stock exchange and thus included in our sample than is the case for US companies. This observation raises in turn the question of

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[18] Mueller and Yurtoglu (2000) also did not observe the $q_{mCF} < q_{mD} < q_{mE}$ pattern for the sample of companies from French-origin countries. The average company in these countries had a q_{mI} that was both less than one and less than for any other country group.

whether large equity markets contribute positively to a country's economic performance. Recent work by Levine and Zervos (1998), Rajan and Zingales (1998) and Demirgüc-Kunt and Maksimovic (1998) linking economic growth to the size of a country's capital market suggests that they do. If weak corporate governance systems lead to thin equity markets, which in turn lead to slower economic growth, then countries which strengthened their corporate governance systems could anticipate improved investment and growth performance. While one would not expect a country to revamp its entire legal system to achieve better investment performance, our results suggest that more modest reforms like stronger accounting standards and better enforcement of contracts can have a significant impact on performance. Such reforms should be feasible for both developed and developing countries regardless of the origins of their legal system.

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Appendix: Balance Sheet and Income Statement Data and Calculation of Variables

Data are taken from the 1997 version of the *Standard and Poors' Compustat* (*CS*) for the US and Canada and from the 1996–2001 versions of the *Global Vantage* (*GV*) for all countries. These datasets contain balance sheet, income statement, and stock market information. The sample period for the data is from 1985 through 2000. The majority of the sample firms (55%) are in manufacturing industries, utilities are 11% of the sample firms and 11% come from the agriculture, construction, or mining sector, and the rest from services.

The variables (*CS* data item numbers in parentheses) are as follows. The market value is defined to be the sum of the market value of common stock, the book value of total debt and preferred stock. The market value of common stock is the end-of-fiscal year number of shares (54) multiplied by the end-of-fiscal year price per share (199). We use the book value of total debt (9+34) instead of its market value. An accurate estimate of the market value of a firm's outstanding debt obligations requires knowledge not only of the associated coupon and maturity structure but also of the credit quality of each component. Because such information is not available from standard data sources, we use the book values. The preferred stock is taken to be, in order and as available, redemption value (56), liquidating value (10), or par value (130). The investment of a firm in year t is meant to represent all funds available to the company, which could have been paid out directly to shareholders but were instead retained. Thus, investment in year t is defined as

$$I = IB + DEP - DIV + \Delta D + \Delta E + R\&D + ADV$$

where *IB* (18) is income before extraordinary items (profits after taxes and interest), *DEP* (14) is accounting depreciation and *DIV* (21) is total dividends paid in the fiscal year. These come directly from the annual income statements of each company. New debt (ΔD) is derived by taking the change in total debt since the previous period. Net new equity (ΔE) is calculated as sales (108) less purchases (214) of common and preferred stock. Where these items are not available, ΔE is approximated by the change in the number of common shares outstanding multiplied by the average share price ((197+198)/2).

Missing values of *R&D* expenditures (46) are interpolated from surrounding values on the premise that *R&D* to sales ratios are fairly constant over short periods of time, or approximated using *R&D* data at the 3-digit SIC code level from the *FTC's Annual Line of Business Reports*.

Advertising expenses (45) are not reported on *GV* database. For all countries (except for US and Canada) these are proxied using aggregate advertising-to-sales ratios at the 4-digit SIC code level from a recent study by Rogers and Tokle (1993) who use firm level data from *Leading National Advertisers* to compute 4-digit advertising sales ratios. The remaining advertising figures are approximated by multiplying the actual company sales by 2-digit advertising to sales ratios that come from the 1990 *IRS Reports on Corporation Returns* (Table 6- Balance Sheets, Income Statements, Tax, and Selected Other Items, by Major Industry).

All variables are deflated using the *CPI* (1995=1.00). The main data source for the *CPI* is the latest version of the *International Financial Statistics* maintained by the *Austrian Institute of Economic Research (WIFO)*.

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