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Measuring Idiosyncratic Risk: Implications for Capital Flows

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Measuring Idiosyncratic Risk: Implications for Capital Flows

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Abstract

This paper offers two refinements of the traditional risk measure based on the volatility of growth. First, we condition GDP growth on structural characteristics of the host country that move only slowly and therefore can be partly predicted by an investor. Second, we adjust conditional risk for the systematic components due to the global and regional interdependence between alternative investment locations. The decomposition of conditional risk into its systematic and idiosyncratic components reveals that not only are African countries on average characterised by a larger conditional risk than Asian and Latin American countries, but the idiosyncratic risk factor also represents a larger share than in other developing countries. As a final contribution, we search the empirical literature on foreign direct investment and risk in order to determine which of the suggested risk measures provide the best description of idiosyncratic risk. Using a general-to-specific methodology, we find that both economic and political risk factors are important elements in the investment decision. We also find that commercial risk factors applied in the literature so far are poor determinants of idiosyncratic risk.

1 Introduction

Foreign direct investment (FDI) has become an important source of capital in developing countries during the last decade with FDI inflows more than tripling since the mid 1990s. However, Table 1 shows that the regional distribution of FDI has been heavily biased against the poor African countries. Despite efforts to improve the investment climate, see for example UNCTAD (1999), African countries only account for around 6% of the total FDI going to developing countries in the period 2000-2003, whereas Asia & Pacific and Latin America & Caribbean have on average attracted almost one third of FDI each. This means that in spite of absolute increases in FDI inflows throughout the period, Africa has experienced a drop in FDI inflows relative to other developing countries.

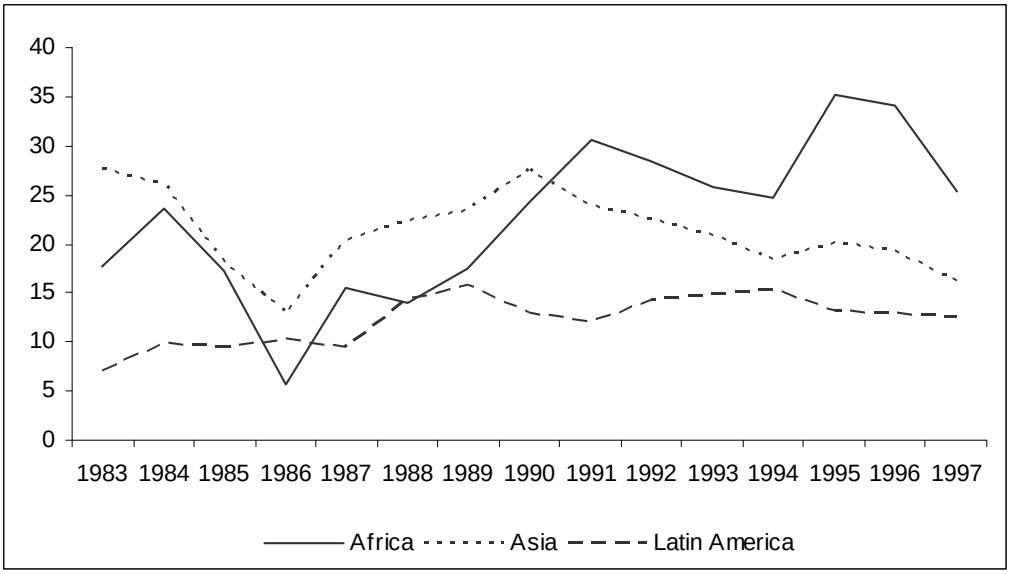
Table 1. FDI Inflows to Developing Countries

	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2003
Developing countries	2,873	6,693	10,837	14,470	51,075	151,544	161,688
Asia & Pacific	15.2	15.8	23.1	37.0	52.4	39.2	34.8
Europe & Central Asia	2.0	1.0	0.8	2.3	9.0	14.6	20.3
Latin America & Caribbean	54.8	53.5	58.4	41.7	30.7	40.1	35.8
Africa[1)]	17.4	19.9	13.2	18.6	5.8	4.4	6.1

Note: Annual averages of net FDI inflows (millions of dollars), 1970-2003.[1)] Numbers do not include South Africa.
Source: World Bank (2005).

Figure 1 depicts the rates of return on FDI for the sample of US foreign investors surveyed by UNCTAD (1999). The average return on US investment to Africa over the period 1983-97 was 23%. This compares with 21% for Asia & Pacific and 12% for Latin America & Caribbean. The figure indicates that, at least for the sample of investors included in the survey, the uneven distribution of FDI across developing countries cannot be explained by a low return in African countries as compared to other developing countries. This puzzle has also been reflected in the way the focus of the empirical FDI literature has changed over time.

Figure 1. Rates of Return on US FDI to Developing Countries (Per cent)



Note: Rates of return have been calculated as the net income of US foreign affiliates in a given year divided by the FDI stock. Numbers do not include South Africa.
Source: UNCTAD (1999).

While a large part of the empirical literature on FDI has focussed mainly on the traditional low-return explanation of insufficient FDI inflows to certain developing countries, more recent studies have applied various risk measures to control for the country risk of investing abroad. The importance of risk stems from the fact that, in the face of the uncertainty connected to foreign investments, the objective of investors is to maximise the *expected* return of their investment. This means that risk becomes a critical element in the investment decision. Since aggregate data on returns to FDI is generally unavailable for a satisfactory number of countries for a sufficient number of years, it is impossible to capture risk as the variance of such returns. Basically, empirical papers on FDI and risk can be grouped according to the way they proxy for country risk.

First, a large part of the literature has included various economic, political and commercial risk measures to account for the risk of investing in foreign countries. The extensive survey of the literature linking FDI to risk provided in this paper concludes that while there seems to have been reached a consensus on the importance of economic risk measures (and which proxies to include), the inclusion of political and commercial risk measures has been more ad hoc and a large variety of

proxies have been tested. The second brand of the literature has applied various volatility measures to proxy for the risk of foreign investments. Suggested volatility measures have been based on inflation, exchange rates or terms of trade, but the most frequently used volatility measure is the variance of GDP growth.This paper provides a bridge between these two empirical methodologies. Taking the variance of GDP growth as the overall proxy for total risk, we argue that variance should only be interpreted as risk when events are unpredictable, and that this risk measure therefore does not reflect truly idiosyncratic country risk. This paper suggests two refinements that take out the structural and systematic components of total risk thereby offering an improved measure of idiosyncratic country risk.

First, we derive a conditional risk measure by drawing on the Solow (1956) growth model to account for the structural characteristics of the host country that move only slowly and therefore can be partly predicted by an investor. Second, we account for the interdependencies of competing investment locations. Figure 1 suggests that there is a global business cycle characterised by a common trend in many of the time periods but also the presence of regional shocks that cause regional returns to diverge in other periods. By using a principal components analysis (PCA) we are able to adjust for the systematic risk components caused by global and regional interdependence. In the end, this exercise allows us to decompose conditional risk into its global, regional and idiosyncratic risk components. We argue that only the idiosyncratic portion of conditional risk is country risk**,** while the first principal component itself (systemic component of risk) is driven by global factors and/or contagion. By symmetry, the first principal component in a region-by-region PCA is driven by regional factors. We then pose the question: "Could the undercapitalisation in Africa be due to the presence of a relatively large country risk? Results show that not only are African countries on average characterised by a higher conditional risk, but idiosyncratic risk also constitutes a larger share of risk as compared with Asian and Latin American countries.

As a final exercise we are interested in analysing how the refined risk measure correlates with the proxies of risk suggested in the empirical FDI literature. We collect as many risk measures from our survey articles as possible and utilise an econometric general-to-specific methodology to select those indicators that best describe idiosyncratic risk. Overall, we conclude that both economic and political risk variables are important determinants of idiosyncratic risk. This means that studies that focus solely on one type of risk (typically economic risk) leave out important variables resulting in biased and inconsistent results. Rather than including various risk measures on an ad hoc basis, our results indicate that certain aspects of country risk are more dominant than others. In particular, the ability of a country to service its debt, the current account balance, government consumption, democratic accountability and external conflicts are important determinants of risk. Also, we find that the proxies of commercial risk applied in the literature so far correlate poorly with idiosyncratic risk and more attention should be directed towards finding better proxies for the commercial aspects of idiosyncratic risk.

The paper proceeds as follows. Section 2 provides an extensive survey of empirical studies of FDI and risk. While there seems to have been reached a consensus on which economic risk measures to include, a large variety of political and commercial risk measures have been tested. As an alternative, Section 3 derives a refined risk measure that conditions total risk on slowly moving economic fundamentals of the host economy and takes the systematic risk components due to global and regional integration into account. Using econometric tools, we are then able to decompose total risk into its conditional, systematic and idiosyncratic components. Section 4 applies a general-to-specific framework to select those economic, political and commercial risk measures that best describe idiosyncratic risk. Finally, Section 5 summarises and concludes.

2 Empirical Risk Measures: A summary

Theoretical work has pointed out a number of different channels through which risk can influence investments under various assumptions about risk aversion, adjustment costs to investment, irreversibility of the investment decision, market competition and returns to scale.[1] Some of these effects operate in contradictory directions, however, and hence the sign of the investment-risk relationship is indeterminate on *a priori* grounds.

Relative to the analytical literature, empirical studies of risk and investment have only started to appear during the last decade or so. Due to the lack of a theoretical framework for studying FDI, there is no guide to the selection of relevant risk measures. Most empirical studies have therefore adopted a non-structural approach, in which various proxies are appended to otherwise conventional investment determinants. A large selection of these papers have been summarised in Table A1-A3.

Following Nordal (2001) we divide country risk into economic, political and commercial risk. Economic risk is risk related to the macroeconomic development of the host country that may influence the profitability of an investment. Political risk is the uncertainty associated with changes in government policy upon the cash flow accruing to firms and investors. Commercial risk is risk related to the specific investment, such as the risk related to the fulfilment of contracts with private companies and local partners.

Economic risk has long been recognised as being important for the attractiveness of a host country. Changes in the real exchange rate contribute to risk in at least two ways. First, the most notable difference between FDI and other types of investment is the addition of transfer risk to other potential risk factors. Transfer risk is the risk of potential restrictions on the ability to remit funds across national borders. A depreciating real exchange rate means that the real value of the foreign investment (measured in terms of the investor's home country currency) will be undermined.[2] Changes in the (real or nominal) exchange rate have be used by Ancharaz (2002), Deichmann (2001), Kamaly (2002) and Wezel (2003) as measures of exchange rate risk. Second, the value of a country's currency may be destabilised by excessive monetary policy or by economic upheaval. Thus, ceteris paribus, a constant real exchange rate is preferred by foreign investors since it is a sign of economic stability. Lemi and Asefa (2003) and Garibaldi et al. (2002) have therefore included some measure of exchanges rate volatility (variance of the real exchange rate) while others have included more direct indicators of exchange rate stability (dummy for a fixed exchange rate, a preannounced exchange rate regime or the existence of multiple exchange rates).

Another frequently applied measure of economic risk is inflation (or the variance of inflation as seen in Lemi and Asefa, 2003). Since a high rate of inflation often results from excessively expansive monetary and fiscal policies a record of high and unpredictable inflation creates uncertainty regarding the net present value of a costly long-term investment, and potential direct investors may perceive difficulty even in making short-term pricing decisions.

Overall, an economically stable economy will be relatively more attractive. Like exchange rate risk, economic instability contributes to a higher transfer risk. This is so because a highly indebted country (as measured by the external debt share, the debt-service ratio or the long-term debt ratio) induces economic agents to anticipate future tax liabilities to service the debt and to expect political turmoil. Another measure of economic stability, applied by Kamaly (2002) and Onyeiwu

[1] We refer to Servén (1998) for a summary of the theoretical literature on investment and risk.

[2] A depreciating exchange rate will also have a direct impact on return since it makes productive capacity cheaper and investors can therefore export more easily. This effect might, however, be outweighed by the costs investors incur to prevent transaction and translation losses when currencies depreciate. In any case, this paper ignores the impact exchange rate volatility has on return and focuses on the effect running through risk.

and Shrestha (2004), is the availability of international reserves since foreign investors regard large international reserves as reflecting a vital host economy. Finally, the government deficit, the balance of payments deficit and the current account balance have been used as indicators of government credibility since the presence of such imbalances may weaken the availability of external credit and spur expectations of higher future tax liabilities.

The importance of **political risk** has been increasingly acknowledged since the late 1990s. Within the set of political risk measures one can distinguish between indicators of political instability, corruption and democracy. Political instability is likely to have an impact on foreign investors for several reasons. First, the emergence of revolutionary movements (or civil wars) in host countries has the capacity to destruct private property and increase uncertainty about the security of property rights, a key consideration for firms holding non-liquid assets. Second, such episodes may undermine the production of goods, transportation of products and sales in domestic markets. Third, such incidents may disrupt the economic process and postpone important reforms.

While Asiedu (2002, 2005), Jaspersen et al. (2000), Schneider and Frey (1985), and Tuman and Emmert (1999, 2004) capture political instability by direct measures of coups, revolutions, strikes, etc., others have turned attention towards more general indices such as the Euromoney political risk index, the International Credit Risk Guide (ICRG) political risk index or the Business Environmental Risk Intelligence (BERI) nationalisation risk index. As an alternative, Ancharaz (2002) includes the standard deviation of government consumption as an indicator of political instability. The argument stems from Brewer (1985) who argues that government agencies are marked by a high degree of inertia and are unlikely to change except as a result of substantial shocks. He therefore suggests that deviations of fiscal indicators (such as government spending) from their trends can be used as a measure of government policy risk.

Even in the presence of a conductive macroeconomic environment, corruption can deter investors from doing business. Corruption is a threat to investors for several reasons: it distorts the economic and financial environment thereby raising operating costs, it reduces the efficiency of government and business by slowing down the bureaucratic process and by enabling people to assume positions for which they are not qualified, and it destabilises the political process. In addition, the degree of corruption in host countries tends to be highly correlated with many other dimensions of government quality, such as the extent of bureaucracy and red tape, or the quality of the legal system. While most empirical papers have included some corruption index, Ancharaz (2002), Asiedu (2002) and Onyeiwu (2003) have included government consumption as a share of GDP based on the argument that it indicates economic distortions, government inefficiency and corruption.

Democracy is another aspect of a sound political environment. Authoritative regimes are often associated with a greater risk of policy reversals, due for example to the dictator's own desire, the need to raise public support through populist measures or simply coups. Democratic regimes are also more likely to respect the rule of law and property rights.[3] Many authors have therefore included the Freedom House annual rating of political rights and civil liberties. Political rights enable people to participate freely in the political process, compete for public office, and elect representatives who have a decisive impact on public policies and are accountable to the electorate. Civil liberties indicate freedoms of expression and belief, associational and organisational rights, rule of law, and personal autonomy without interference from the state.

Commercial risk can be divided into measures of the quality of governance, rule of law indicators and more specific variables reflecting the investment climate. The quality of governance includes broad measures of government effectiveness, bureaucratic competence and quality of public

[3] See Onyeiwu and Shrestha (2004) for further references on the impacts of democracy.

service delivery. While Garibaldi et al. (2002) have included a whole range of governance measures from the World Development Report (1997), Kinoshita and Campos (2003), Ancharaz (2002), and Globerman and Shapiro (2002) have used econometric tools to construct their own quality indicator based on various governance measures.

The rule of law is the most frequently used commercial risk measure. The strength and impartiality of the legal system and popular support for the law reflect the degree to which citizens are willing to accept the established institutions for making and implementing laws and adjudicating disputes. While Asiedu (2005), Kinoshita and Campos (2003), and Méon and Sekkat (2004) have used overall indices of the impartiality of the legal system and the extent to which the rule is enforced, Gastanaga et al. (1998) use a more specific measure of contract enforcement from the BERI.

Indicators of the investment climate include an amalgamate of factors more directly relevant to the foreign investor. Deichmann (2001), for example, uses the overall investment climate rating from EBRD (1999), which ranks countries according to the following considerations: macroeconomy, taxation, political stability, business regulations, the judiciary, law and order, and other obstacles. Garibaldi et al. (2002) and Kinoshita and Campos (2003) include a measure of the restrictions on FDI in order to capture other important aspects of transfer risk: approval requirements, the extent to which profits can be remitted abroad, ease in liquidating assets, and preferential treatment of direct investment. Zeghni (2001) constructs an intellectual property rights protection (IPR) index, which captures the strength of IPR protection legislation and its enforcement. Finally, Globerman and Shapiro (2002) apply the Kaufmann et al. (1999) regulatory burden index, which measures government intervention, trade policy, capital restrictions, etc.

In addition to the individual risk measures summarised in the tables, several papers have included some overall composite risk indices. First, the Euromoney risk rating has been applied by Carstensen and Toubal (2003), Frenkel et al. (2004), Garibaldi et al. (2002) and Wezel (2003). The index summarises different influences on the overall risk of a country including economic performance, political risk, debt indicators, access to bank lending, access to short-term finance, access to capital markets, discount on forfeiting, credit ratings and debt in default or rescheduling. Second, the Institutional Investor risk rating ranks countries on the probability of default. This index has been used by Bevan and Estrin (2004), Janicki and Wunnava (2004), Schneider and Frey (1985), Treviño et al. (2002a, b), and Treviño and Mixon (2004). Third, the composite ICRG index of economic, financial and political risk has been used by Jaspersen et al. (2000), Méon and Sekkat (2004) and Wezel (2003). Finally, the index of economic freedom applied by Bengoa and Sanchez-Robles (2003) quantifies aspects such as the size of government, the legal structure and security of property rights, access to sound money, freedom to trade internationally, and regulation of credit, labour and business.

A few observations from the survey should be highlighted. The importance of economic risk as a determinant of a country's attractiveness as an investment location has rarely been questioned. Most empirical papers on FDI include a measure of exchange rate risk, inflation and economic instability (typically based on some debt measure). Political risk factors are less frequently included and commercial risk is only accounted for in a small number of papers. And when such political and commercial risk measures are taken into account, there is little consensus on which measures to include. Overall there seems to be a need for a more profound analysis of the relative importance of the suggested risk proxies. Based on the derived measure of country risk in Section 3, Section 4 therefore contributes to this debate and uses a general-to-specific methodology to provide a set of variables that are significant and robust determinants of country risk.

3 A Refined Measure of Risk

Although all of the risk measures summarised above can be justified theoretically each of them only captures one dimension of risk. So far, the solution has been the rather ad hoc inclusion of multiple risk measure or the construction of risk indices. Instead this paper offers a refined measure of country risk. This paper builds on the variance of GDP growth, which has often been used as an overall risk measure, see among others Hausmann and Gavin (1995), Ramey and Ramey (1995), Servén (1998) and Calderón et al. (2003). The focus on GDP growth is motivated by the new growth literature, which argues that GDP growth per worker reflects the most important elements of economic policy and performance. Not only does it reflect the market potential of an economy (the strength of local demand), as highlighted by Guiso and Parigi (1998), but eventually all inefficiencies, instabilities and incredibilities of an economy will show up in the growth rate.[4]

This argument is confirmed by Calderón, Loayza and Servén (2003) who find that when stock-market returns are regressed on other underlying indicators (inflation, exchange rate, political and financial risk), GDP growth takes the bulk of the explained variance.

Yet, it is quite obvious that variability only amounts to uncertainty when events are unpredictable, and therefore a refined measure of uncertainty will be required.[5] First, we derive a conditional risk measure by taking out the part of GDP growth caused by growth determinants that move only slowly and therefore can be partly predicted by an investor. Second, since countries are interdependent there will be some systematic components in the local return to investment that will depend on global and regional factors. Adjusting for such structural and systematic factors will give us an improved measure of idiosyncratic country risk.

3.1 Adjustment for Economic Fundamentals

Proxying the return to investment with GDP growth, we can decompose actual return into a predictable part, $x'_{it}\beta$, and an unpredictable part, ε_{it},

$$\Delta \ln(y_{it}) = x'_{it}\beta + \varepsilon_{it}, \tag{1}$$

where y_{it} is real GDP per worker in country i at time t, x_{it} is a vector of economic fundamentals identified from the neoclassical and endogenous growth literature, and ε_{it} is the growth residual.[6] While the variance of growth has previously been used as a measure of risk, this paper has made the case that $\sigma^2_{\varepsilon i}$ is a better proxy for country risk.

The methodology behind the growth regression is based on the convergence literature, most notably Islam (1995), where the growth regression in a panel data setting can be presented as

$$\Delta \ln(y_{it}) = \gamma_i + (\alpha - 1)\ln y_{it-1} + \beta_0 \ln(n_{it} + g + \delta) + \beta_1 \ln(inv_{it}) + \beta_2 \ln(open_{it}) + \varepsilon_{it}, \tag{2}$$

[4] GDP growth is also by far the most frequently applied proxy for market potential in the papers referenced in Table A1-A3 and is therefore tightly linked with the return to investment.

[5] This statement was stressed by Servén (1998) who draw the distinction between sample variation and uncertainty. The argument is that the former may overstate the latter by including not only truly unpredictable innovations to the variables of interest, but possibly also (cyclical) movements partly predictable from the past.

[6] We assume that growth and return are linearly and positively correlated. However, foreign investors might experience increasing factor prices and scarce resources in countries where FDI inflows have increased a lot over a short period of time. This means that there will be some second order effects that are not captured by the simple linear relationship defined in this paper.

where γ_i is an unobserved country-specific time-invariant constant reflecting among other things the initial level of efficiency, institutional settings, geographic characteristics and cultural norms, and where the lagged dependent variable, $\ln y_{it-1}$, captures the tendency of an economy to converge to its steady state. The term $(n_{it} + g + \delta)$ captures the effectiveness of the production factors: n_{it} the is growth rate of the labour force, g is technological advancement and δ is the rate of depreciation. In line with Mankiw, Romer and Weil (1992) we assume $(g + \delta)$ to be the same for all countries and equal to 0.05. Capital accumulation is the main driver of growth in the traditional Solow model and we therefore include total investment as a share of GDP, inv_{it}. Finally, like Beaudry, Collard and Green (2005) we include total trade as a share of GDP, $open_{it}$, as an instrument for institutions. Income per capita, investment, openness and population are from Penn World Tables 6.1. Due to errors in the demographic time series, as documented by Dowrick (2005), data on the labour force are taken from WDI (2005).[7]

Various methods have been used to estimate the growth regression. In the presence of unobserved country-specific effects and a lagged dependent variable, Hsiao (1986) shows that the pooled OLS estimator (POLS) is upwards biased, and Nickell (1981) shows that the Fixed Effects (FE) estimator is downwards biased. We therefore turn to the first-differences Generalised Method of Moments (GMM-DIF) estimator, originally developed by Holtz-Eakin, Newey and Rosen (1988) and Arellano and Bond (1991), which produces consistent estimates in the dynamic growth relation. The basic idea is to take first-differences to remove unobserved time-invariant country-specific effects, and then instrument the right-hand-side variables in the first-differenced equations using levels of the series lagged two periods or more, under the assumption that the time-varying disturbances in the original levels equation are not serially correlated.

However, when the time series are persistent (α close to unity) the GMM-DIF estimator is poorly behaved. The reason is that, under such conditions, lagged levels of the variables are only weak instruments for subsequent first-differences. We therefore turn to the system GMM (GMM-SYS) estimator suggested by Arellano and Bover (1995) and Blundell and Bond (1998). The GMM-SYS estimator exploits an assumption about the initial conditions to obtain moment conditions that remain informative even for persistent series.[8] Results are reported in Table 2. All estimators are based on the efficient two-step estimator to allow for heteroscedasticity in the residuals. Since the two-step GMM estimators have the disadvantage of converging to their asymptotic distribution relatively slowly we compensate by using the finite-sample correction to the two-step covariance matrix derived by Windmeijer (2005). Investment, openness and population growth rates are treated as endogenous variables in the GMM estimators, which means that instruments should be lagged two periods or more to be valid. All regressions are carried out using STATA.

The results are largely in line with other empirical studies; see for example Bond, Hoeffler and Temple (2001). Unexpectedly, *open* enters negatively in the regression, which is also the case in the Beaudry, Collard and Green (2005) IV5 regression for the period 1978-98. This could be due to omitted variable bias (from human capital or excluded short-term growth determinants) or due to the fact that there might be some short term drawbacks from trade that disappear in the longer run. It is worth noticing that the coefficient on the lagged dependent variable is lower than in other studies. This is because we use annual observations rather than the typical 5-year averages.

[7] Human capital enters as a fundamental growth determinant in the Solow model. However, since typical human capital variables (average years of schooling or school enrolment rates) are available only with five year intervals such variables have been excluded. In addition, we do not include time dummies since these are not predictable by foreign investors. Tests show, however, that rge results are robust to the inclusion of time dummies.

[8] Bond, Hoeffler and Temple (2001) argue that the necessary stationarity restriction on the initial conditions are consistent with standard growth frameworks and we refer to their paper for more details.

In this case the persistency of the income data will be higher and, consequently, that the rate of convergence will be lower. Given the high α we base our subsequent analysis on residuals from the GMM-SYS estimator.

Table 2. Growth Determinants

	POLS	FE	GMM-DIF	GMM-SYS
constant	0.009	0.123**		-0.061
	[0.027]	[0.049]		[0.059]
$\ln(y_{t-1})$	-0.004**	-0.053*	-0.186***	-0.005
	[0.002]	[0.007]	[0.040]	[0.006]
$\ln(n+g+d)$	-0.019**	-0.037***	-0.045	-0.058***
	[0.009]	[0.012]	[0.045]	[0.022]
$\ln(inv)$	0.015***	0.011***	-0.055***	0.023***
	[0.003]	[0.004]	[0.021]	[0.006]
$\ln(open)$	-0.011	0.004	0.041**	-0.015***
	[0.002]	[0.006]	[0.016]	[0.005]

Note: Dependent variable is growth in GDP per capita. Growth regressions including 126 countries using annual data , 1970-2000. Heteroscedastic consistent standard errors in brackets.
*** significant at 1%, ** significant at 5%, * significant at 10%.

3.2 Adjusting for Global and Regional Interdependence

Figure 1 depicts a clear common trend in the regional returns, which we interpret as a global return factor. This is confirmed by Albuquerque et al. (2002) and Kose, Otrok and Whiteman (2003), among others, who argue that the close trading and investment relationships between countries give rise to a global business cycle. This means that the global investment climate will affect the return to investment in individual countries and regions. In our context, the presence of a global return component means that there is some component in the unpredictable return, ε_{it}, that varies systematically across countries. To capture this, we define a single-index model based on the assumption that the common return component, ω_t, enters linearly in the country-specific return.[9] Now, the unpredictable return component (the growth residual) can be written as

$$\hat{\varepsilon}_{it} = \eta_{i\omega}\omega_t + e_{it}, \qquad e_{it} \sim IID(0, \sigma^2_{ei}), \tag{3}$$

where $\eta_{i\omega}$ reflects the degree to which global return factors spill over into local return (the degree of global integration). $\eta_{i\omega}\omega_t$ can be interpreted as the part of local return that is attributable to the global investment climate. Now, e_{it} can be interpreted as the local return adjusted both for the structural characteristics of the host economy and the systematic return due to global investment conditions. $\hat{\sigma}^2_{ei}$ therefore gives a refined measure of country risk.

[9] For simplicity the degree of global and regional spillovers are assumed to be constant over time. This is not completely in line with empirical observations since one of the most significant features about the global economy of the past few decades has been the move towards closer and more open trading systems and investment relationships between countries. However, this assumption is necessary to make the index model operational.

Not only are returns in individual countries affected by global factors but Figure 1 also suggests that countries belonging to the same region are affected by common shocks (regional contagion).[10] The regional return component could be explained by the fact that many multinational firms locate in one country but serve markets in the whole region. Also political, economic and social ties between countries within a region (often enhanced by the signing of Regional Integration Agreements) means that shocks to one country spills over to the remaining countries in the region.

To capture the regional aspect of local return, we define an indicator of regional belonging that takes on the value one if country i belongs to region k and zero otherwise, $I_{ik} = 1(i \in \Pi_k)$. We then define a regional return component, τ_{kt}, common to all countries in region k but varying over time, that enters linearly in the local return of country i

$$\hat{e}_{it} = \sum_{k=1}^{K} \eta_{i\tau_k} I_{ik} \tau_{kt} + u_{it}, \qquad u_{it} \sim IID(0, \sigma_{ui}^2), \tag{4}$$

where $\eta_{i\tau_k}$ is the spillover from the regional investment climate to the local, and τ_{kt} is return in region k at time t. Now, $\hat{\eta}_{i\tau_k}\hat{\tau}_{kt}$ can be interpreted as the part of country return that is attributable to the regional investment climate. Under such circumstances $\hat{\sigma}_{ui}^2$ is the relevant measure of idiosyncratic country risk since it is adjusted for both the structural and systematic components.

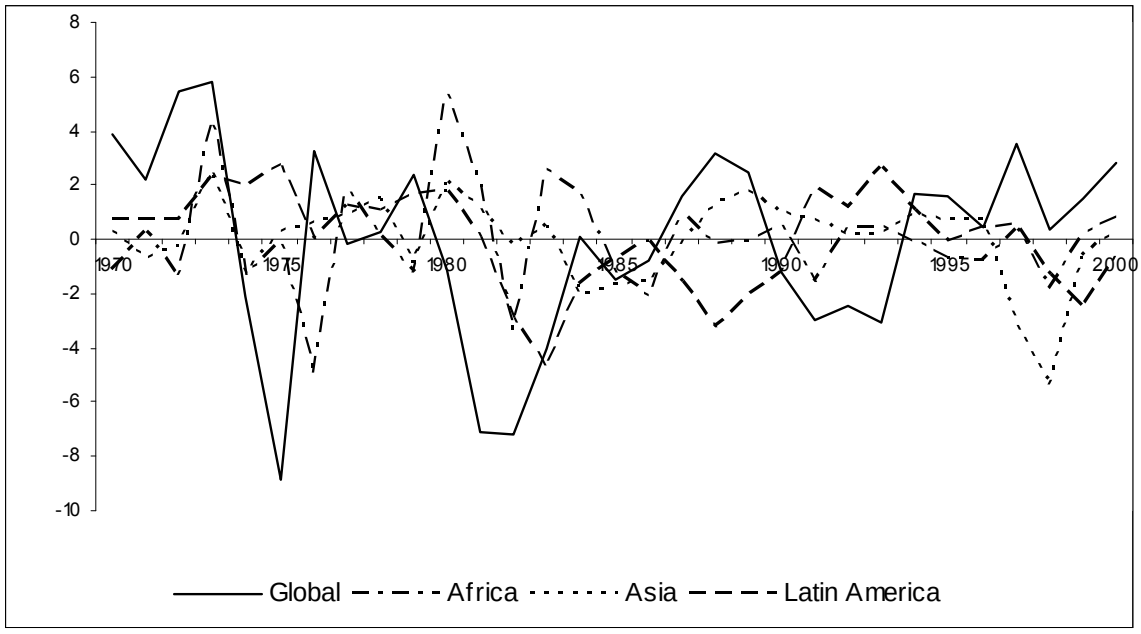
We make the return components operational by means of a principal components analysis (PCA). The PCA will extract from the historical variance-covariance matrix of growth residuals a series of uncorrelated linear combinations that contain most of the variance of the original data. The first principal component has maximal overall variance. The second principal component has maximal variance among all unit length linear combinations that are uncorrelated with the first principal component, etc.

Empirically, $\hat{\omega}_t$ can therefore be estimated as the first principal component of $\hat{\varepsilon}_{it}$, and $\hat{\eta}_{i\omega}$ is the factor loading reflecting the degree of global spillover. Since the PCA methodology requires full time series for the growth residual, the 126 countries from the growth regression are reduced to 92 developed and developing countries that enter the global PCA. It is worth noticing that the sign of $\eta_{i\omega}$ and ω_t are not identified individually. Based on the belief that the USA is a dominant player in the global economy, we have therefore normalised the sign of $\eta_{i\omega}$ and ω_t to ensure that $cov(\omega_t, \varepsilon_{USA,t}) > 0$.

By symmetry, $\hat{\tau}_{kt}$ can be obtained as the first principal component from a region-by-region PCA of $\hat{e}_{it}$, and $\hat{\eta}_{i\tau_k}$ is the factor loading reflecting the degree of regional spillover. Again, the sign of $\hat{\tau}_{kt}$ and $\hat{\eta}_{i\tau_k}$ are not identified individually and we normalise the sign to ensure that the largest economy in the region (in terms of GDP) is positively correlated with regional return, $cov(\tau_t, e_{DYNAMO,t}) > 0$. The argument is that the largest economy often functions as a regional dynamo and we wish to ensure that there is a positive connection between the dynamo and the regional business cycle. The dynamos are South Africa (Africa), Brazil (Latin America) and China (Asia).

[10] The existence of a regional market seeking motive of foreign investors has been confirmed by Veugelers (1991), Chakrabarti (1997, 2003), Méon and Sekkat (2002), Sethi et al. (2003), Jaumotte (2004), and Carstensen and Toubal (2004), and the importance of the macroeconomic and political situation of neighbouring countries has been examined by Ades and Chua (1997), and Easterly and Levine (2000). In addition, in their cluster analysis of the relationship between financial market segmentation and political risk, Hooper and Heaney (2001) find that stock markets are generally segmented on a regional basis.

Figure 2. Global and Regional Principal Components



Note: The figure shows the development in $\hat{\omega}_t$ and $\hat{\tau}_{kt}$ over time. The principal components have been normalised to ensure that the global component is positively correlated with US return and that the regional component is positively correlated with the dominant country in the particular region.

Figure 2 depicts the time pattern of the global and regional principal components, $\hat{\omega}_t$ and $\hat{\tau}_{kt}$. Overall, the global component explains 14% of the total variance. The Asian principal component is the strongest explaining 21% of the residual variance, whereas the Latin American and African components explain 17% and 11%, respectively. The global return component is quite volatile and tests reject that it is constant over time. The global return picks up the economic downturns in conjunction with the two oil crisis in 1973 and 1979. It also shows a more stabilised economy during the 1980s as well as the upturn in the mid 1990s.

Tests also reject the hypothesis that the regional return components are constant over time. During the first two decades, the African return component was quite volatile but the region has stabilised during the late 1980s and 1990s at a relatively high level compared with Asia and Latin America. This is in line with the prediction from Figure 1. The Asian return component, on the other hand, has been stable and most often positive except for the Asian crisis that comes through strongly in the return component in the late 1990s. Finally, the Latin American debt crisis in the 1980s shows up clearly in the regional return.

The PCA methodology ensures that the covariance between the two indices is zero ($E[\omega_t \tau_{kt}] = 0$), and that the residual is uncorrelated with each index ($E([\omega_t u_{it}] = E([\tau_{kt} u_{it}] = 0$). Together this means that conditional risk can be decomposed as

$$\sigma^2_{\varepsilon i} = \eta^2_{i\omega}\sigma^2_{\omega} + \eta^2_{i\tau_k}\sigma^2_{\tau_k} + \sigma^2_{ui}, \tag{5}$$

where $\eta_{i\omega}^2\sigma_{\omega}^2$ is the global risk factor, $\eta_{i\tau_k}^2\sigma_{\tau_k}^2$ is the regional risk factor and σ_{ui}^2 is the idiosyncratic country risk factor. Table 3 shows the risk decomposition for the sample of 67 developing countries for which coherent data was available.

Table 3. Risk Decomposition

Africa	$\sigma_{\varepsilon i}^2$	$\eta_{i\omega}^2\sigma_{\omega}^2/\sigma_{\varepsilon i}^2$	$\eta_{i\tau_k}^2\sigma_{\tau_k}^2/\sigma_{\varepsilon i}^2$	$\sigma_{ui}^2/\sigma_{\varepsilon i}^2$
Algeria	0.309	0.013	0.149	0.838
Benin	0.165	0.053	0.069	0.878
Burkina Faso	0.124	0.143	0.462	0.395
Burundi	0.954	0.006	0.010	0.984
Cameroon	0.378	0.113	0.001	0.887
Cape Verde	0.589	0.001	0.248	0.751
Congo, Rep.	0.457	0.034	0.022	0.944
Cote d'Ivoire	0.202	0.005	0.310	0.685
Egypt	0.170	0.068	0.004	0.929
Ethiopia	0.351	0.044	0.032	0.924
Gabon	0.987	0.091	0.012	0.897
Gambia	0.185	0.002	0.130	0.867
Ghana	0.392	0.161	0.072	0.767
Guinea-Bissau	0.142	0.013	0.094	0.893
Iran	0.741	0.086	0.272	0.642
Jordan	0.618	0.001	0.036	0.964
Kenya	0.335	0.023	0.004	0.973
Lesotho	0.516	0.141	0.023	0.835
Madagascar	0.074	0.074	0.065	0.861
Malawi	0.698	0.021	0.001	0.978
Mali	0.336	0.080	0.046	0.875
Mauritius	0.165	0.022	0.574	0.405
Morocco	0.225	0.001	0.153	0.845
Mozambique	0.682	0.092	0.009	0.900
Niger	0.503	0.032	0.256	0.712
Nigeria	0.937	0.147	0.027	0.826
Senegal	0.254	0.011	0.547	0.442
South Africa	0.024	0.121	0.098	0.782
Syria	1.170	0.037	0.026	0.937
Tanzania	0.915	0.001	0.023	0.977
Togo	0.794	0.030	0.000	0.970
Tunisia	0.078	0.041	0.010	0.949
Uganda	0.723	0.174	0.030	0.796
Zambia	0.160	0.070	0.050	0.880
Zimbabwe	0.379	0.000	0.043	0.957
Average	**0.450**	**0.056**	**0.112**	**0.833**

Note: Decomposes conditional risk into the global, regional and idiosyncratic components.

Table 3. Decomposition of Country Risk (continued)

Latin America	$\sigma^2_{\varepsilon i}$	$\eta^2_{i\omega}\sigma^2_{\omega}/\sigma^2_{\varepsilon i}$	$\eta^2_{i\tau_k}\sigma^2_{\tau_k}/\sigma^2_{\varepsilon i}$	$\sigma^2_{ui}/\sigma^2_{\varepsilon i}$
Argentina	0.374	0.001	0.251	0.748
Bolivia	0.075	0.165	0.210	0.625
Brazil	0.156	0.339	0.205	0.457
Chile	0.366	0.187	0.010	0.803
Colombia	0.038	0.310	0.279	0.411
Costa Rica	0.124	0.303	0.016	0.681
Dominican Republic	0.121	0.195	0.032	0.773
Ecuador	0.247	0.095	0.314	0.591
El Salvador	0.171	0.167	0.015	0.818
Guatemala	0.054	0.277	0.265	0.458
Honduras	0.185	0.003	0.013	0.985
Jamaica	0.246	0.084	0.118	0.798
Mexico	0.099	0.052	0.176	0.773
Panama	0.200	0.053	0.209	0.738
Paraguay	0.140	0.006	0.115	0.879
Peru	0.379	0.003	0.335	0.662
Trinidad and Tobago	0.652	0.002	0.002	0.997
Uruguay	0.260	0.031	0.320	0.649
Venezuela	0.136	0.007	0.004	0.989
Average	**0.212**	**0.120**	**0.152**	**0.728**

Asia	$\sigma^2_{\varepsilon i}$	$\eta^2_{i\omega}\sigma^2_{\omega}/\sigma^2_{\varepsilon i}$	$\eta^2_{i\tau_k}\sigma^2_{\tau_k}/\sigma^2_{\varepsilon i}$	$\sigma^2_{ui}/\sigma^2_{\varepsilon i}$
Bangladesh	0.200	0.102	0.048	0.849
China	0.179	0.045	0.047	0.908
India	0.099	0.098	0.001	0.901
Indonesia	0.137	0.004	0.598	0.398
Malaysia	0.078	0.186	0.283	0.531
Nepal	0.098	0.031	0.068	0.902
Pakistan	0.056	0.004	0.232	0.764
Philippines	0.103	0.200	0.200	0.599
Sri Lanka	0.062	0.110	0.174	0.716
Thailand	0.154	0.021	0.662	0.317
Turkey	0.129	0.008	0.058	0.934
Average	**0.118**	**0.074**	**0.216**	**0.711**

Note: Decomposes conditional risk into the global, regional and idiosyncratic components.

On average, the conditional risk of investing in Africa (0.005) is significantly higher than investing in Latin America (0.002) or in Asia (0.001). The Latin American countries are the most affected by global conditions: in Latin America the global risk factor explains 12% of the total variance as opposed to 7% in Asia and 6% in Africa. On a regional basis, the Asian spillover effect is the strongest, and the Asian return factor explains close to 22% of the total variance. In Latin America and Africa the regional factor accounts for 15% and 11%, respectively. Overall, this means that idiosyncratic country risk accounts for 84% of total risk in Africa, but only 73% and 71% in Latin America and Asia, respectively. Since idiosyncratic risk is the relevant measure of country

risk, the low level of investment in African countries might be explained not only by a large total risk but more importantly by a large proportion of conditional risk being idiosyncratic risk.

Asian and Latin American countries, on the other hand, are more integrated in the global economy and a large part of the risk of investing in these countries is systematic risk that can be compensated by a risk premium. The enormous flows of FDI to Asian countries indicate that the local return has been high enough to compensate for the large systematic risk components.

4 What Determines Country Risk?

Having now adjusted for the structural component of country risk due to economic fundamentals as well as the systematic global and regional risk components, we are left with a measure of idiosyncratic country risk that enables us to carry out an analysis of which factors influence idiosyncratic risk. This section therefore applies econometric tools to select among the various risk measures summarised in Table A1-A3 the most significant determinants of country risk. That is, we estimate

$$\hat{\sigma}^2_{ui} = x_i'\beta + \epsilon_i, \tag{6}$$

where x_i is a vector of economic, political and commercial risk measures. We include in our list of explanatory variables as many as possible of the risk measures suggested in the empirical literature on FDI and risk. However, since some of these papers focus on bilateral FDI flows, include only a selection of countries (for example transition economies) or calculate their own risk measures using econometric tools (such as GARCH or factor analysis) we will not be able to collect all the variables listed in the tables. Where nothing else is mentioned, the variables have been calculated as averages over the time period 1970-2000. Table A4 provides summary statistics and sources of the 35 potential risk measures. Data availability means that we end up with a cross-section of 60 developing countries.

4.1 Description of Variables

To capture exchange rate risk we add two measures based on the real exchange rate. First, given the non-stationarity of the real exchange rate we take the variance of the log-difference rather than the level (VREXCH). Second, we include the average log-difference of the real exchange rate (CREXCH). As another group of economic risk variables, we take in both inflation (INFL) and the variance of inflation (VINFL) over the period 1970-2000. Third, we include four indicators of the debt situation of the host economy: external debt as a share of GDP (EXDEBT), the debt-service ratio (DEBTSERV), long-term debt as a share of GDP (LONGDEBT), and international reserves as a share of GDP (INTRES). Finally, we add the current account balance as a share of GDP (CACCOUNT) and the government deficit as a share of GDP (DEFICIT) to account for the fiscal balance.

We include a large variety of political risk variables. We capture political instability by the Kaufmann et al. (2005) index of political instability and violence (STABILITY), measuring the likelihood of violent threats to the government, as well as the standard deviation of the share of government consumption in GDP (GOVCON). In addition, we include some of the ICRG subcomponents: the government's ability to carry out its declared programs and its ability to stay in office (GOVSTAB), internal political violence and civil disorder (INTERNAL), external conflicts (EXTERNAL), military participation in government (MILITARY), religious tensions (RELIGION) and ethnic tensions due to racial, nationality or language divisions (ETHNIC). Three measures of corruption have been added.

First, is the Kaufmann corruption index (CORRUPTION), which measures the exercise of public power for private gain. Second, we add the ICRG assessment of corruption within the political system (POLCOR), which is more concerned with corruption in the form of excessive patronage, nepotism, job reservations, 'favour-for-favour', secret party funding, and suspiciously close ties between politics and business. Finally, we take government consumption as a share of GDP (GCON).

To capture the effects of democracy on risk, the voice and accountability variable (VOICE) from Kaufmann (2005) reflecting political, civil and human rights has been collected. In addition, the indicators from the Freedom House index have been included individually: civil liberties (CIVIL), political rights (POLRIGHTS) and democracy (FHDEMOC). To supplement, we include the ICRG measure of democratic accountability (ACCOUNT) to capture the degree of tension within a country. Finally, the Marshall and Jaggers (2002) institutionalised democracy index (PDEMOC) and the Vanhanen (2000) index of democratisation (VDEMOC) have been added to our list of political risk measures.

Finally, the quality of governance is first of all captured by the Kaufmann et al. (2005) indicator of government effectiveness (EFFECT), which measures the competence of the bureaucracy and the quality of public service delivery. We supplement with the 'bureaucratic quality' indicator from the ICRG (BUREAU), which reflects the extent to which the national bureaucracy enjoys autonomy from political pressure, has the strength and expertise to govern in a stable manner, and has an effective mechanism for recruiting and training. The strength and impartiality of the legal system and popular observance of the law are captured by the Kaufmann et al. (2005) rule of law indicator (LAW), measuring the quality of contract enforcement, the police and the courts, as well as the likelihood of crime and violence, and the ICRG law and order indicator (ORDER) reflecting the degree to which citizens are willing to accept the established institutions for making and implementing laws as adjudicating disputes.

A more concrete measure of the investment climate is the Kaufmann (2005) regulatory quality indicator (QUALITY) measuring the incidence of market-unfriendly policies. Also, we supplement with two ICRG subcomponents. First is the measure of socioeconomic conditions (SOCIO), which assesses the socioeconomic pressures at work in the society (unemployment, consumer confidence and poverty) that could constrain government action or fuel social dissatisfaction. Second, we include the investment profile component (PROFILE), which is an assessment of factors affecting contract viability/expropriation, profits repatriation and payment delays. Finally, we add the Heritage Foundation property rights index (PRIGHTS).

4.2 Methodology and Results

In view of the large set of (possibly correlated) potential determinants of country risk, it is a challenge to maintain a reasonable degree of parsimony while avoiding misspecification of the model. To deal with this, we use a general-to-specific model selection approach, which enables us to 'test down' among the large set of potential right-hand-side variables. We use the *PcGets* software, which automatically selects an undominated, congruent model where statistically insignificant variables are eliminated and where diagnostic tests check the validity of reductions to ensure a congruent final selection. There are many ways in which a model can be simplified, so *PcGets* selects a multipath search strategy, exploring the consequences of every initially-feasible path. We refer to Hendry (1995, Chapter 9) for further details on the methodology.

Initially, we test the economic, political and commercial risk models separately and the results are reported in Table 4 underneath. Column 1 shows that the external debt (EXDEBT), the debt

service ratio (DEBTSERV), international reserves (INTRES) and the current account (CACCOUNT) turn out to be robust and significant economic determinants of idiosyncratic country risk. As expected highly indebted countries with poor debt services are perceived more risky since future tax liabilities are anticipated to be higher. Likewise, a positive current account balance is indicative of a stable economic environment and thus of lower risk. Surprisingly, the availability of international reserves increases risk rather than lowering it. Since this result does not carry over into the combined model in Column 4, we interpret the positive sign as being indicative of an omitted variable bias.

In Column 2 GCON, CIVIL, VDEMOC and ACCOUNT are the only robust determinants out of the 18 proposed political risk measures. Government consumption as a share of GDP (GCON) was included as an indicator of economic distortions, government inefficiency and corruption, and its positive correlation with risk is therefore to be expected. The civil liberty variable (CIVIL) captures freedom of expression, assembly, association, education and religion. It ranges from one to seven where small numbers indicate an established and generally equitable system of rule of law, and the positive sign of this risk proxy confirms the perception that countries with civil liberties are less risky. The Vanhanen (2000) index of democratisation (VDEMOC) and the ICRG measure of democratic accountability (ACCOUNT) both capture the stabilising effect of democracy. They are rated so that high values indicate a more democratic regime and we would therefore expect them to enter negatively in the regression. The fact that VDEMOC has a positive sign suggests that as soon as we take the accountability aspect of democracy into account, VDEMOC actually captures something that is positively correlated with risk. However, as we will see from Column 4, the significance of this variable is not robust to the merger of the three models and we will therefore not go into details with this preliminary and unstable result.

From Column 3 we see that two out of the eight commercial risk variables turn out to be significant. Regulatory quality, high values of QUALITY, lowers risk since it indicates the incidence of market-friendly policies. Likewise, a high value of PROFILE indicates good contract enforcement and low risk of expropriation, profits repatriation and payment delays. The explanatory power of the commercial risk variables is rather low and overall we must conclude that the proposed commercial risk measures are not very successful in describing idiosyncratic risk. This can also be seen from Column 4 where none of the commercial risk proxies enter in the combined model. There seems to be scope for a more detailed analysis of the investment environment in order to detect more precise indicators of commercial risk in developing countries.

Column 4 shows that when we merge the three models DEBTSERV, ACCOUNT, GCON and ACCOUNT stay significant while the remaining variables from Column 1-3 are not robust to the inclusion of other risk variables. On the other hand, the prevalence of external conflicts (EXTERNAL) becomes a significant determinant of idiosyncratic country risk. Interestingly, when we carry out the general-to-specific exercise using overall risk, the variance of GDP growth, $\hat{\sigma}^2_{\Delta \ln(y_{it}),i}$, as the dependent variable

$$\hat{\sigma}^2_{\Delta \ln(y_{it}),i} = x_i'\beta + \epsilon_i, \tag{7}$$

only the debt service ratio, the current account balance and government consumption turn out significant and robust. This is in line with Persson and Tabellini (2006) who find that democracy has no direct effect on growth but there is a positive indirect effect via higher expected returns. However, once we adjust for structural and systematic components we are able to pick up an effect of democratic accountability on country risk.

Overall, the five significant risk measures account for close to 60 per cent of idiosyncratic risk. Since there are obviously missing variables and serious endogeneity issues, we need to turn to instrumental variable estimation methods, see for example Persson and Tabellini (2006), in order to determine the direction of causality. This lies beyond the scope of this paper. Overall, we conclude that several of the suggested individual risk measures correlate significantly with idiosyncratic risk but that one needs to be careful in selecting individual measures. Our results also indicate that studies that focus solely on one type of risk (typically economic risk) leave out important explanatory variables resulting in biased and inconsistent results.

Table 4. Determinants of Idiosyncratic Risk

Risk measure	Economic $\hat{\sigma}^2_{ui}$	Political $\hat{\sigma}^2_{ui}$	Commercial $\hat{\sigma}^2_{ui}$	Combined $\hat{\sigma}^2_{ui}$	Combined $\hat{\sigma}^2_{\Delta \ln(y_{it}),i}$
EXDEBT	0.388**				
	[0.153]				
DEBTSERV	-0.033***			-0.041*	-0.038***
	[0.012]			[0.013]	[0.014]
INTRES	1.233**				
	[0.560]				
CACCOUNT	-0.024**			-0.033***	-0.042***
	[0.012]			[0.001]	[0.007]
GCON		0.034***		0.027***	0.035***
		[0.012]		[0.001]	[0.007]
CIVIL		0.101**			
		[0.044]			
VDEMOC		0.037***			
		[0.019]			
ACCOUNT		-0.339***		-0.149***	
		[0.154]		[0.041]	
EXTERNAL				0.053***	
				[0.017]	
QUALITY			-0.267***		
			[0.075]		
PROFILE			-0.047***		
			[0.007]		
R^2	0.45	0.43	0.14	0.59	0.44

Note: Results from a general-to-specific analysis of 35 risk measures on idiosyncratic risk. The sample includes 60 developing countries. A constant was included but is not reported. Heteroscedastic consistent standard errors in brackets.*** significant at 1%, ** significant at 5%, * significant at 10%. The PcGets software package was used.

5 Summary and Conclusions

Although the inflow of FDI to developing countries has increased tremendously during the last decade, the regional distribution of such inflows has been heavily biased against the poor African countries. Empirical observations presented in this paper suggest that the uneven distribution of FDI cannot be explained by a low return to investment in these countries, and recent studies of FDI have increasingly turned attention towards country risk as an explanation for the poor investment records of African countries. Ideally, the appropriate risk measure would be the volatility of returns to investment, but since suitable measures of rates of return to FDI are rarely available, empirical papers linking FDI to risk have applied various proxies for country risk. While one group of studies includes various economic, political and commercial risk measures, another set of papers apply various volatility measures to proxy for the risk of the foreign investment.

This paper provides a bridge between these two empirical methodologies. Taking the variance of GDP growth as the overall proxy for country risk, we argue that volatility should only be interpreted as risk when events are unpredictable, and the applied volatility measure therefore does not reflect idiosyncratic country risk. This paper suggests two refinements that take out the structural and systematic components of total risk thereby offering an improved measure of idiosyncratic country risk. This exercise allows us to decompose conditional risk (total risk adjusted for economic fundamentals) into its global, regional and idiosyncratic risk components. Results suggest that the low level of investment in African countries might be explained not only by a large conditional risk but more importantly by a large proportion of this risk being idiosyncratic risk.

As a final exercise, we survey the empirical literature on FDI and risk in order to collect as many economic, political and commercial risk proxies as possible. We then utilise an econometric general-to-specific methodology to select robust indicators that describe the refined idiosyncratic country risk measure. We conclude that both economic and political risk variables are important determinants of idiosyncratic However, the proposed commercial risk measures are not very successful in describing idiosyncratic risk and more work could be done in this area.

Overall, our results indicate that both empirical methodologies are valid in that our refined country risk measure correlate well with several of the risk proxies proposed in the literature. However, if the applied risk measure builds on GDP growth volatility, it is important to adjust for structural and systematic risk components in order to capture idiosyncratic country risk. Likewise, if one chooses to include various risk measures particular attention should be directed towards the host country's ability to service its debt, to ensure a positive current account balance, to keep government consumption on a sustainable level, to implement democratic accountability and to avoid external conflicts.

Table A1. Economic Risk Factors

	Definition	Source
Exchange rate		
Lemi and Asefa (2003)	Variance of real exchange rate	World Development Indicators (WDI) (World Bank)
Ancharaz (2002)	Change in real exchange rate	World Economic Outlook (WEO) (IMF)
Deichmann (2001), Kamaly (2002)	Change in nominal exchange rate	WDI (World Bank)
Wezel (2003)	Two-year moving average of squared percentage change in the bilateral real exchange rate	International Financial Statistics (IFS) (IMF)
Treviño et al. (2002a, b), Treviño and Mixon (2004), Tuman and Emmert (1999, 2004), Wezel (2003)	Bilateral real exchange rate	IFS (IMF)
Frenkel et al. (2004)	Fixed exchange rate dummy. The regimes are categorised in three groups: float, intermediate and fixed	Levy-Yeati and Sturzenegger (2002)
Garibaldi et al. (2002)	Preannounced exchange rate regime dummy	Annual Report on Exchange Arrangements and Restrictions (IMF)
Garibaldi et al. (2002)	Multiple exchange rates	Annual Report on Exchange Arrangements and Restrictions (IMF)
Inflation		
Asiedu (2002, 2005), Bengoa et al. (2003), Frenkel et al. (2004), Garibaldi et al. (2002), Holland and Pain (1998), Kinoshita and Campos (2003), Onyeiwu (2003), Onyeiwu et al. (2004), Schneider and Frey (1985), Treviño et al. (2002a,b), Treviño and Mixon (2004), Tuman and Emmert (1999, 2004)	Inflation	WDI (World Bank)
Lemi and Asefa (2003)	Variance of inflation	WDI (World Bank)
Economic instability		
Schoeman et al. (2000)	Government deficit as a share of GDP	IFS (IMF)
Chen (1998)	Balance of payments deficit as a share of total expenditure	IFS (IMF)
Garibaldi et al. (2002), Schneider and Frey (1985), Treviño et al. (2002a, b)	Current account balance as a share of GDP	WEO (IMF)
Baumgarten and Hausman (2000), Bengoa et al. (2003), Holland and Pain (1998), Kamaly (2002), Lemi and Asefa (2003), Onyeiwu (2003), Onyeiwu et al. (2004), Wezel (2003)	External debt as a share of GDP	WDI (World Bank)
Ancharaz (2002)	Debt-service ratio	WDI (World Bank)
Kamaly (2002)	Long-term debt as a share of GDP	WEO (IMF)
Kamaly (2002)	Difference between total debt and international reserves	WEO (IMF)
Onyeiwu et al. (2004)	International reserves as a share GDP	WDI (World Bank)

Table A2. Political Risk Factors

	Definition	Source
Political instability		
Asiedu (2005), Jaspersen et al. (2000)	Coups and revolutions. The number of forced changes in the top government	Cross-National Time Series Data Archive
Asiedu (2002, 2005)	Assassinations. Politically motivated murder or attempted murder of a high government official	Cross-National Time Series Data Archive
Asiedu (2002, 2005)	Revolutions. Illegal or forced change in the ruling government	Cross-National Time Series Data Archive
Tuman and Emmert (1999, 2004)	Revolution deaths. Annual civilian and combatant deaths caused by revolutionary movements	Clodfelter (1992)
Schneider and Frey (1985), Tuman and Emmert (1999, 2004)	Number of annual anti-government strikes and riots	News database
Tuman and Emmert (1999, 2004)	Annual number of successful or attempted coups d'etat	News database
Baumgarten and Hausman (2000), Meón and Sekkat (2004)	Political instability index. Ranges from 1 and 4 where 4 indicate more instability	ICRG political risk index. See Coplin and O'Leary (1994)
Gastanaga et al. (1998)	Nationalisation Risk Index. Ranges from 0 to 4 where 0 is most risky	Business Environmental Risk Intelligence (BERI)
Ancharaz (2002)	Standard deviation of government consumption as a share of GDP	WDI (World Bank)
Corruption		
Asiedu (2005)	Actual or potential corruption within the political system. Ranges from 0 to 6 where 6 indicates more corruption	ICRG corruption index. See Coplin and O'Leary (1994)
Jaspersen et al. (2000), Wei (2000)	Control of corruption. Ranges from -2.5 to 2.5 where 2.5 indicates less illegal payments	Knack and Keefer (1995)
Meón and Sekkat (2004), Wei (2000)	Corruption perception index defined as an average of ten survey results on corruption over a number of years. Ranges 0 to 9 where 9 is the least corrupt	Transparency International
Wei (2000)	The BI corruption index measures the degree to which business transactions involve corruption or questionable payments. Ranges from 1 to 10 where 10 is the least corrupt	Business International (now a subsidiary of the Economist Intelligence Unit
Gastanaga et al. (1998)	Index of absence of corruption. Ranges from 0 to 10 where 10 is the least corrupt	Mauro (1995)
Meón and Sekkat (2004)	Index of corruption	Wei (2000)
Meón and Sekkat (2004)	Index of corruption	Kaufmann et al. (1999)
Ancharaz (2002), Asiedu (2002), Onyeiwu (2003)	Government consumption as a share of GDP	WDI (World Bank)
Democracy		
Ferris et al. (1997), Kamaly (2002), Lemi and Asefa (2003), Onyeiwu et al. (2004), Tuman and Emmert (2004)	Annual rating of political rights and civil liberties. Ranges from 1 to 7 where 1 indicates the highest degree of freedom	Freedom House

Table A3. Commercial Risk Factors

	Definition	Source
Quality of governance		
Kinoshita and Campos (2003)	Bureaucratic quality. Constructed from two indicators: (i) bureaucratic quality from ICRG, and (ii) factor # 9, regulation from Holmes et al. (1997). High values imply lower cost for foreign investors	Campos (2000)
Ancharaz (2002)	Institutional quality. Defined as the product of ICRG's rule of law and corruption in government indices	ICRG. See Coplin and O'Leary (1994)
Garibaldi et al. (2002)	Predictability of laws and policies. Ranges from 1 to 6 where 6 is worst	World Development Report (1997)
Garibaldi et al. (2002)	Political stability and security of property. Ranges from 1 to 6 where 6 is worst	World Development Report (1997)
Garibaldi et al. (2002)	Overall government-business interface. Ranges from 1 to 6 where 6 is worst	World Development Report (1997)
Garibaldi et al. (2002)	Bureaucratic red tape. Ranges from 1 to 6 where 6 is worst	World Development Report (1997)
Garibaldi et al. (2002)	Efficiency in government in providing services. Ranges from 1 to 6 where 6 is worst	World Development Report (1997)
Méon and Sekkat (2004)	Government effectiveness index. Ranges from -2.5 to 2.5 where 2.5 implies higher effectiveness	Kaufmann et al. (1999)
Gastanaga et al. (1998)	Bureaucratic Delay Index. Ranges from 0 to 4 where 4 implies low delay	BERI
Globerman and Shapiro (2002)	Governance Infrastructure Index. First principal component of governance indices (LAW, INSTAB, REG, GOV, GRAFT, VOICE)	Kaufman et al. (1999)
Rule of law		
Asiedu (2005), Kinoshita and Campos (2003)	The impartiality of the legal system and the extent to which the rule of law is enforced. Ranges from 0 to 6 where 6 implies a more impartial court system	ICRG law and order index. See Coplin and O'Leary (1994)
Méon and Sekkat (2004)	Rule of law index. Ranges from -2.5 to 2.5 where 2.5 corresponds to agents having confidence in and abide by the rules of society	Kaufmann et al. (1999)
Gastanaga et al. (1998)	Contract Enforcement Index. Ranges from 0 to 4 where 4 implies better contract enforcement	BERI
Investment climate		
Deichmann (2001)	Investment climate rating from survey data. Ranges from 1 to 4 where 4 indicates the worst investment climate	EBRD (1999)
Garibaldi et al. (2002), Kinoshita and Campos (2003)	Restrictions on FDI. Ranges from -0.2 to 6 where 6 reflects most restrictions	Annual Report on Exchange Arrangements and Restrictions (IMF)
Zeghni (2001)	Intellectual Property Rights protection index. Ranges from 1 to 3 where 3 implies stronger IPR protection	Constructed by the author based on information from Special 301 Recommendations
Globerman and Shapiro (2002)	Regulatory Burden Index. Ranges from -2.5 to 2.5 where 2.5 implies less burdens	Kaufmann et al. (1999)

Table A4. Summary Statistics of Risk Determinants

Variable	Obs	Mean	Std. Dev.	Min	Max	Source
Economic Risk Factors						
CREXCH	67	0.14	0.17	0.00	0.92	IFS (IMF)
VREXCH	67	0.31	1.66	0.00	13.53	IFS (IMF)
INFL	66	0.44	1.06	-0.02	5.82	WDI (World Bank)
VINFL	66	11.74	60.72	0.00	444.87	WDI (World Bank)
EXDEBT	67	0.61	0.38	0.08	1.99	WDI (World Bank)
DEBTSERV	67	5.40	2.82	1.05	15.49	WDI (World Bank)
LONGDEBT	67	0.51	0.33	0.05	1.84	WDI (World Bank)
INTRES	67	0.09	0.06	0.02	0.31	WDI (World Bank)
CACCOUNT	67	-4.41	4.68	-31.06	2.23	WDI (World Bank)
Political Risk Factors						
STABILITY	66	-0.30	0.72	-2.38	1.20	Kaufmann et al. (2005)
GOVCON	67	0.13	0.06	0.04	0.35	WDI (World Bank)
GOVSTAB	61	6.66	0.74	4.87	8.38	ICRG subcomponent
INTERNAL	61	7.59	1.67	1.97	10.52	ICRG subcomponent
EXTERNAL	61	9.23	1.39	5.88	12.00	ICRG subcomponent
MILITARY	61	2.96	1.29	0.72	6.00	ICRG subcomponent
RELIGION	61	4.30	1.23	1.16	6.00	ICRG subcomponent
ETHNIC	61	3.67	1.15	1.04	6.00	ICRG subcomponent
CORRUPTION	67	-0.36	0.48	-1.09	1.34	Kaufmann et al. (2005)
GCON	67	13.22	3.77	4.85	26.51	WDI (World Bank)
POLCOR	61	2.83	0.74	1.08	5.00	ICRG subcomponent
VOICE	67	-0.25	0.67	-1.53	1.31	Kaufmann et al. (2005)
CIVIL	67	4.42	1.14	1.29	6.86	Freedom House
POLRIGHTS	67	4.41	1.43	1.00	6.75	Freedom House
FHDEMOC	66	4.47	2.31	0.60	9.88	Freedom House
PDEMOC	66	0.68	4.90	-12.90	10.00	Heritage Foundation
VDEMOC	67	6.93	5.98	0.00	24.67	Vanhanen (2000)
ACCOUNT	61	3.15	0.87	1.03	5.00	ICRG subcomponent
Commercial Risk Factors						
EFFECT	67	-0.26	0.53	-1.22	1.32	Kaufmann et al. (2005)
BUREAU	61	1.67	0.78	0.00	3.51	ICRG subcomponent
LAW	67	-0.30	0.54	-1.37	1.28	Kaufmann et al. (2005)
ORDER	61	2.91	0.77	1.00	4.40	ICRG subcomponent
PRIGHTS	67	3.07	0.77	1.00	5.00	Heritage Foundation
QUALITY	67	0.03	0.57	-1.49	1.37	Kaufmann et al. (2005)
SOCIO	61	5.22	0.81	3.23	7.79	ICRG subcomponent
PROFILE	61	6.35	0.77	4.40	7.86	ICRG subcomponent

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