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INVESTMENT AND INSTABILITY

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ABSTRACT

Investment and Instability*

Although recent research has repeatedly found a negative association between investment and political instability, the existence and direction of causality between these two variables has not yet been investigated. This Paper empirically tests for such a causal and negative long-run relationship between political instability and investment. It finds that there is a robust causal relationship from instability to investment, and that it is positive. In other words, an increase in political instability causes an increase in investment (Granger). We identify three different theories that can explain this result.

JEL Classification: D72, E23, O40
Keywords: aggregate investment, granger causality, political instability

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Submitted 21 September 2000

NON-TECHNICAL SUMMARY

Socio-political instability is generally thought of as disruptive of production, therefore increasing uncertainty in the economy. By doing so, it undermines the incentives for the accumulation of physical capital and reduces the rate of economic growth. This is not only strikingly intuitive, but it is also a hypothesis that has been repeatedly confirmed in recent econometric studies. Surprisingly, however, a number of theoretical contributions from the investment literature have recently highlighted the conditions under which uncertainty has a *positive* effect on investment. Such a rare event in economics (a broad empirical consensus coupled with wide theoretical disagreement) calls for, *inter alia*, a re-examination of the evidence and, in particular, a closer look at what this empirical literature has been leaving aside. One such overlooked issue is the existence and direction of a causal relationship between SPI and the accumulation of physical capital. That is the objective of this paper.

There are two other motives for the study. First, although the negative relationship between SPI and economic growth has been elevated to the status of a 'stylized fact', the empirical studies on which it is based have been heavily criticized for ad hoc selection of explanatory or control variables, insufficient sensitivity analysis and failure to investigate the direction of causality. Second, in finding no evidence of a causal relationship between SPI and growth rates of per capita GDP, a previous study indicated that the relationship could be an indirect one operating mainly through investment.

The objective of this paper is to investigate the existence of a causal relationship between SPI and investment. To do so, we construct an index of SPI (based on the number of political assassinations, revolutions and *coups d'Etat*) for non-overlapping five-year periods between 1960 and 1995 for 98 developing countries. We use the Granger causality framework and report Anderson-Hsiao-Arellano instrumental variable estimates.

Our main conclusion is that, for the full sample, there is indeed a (robust) causal relationship going from SPI to the rate of investment, and it is positive. In other words, an increase in instability causes an increase in investment. We identify three theoretical frameworks that are compatible with this result, arguing respectively that: SPI delays investment, that SPI destroys at least partly the capital stock, and that SPI causes changes in government and in government policies that are beneficial in the long run.

I. Introduction

Socio-political instability (hereafter, SPI) disrupts production and increases uncertainty in the economy. By doing so, it undermines the incentives for the accumulation of physical capital and reduces the rate of economic growth. This is not only strikingly intuitive, but it is also a hypothesis that has been repeatedly confirmed in recent econometric studies.[1] Surprisingly, however, a number of theoretical contributions from the investment literature have recently highlighted the conditions under which uncertainty has a *positive* effect on investment.[2] Such a rare event in economics (a broad empirical consensus coupled with wide theoretical disagreement) calls for, *inter alia*, a re-examination of the evidence and, in particular, for a closer look at what this empirical literature has been leaving aside. One such overlooked issue is the existence and direction of a causal relationship between SPI and the accumulation of physical capital. That is the objective of this paper.

There are two other motives for the study. First, although the negative relationship between SPI and economic growth has been elevated to the status of a "stylized fact,"[3] the empirical studies on which it is based have been heavily criticized for ad hoc selection of explanatory or control variables, insufficient sensitivity analysis and failure to investigate the direction of causality.[4] Second, in finding no evidence of a causal relationship between SPI

[1] See, among others, Gupta (1990), Londregan and Poole (1992), Perrotti (1994), Alesina, Ozler, Roubini and Swagel (1996), Alesina and Perrotti (1996), and Ades and Chua (1997).

[2] See, among others, Caballero (1991), Dixit and Pindyck (1994), and Abel and Eberly (1999). For an excellent survey, see Serven (1997). In contrast, it should be noted that the theoretical literature on SPI is still at a very early stage. On the latter, see, e.g., Robinson (1994) and Benhabib and Rustichini (1996).

[3] Distilling the lessons from this literature, Mankiw lists among its robust findings that "political instability, as measured by the frequency of revolutions, coups, or wars, is negatively associated with growth" (1995, 302). Another assessment of what has been learned from such studies is the following "stylized fact" from Persson and Tabellini's chapter for the *Handbook of Macroeconomics* (1999): "Political instability, as measured by more frequent regime changes, or political unrest and violence, is significantly and negatively correlated with growth in cross-country data".

[4] Durlauf and Quah summarize this literature and find that "in addition to the four variables suggested by the augmented Solow-Swan model (initial income and the rates of human capital investment, physical capital investment, and population growth), [different studies have used a total of] 36 different categories of variables and 87 specific examples" (1998, 45).

and growth rates of per capita GDP, Campos and Nugent (1999) suspected that the relationship could be an indirect one operating mainly through investment.

The objective of this paper is to investigate the existence of a causal relationship between SPI and investment. To do so, we construct an index of SPI (based on the number of political assassinations, revolutions and *coups d'Etat*) for non-overlapping five-year periods between 1960 and 1995 for 98 developing countries. We use the Granger causality framework and report Anderson-Hsiao-Arellano instrumental variable estimates.

Our main conclusion is that, for the full sample, there is indeed a (robust) causal relationship going from SPI to the rate of investment, and it is positive. In other words, an increase in instability Granger causes an increase in investment. We argue that three reasons may explain this result: that SPI delays investment, that SPI destroys at least partly the capital stock, and that SPI causes changes in government and in government policies that are beneficial in the long run.[5]

The paper is organized as follows. In the next section (section II) we discuss methodological and data issues. In section III we present our Granger causality results and, in section IV, subject them to various sensitivity analyses. Section V presents our major conclusions and suggestions for further research.

II. Data and methodology

This section has two objectives. The first is to present the data used to construct our SPI index. The second is to discuss the conceptual and econometric advantages (as well as the limitations) of the Granger causality framework.

[5] Formalizations of these three explanations can be found in Abel and Eberly (1999), Hirshleifer (1987), and Robinson and Acemoglu (forthcoming), respectively.

For our measure of SPI, we wish to be as consistent as possible with the other studies in this field.[6] Hence, we draw upon three indicators: number of political assassinations, revolutions and successful *coups d'Etat*.[7] The first, measured as the yearly number of assassinations per million people, is especially important because it captures a magnitude dimension that is largely missing from the other (frequency) measures.

Studies on this topic often choose a cross-sectional design based on long, say 25-year, periods. This is not only far too long a period for capturing instability, but also a clear impediment to investigating causality. On the other hand, annual data would seem too short in duration to reflect underlying factors other than mere productive time lost due to the disruptive influences themselves. For these reasons, in this study we settle on five-year, non-overlapping periods, where the observations on SPI are the averages over each five-year interval.

In accordance with most of the literature, we use the method of principal components to construct our SPI index. We believe this method is best because it minimizes the inherent arbitrariness in the aggregation. For our index of SPI, the weights resulting from this procedure are 0.3162 for assassinations, 0.6909 for revolutions, and 0.6502 for coups.

The data on investment rates are the average share of investment in GDP, by five-year period and by country, from Summers and Heston (1994). For SPI and investment, time series data covering the period 1960-1995 are collected for an unbalanced panel of 98 developing countries.[8] Included are 14 countries from Asia, 21 from Latin America, 17 from the Middle East and North Africa and 46 from Sub-Sahara Africa. Table 1 shows basic statistics and correlation matrix.

[6] See footnote 1.
[7] The data source is Barro and Lee (1993).
[8] The reason for choosing an unbalanced panel was to keep the exercise as comparable to the rest of the literature as possible. The sample we use differs from other studies' by very few countries.

INSERT TABLE 1 ABOUT HERE

As it can be seen in Equation (1), using the data and sample described above we are able to replicate the negative (and statistically significant) contemporaneous relationship between SPI and investment found in most of the literature.[9] Yet we understand these results as suggesting only association, and hence as being rather far from revealing anything useful about the existence and direction of a causal relationship.

Investment =	13.78 Constant	- 1.17	SPI	Adjusted R-squared = .031	(1)
	(36.83)	(-3.74)		Number of observations = 414	

These are Ordinary Least Squares estimates, with t-statistics in parentheses.

We selected the Granger-causality framework to investigate the existence and direction of a causal relationship between socio-political instability (SPI), on the one hand, and the accumulation of physical capital, on the other. This framework has endured the test of time because of its elegance and strong intuitive appeal: the notion that an event in the future cannot cause one in the past.[10] Consider two time series, x_t and y_t. Series x_t is said to Granger-cause series y_t if, in a regression of y_t on lagged y's and lagged x's, the coefficients of the lagged x's are jointly significantly different from zero.

[9] In our OLS regressions of investment on (contemporaneous) SPI, the coefficients on the latter are all negative and statistically significant at the 10 percent level, for the sample as a whole (above) as well as for the four separate regions considered below, with the exception of Latin America. Notice that the addition of country dummies to equation (1) does not alter the conclusions: the coefficient on political instability is still negative and statistically significant (at the 1 percent level). Yet, the size of the coefficient on SPI changes (to -.59) and the adjusted R-squared increases (to .724).

[10] Granger remarks that "causation is a non-symmetric relationship, and there are various ways in which asymmetry can be introduced, the most important of which are controllability, a relevant theory, outside knowledge, and temporal priority" (1987, 49.) For discussion see, e.g., Hsiao (1979), and Zellner (1989).

There are two critical issues that have to be addressed in conducting Granger causality tests.[11] The first concerns the length and frequency of the time lags. On their length, Granger admonishes that "using data measured over intervals much wider than actual causal lags can also destroy causal interpretation" (Granger, 1987, 49). The use of five-year periods is short enough to allow us to investigate the effects of lagged variables and hence to undertake proper (Granger) causality tests, and yet is also long enough to be meaningful for studying the long-run effects of SPI on investment, and vice versa. As for their frequency, there are a number of tests to determine the "optimal number of lags," but because ours is a short panel we used a grid procedure to evaluate the robustness of the results presented below.[12]

The second issue to be dealt with lies in the information set. The Granger test depends on the assumption that the cause contains unique information about the effect, in the sense that it is exhaustive and not available elsewhere. If the information set underlying the test is composed solely of two series, both of which may be affected by a third variable, the test can be rendered useless.[13] In what follows, we present Granger causality results that are unaffected after enlarged by variables that could potentially play this disruptive role.

Finally, we must attend to the econometric issue that arises from the inclusion on the right-hand side of the (lagged) dependent variable, referred to in the econometric literature as the dynamic panel problem: unless the time dimension of the panel is very large, parameter estimates will be inconsistent and biased.[14] While the best solution to this problem is still an object of debate in the econometrics literature,[15] in one of the few studies focusing on "short and wide" panels (like ours), Kiviet finds that the instrumental variable approach pioneered

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[11] We do not know of other studies that use the Granger framework in this context. The closest paper to ours is Blomstrom, Lipsey and Zejan (1996).
[12] We tried two lags, instead of one as reported throughout the paper. The conclusions are unaffected.
[13] See Harvey for a discussion of this issue (1990).
[14] For discussion see, e.g., Hsiao (1986), Sevestre and Trognon (1992), and Baltagi (1995).
[15] See, among others, Holtz-Eakin et al. (1988), Arellano and Bond (1991), Kiviet (1995), and Judson and Owen (1999).

by Anderson and Hsiao (1982) performs as well as any other alternative. On this basis, we use this method which requires first-differencing all variables and using second lag differences as instruments. However, we also follow Arellano (1989)'s recommendation by using the twice lagged levels instead of the twice-lagged first-differences as instruments and in Section IV we show that the results are robust to the use of alternative estimators.

III. Empirical results

We present the results obtained for the causality patterns between SPI and investment in Tables 2 and 3.[16] In Table 2 we ask whether SPI Granger causes investment. For our complete sample of 98 developing countries there is indeed such a causal relationship as indicated by the statistical significance of the effect of the lagged SPI term on the investment rate for the current period. Strikingly, it shows that the relationship is positive rather than negative. While, as noted above, this is not inconsistent with theory —which is essentially ambiguous on the sign of the relationship— it is certainly inconsistent with the vast majority of empirical studies to date. Although the coefficients of the lagged SPI term are no longer significant in the regional sub-samples, they remain consistently positive and do not oscillate very far from the value of 0.5 obtained for the full sample.

INSERT TABLE 2 ABOUT HERE

In Table 3 we turn to the reverse question, that is, to whether investment Granger causes SPI. In this case, there is clearly no causal relationship in either the full sample or any

[16] Throughout the paper, we use the term "x Granger causes y" as an abbreviation for "past x values show a statistically significant effect on current values of y, given the past history of y."

of the regions. The coefficient is essentially zero for the full sample and is between a positive 0.053 and a negative 0.01 in the sub-regions.

INSERT TABLE 3 ABOUT HERE

In sum, the main result of this exercise is that there is a Granger causality relationship going from SPI to investment, and it is positive. This obtains for our full sample, but not for any of the four regional sub-samples. Although one could easily blame this discrepancy on the smaller number of observations (in each region), there may be other explanations. Since there are broad similarities among regions of developing countries but also very considerable heterogeneity in institutional and other background characteristics among countries of each region, it would seem quite plausible that the time lags needed for the relationship to change from negative (as in the contemporary relationship between SPI and investment) to positive when SPI is lagged could well vary from one country to another within a given region.[17] Before exploring further, it is imperative to provide reasonable assurance that these results are robust. This is the objective of the next section.

IV. Sensitivity analysis

The most critical issue in applying the Granger framework concerns the content of the information set. In particular, the issue revolves around whether omitted variables might exist that could affect both investment rates and SPI, thereby giving rise to potentially serious

[17] It would be important to investigate under which lag length a causal relationship will appear (that is, whether using one, two, three or four-year lag lengths would change our conclusions). Gupta (1990) has annual series for a similar SPI index but only until 1982. He also mentioned (personal communication) that the updating of these series (until 1995) is not yet ready. We thus have to leave this important exercise for future work.

biases in Granger causality results.[18] The most natural candidate for such an omitted variable is the level of real per capita income. In Tables 4 and 5, therefore, we wish to evaluate how and to what extent including the level of real GDP per capita would affect the results of the causality tests reported above. More specifically, our hypothesis is that, in a given country, both the level of SPI and the investment rate would be negatively related to the (previously) omitted level of income per capita. Hence, we might expect to find negative effects of levels of per capita income on both investment and SPI.

INSERT TABLE 4 ABOUT HERE

From the results reported in Tables 4 and 5 it can clearly be seen that the effects of the level of GDP per capita term are generally negative. They are, however, not statistically significant. The case that comes closest to becoming statistically significant is the effect of initial income in the equation for investment for the Latin America sub-sample in Table 5 where this coefficient is significant at the 10 percent level.

INSERT TABLE 5 ABOUT HERE

Of greater importance, however, is the fact that the inclusion of this variable has little effect on the results of the causality tests. There is still, in Table 5, no causality going from

[18] Although we only report results using the level of income per capita to deal with the issue of the information set, the results presented in the previous section were subjected to a number of other sensitivity tests. First, the results are not affected by using (instead of level of per capita income) the rate of population growth or the growth rate of the country's main trade partners (we thank an anonymous referee for these suggestions). Second, the results remain unchanged if we include two lags, instead of one as reported throughout. Third, our conclusions do not change if instead of the Anderson-Hsiao-Arellano estimator, we report OLS (levels), OLS (first-differences), the Anderson-Hsiao estimator, the one-step GMM estimator proposed by Arellano and Bond (1991), the two-step GMM estimator proposed by Arellano and Bond (1991), and the GMM estimator proposed by Ahn

investment rates to SPI as shown (for the regions), and there is still a causal relation for the full sample going from SPI to investment. Indeed, the size of the coefficient and its level of significance are slightly increased by the inclusion of this control. Similarly, there is a slight increase in the coefficients of the lagged SPI term in most of the sub-samples. Once again, and still in contrast with much of the existing empirical literature on the relation between SPI and investment, the causal relationship is positive. Because we can only speculate about the possible reasons for this result, we leave these speculations for the next section.

V. Conclusions

The objective of this paper was to investigate the existence (and direction) of a causal relationship between SPI and investment. We construct an index of SPI (based on the number of political assassinations, revolutions and successful *coups d'Etat*) for non-overlapping five-year periods between 1960 and 1995 for 98 developing countries. We use the Granger causality framework with Anderson-Hsiao-Arellano instrumental variable estimates. We find that the evidence in support of the hypothesis that a high level of SPI can cause a decrease in the rate of investment is much weaker than generally believed. Despite verifying the negative contemporaneous relationship between SPI and the investment rate, we find evidence of a robust positive causal relationship going from SPI to the investment rate.

One interesting policy implication that can be derived from these results is that there seems to be less reason to believe that SPI, by itself, constitutes such a severe barrier to medium or long-term economic growth and investment, as has often been advocated. The negative effects seem to be limited to the short run and offset by the present finding of a

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and Schmidt (1995). All these results are not reported for the sake of space, but are available from the authors upon request.

positive effect on investment over the medium term. Certainly, the results strongly contradict the notion that lower levels of SPI should be achieved at virtually any cost.[19]

The findings of this paper also raise new questions that should be pursued in future research. First, in view of the fact that there could be several alternative explanations for the observed positive causal relationship between SPI and investment, it would be highly desirable to try to narrow down their range. Can this result be because SPI delays investment (Abel and Eberly, 1999)? Can it be because SPI destroys at least partly the capital stock (Hirshleifer, 1987)? Or is it because SPI causes changes in government and in government policies that are beneficial in the long run (Robinson and Acemoglu, forthcoming)? Which one of these is the most important reason? Does the relative importance of these explanations vary by region or time frame?

Second, we have seen a sharp inconsistency between the existing results, that reveal a negative contemporaneous relationship between SPI and the investment rate, and our own findings of a positive and causal relationship going from SPI to the investment rate when the observations are for non-overlapping five year periods. This raises the following question: At what frequencies and lag lengths does the relationship change from negative and non-causal to one that is positive and causal? As noted before, this is one of the most important questions we leave unanswered. As soon as reliable data are available, attention should focus on this question.

Third, there would seem to be considerable scope for efforts to identify additional omitted variables, especially those of an institutional nature, which might be related to both the SPI measure and the rate of investment. Numerous institutional variables may be relevant, like the fairness and effectiveness of the judicial system, the stability of property rights, and

[19] Recall that a common justification given by dictators during their first days in office is that they are needed to halt the chaos, which presumably characterized the previous regime, because the cost of this instability is the disruption of productive activities with subsequent output and welfare losses.

the quality of the bureaucracy. Indeed, in a cross-sectional framework Keefer and Knack (1995) find that once these are taken into account, the negative effect of SPI on growth vanishes. Another important candidate for such an omitted variable role, following Persson and Tabellini (1992, 1994) and Alesina and Perotti (1996), might be the level of income inequality. It should be noted, however, that the data (on income distribution and institutions) for time frequencies of five years or less for these "enlargements" of our Granger tests is mostly unavailable.

Finally, considering that the current traditional measure of SPI is rather coarse (i.e., is sensitive only to major disruptions such as political assassinations, revolutions and civil wars), it might be useful to experiment with somewhat finer measures of more ordinary instances of political as well as of policy instability. By constructing such measures, one could then determine whether the results presented above still hold.

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Table 1
Basic statistics and correlation matrix

Variable	Mean	Standard Deviation	Min	Max
Investment	14.50814	7.318093	1.02	39.5
SPI	-.047235	1.215492	-.90764	4.894848
Per capita income	2013.678	1563.445	322	7777
Population growth	2.532	.7743685	.1490161	6.954178
Trading partners' Growth	2.519776	1.286855	-2.238912	6.438717

Correlation matrix

Variable	Investment	SPI	Per capita income	Population growth
SPI	-0.2237			
Per capita income	0.5013	-0.1080		
Population growth	0.0189	-0.0665	-0.0511	
Trading partners' Growth	0.0512	-0.0149	-0.1583	0.0297

Note: See text for details.

Table 2.
Does SPI Granger cause investment?
(Endogenous variable is ΔINV_t)

	ΔINV_{t-1}	ΔSPI_{t-1}
All LDCs	.893647 ***	.502752 **
	(3.62041)	(2.12038)
Asia	.509661 *	.589710
	(1.91667)	(1.38880)
Latin America	.985997 ***	.323442
	(3.12381)	(.729824)
Middle East & North Africa	.482033	.542963
	(1.46367)	(.753546)
Sub-Saharan Africa	.950372 ***	.398886
	(2.82225)	(1.17682)

Notes: All variables are in first-differences (Δ); five-year averages, between 1960-1995, and t-statistics are in parentheses. Instrumental variables estimates shown (Anderson-Hsiao-Arellano). *SPI* is the measure of social and political instability described in the text, and *INV* is the investment as a share of GDP.

* Statistically significant at the 10 percent level.

** Statistically significant at the 5 percent level.

*** Statistically significant at the 1 percent level.

Table 3.
Does investment Granger cause SPI?
(Endogenous variable is ΔSPI_t)

	ΔSPI_{t-1}	ΔINV_{t-1}
All LDCs	.179173 (1.60772)	.009473 (.427063)
Asia	.242095 (.721596)	.052338 (.836329)
Latin America	.050252 (.225079)	-.006459 (-.127577)
Middle East & North Africa	.188081 (1.26888)	.014092 (.427949)
Sub-Saharan Africa	.216226 (1.05233)	-.000037 (-.000973)

Notes: All variables are in first-differences (Δ); five-year averages, between 1960-1995, and t-statistics are in parentheses. Instrumental variables estimates shown (Anderson-Hsiao-Arellano). *SPI* is the measure of social and political instability described in the text, and *INV* is the investment as a share of GDP.

* Statistically significant at the 10 percent level.

** Statistically significant at the 5 percent level.

*** Statistically significant at the 1 percent level.

Table 4.
Controlling for initial income,
does SPI Granger cause Investment?
(Endogenous variable is ΔINV_t)

	ΔINV_{t-1}	ΔSPI_{t-1}	$\Delta GDP0_{t-1}$
All LDCs	.1.0908***	.570358**	-.000765
	(4.02819)	(2.26743)	(-1.27153)
Asia	.479503	.566251	-.000996
	(1.38807)	(1.34604)	(-.785538)
Latin America	.875797***	.325820	-.001764 *
	(3.12665)	(.788490)	(-1.90024)
Middle East & North Africa	.591943	.884785	.000595
	(1.15719)	(1.13967)	(.649242)
Sub-Saharan Africa	1.01528***	.416341	.000427
	(3.03117)	(1.17973)	(.357729)

Notes: All variables are in first-differences (Δ); five-year averages, between 1960-1995, and t-statistics are in parentheses. Instrumental variables estimates shown (Anderson-Hsiao-Arellano). *SPI* is the measure of social and political instability described in the text, *GDP0* is level of initial per capita income, and *INV* is the investment as a share of GDP.

* Statistically significant at the 10 percent level.

** Statistically significant at the 5 percent level.

*** Statistically significant at the 1 percent level.

Table 5.
Controlling for initial income,
does investment Granger cause SPI?
(Endogenous variable is ΔSPI_t)

	ΔSPI_{t-1}	ΔINV_{t-1}	$\Delta GDP0_{t-1}$
All LDCs	.166307 (1.51044)	.013304 (.538796)	-.000091 (-.535246)
Asia	.313547 (.873603)	.070839 (.950382)	-.000274 (-.497368)
Latin America	.043146 (.191834)	.002559 (.048111)	-.000232 (-.618292)
Middle East & North Africa	.154136 (.989875)	.032343 (.620861)	-.000155 (-.717280)
Sub-Saharan Africa	.177278 (.923239)	-.001221 (-.032562)	.000097 (.246857)

Notes: All variables are in first-differences (Δ); five-year averages, between 1960-1995, and t-statistics are in parentheses. Instrumental variables estimates shown (Anderson-Hsiao-Arellano). *SPI* is the measure of social and political instability described in the text, *GDP0* is level of initial per capita income, and *INV* is the investment as a share of GDP.

* Statistically significant at the 10 percent level.

** Statistically significant at the 5 percent level.

*** Statistically significant at the 1 percent level.

APPENDIX TABLES
(FOR THE SAKE OF SPACE, THE AUTHORS FEEL
THESE APPENDIX TABLES SHOULD NOT BE PUBLISHED)

Table A1.
Controlling for POPULATION GROWTH,
does SPI Granger cause Investment?
(Endogenous variable is ΔINV_t)

	ΔINV_{t-1}	ΔSPI_{t-1}	ΔPOP_{t-1}
All LDCs	.870356***	.495160**	.022379
	(3.45445)	(2.11091)	(.056591)
Asia	.628421*	.719482	1.65062
	(1.78597)	(1.48854)	(.860579)
Latin America	.988830***	.328082	-3.25241*
	(3.05249)	(.754105)	(-1.79404)
Middle East & North Africa	.429354	.608828	.817088
	(1.33768)	(.872319)	(1.50307)
Sub-Saharan Africa	.977459***	.408573	-.578716
	(2.81548)	(1.18540)	(-.865717)

Notes: All variables are in first-differences (Δ); five-year averages, between 1960-1995, and t-statistics are in parentheses. Instrumental variables estimates shown (Anderson-Hsiao-Arellano). *SPI* is the measure of social and political instability described in the text, and *INV* is the investment as a share of GDP.
* Statistically significant at the 10 percent level.
** Statistically significant at the 5 percent level.
*** Statistically significant at the 1 percent level.

Table A2.
Controlling for POPULATION GROWTH ,
does investment Granger cause SPI?
(Endogenous variable is ΔSPI_t)

	ΔSPI_{t-1}	ΔINV_{t-1}	ΔPOP_{t-1}
All LDCs	.178916 (1.60117)	.010280 (.455738)	-.031488 (-.198264)
Asia	.295503 (.830154)	.089502 (1.24806)	.876087 (1.22090)
Latin America	.039254 (.177791)	.000866 (.017020)	-.535876 (-1.09077)
Middle East & North Africa	.217301 (1.38818)	.000630 (.017839)	.296797 (1.02576)
Sub-Saharan Africa	.229854 (1.09684)	.004162 (.105998)	-.117832 (-.503505)

Notes: All variables are in first-differences (Δ); five-year averages, between 1960-1995, and t-statistics are in parentheses. Instrumental variables estimates shown (Anderson-Hsiao-Arellano). *SPI* is the measure of social and political instability described in the text, and *INV* is the investment as a share of GDP.

* Statistically significant at the 10 percent level.

** Statistically significant at the 5 percent level.

*** Statistically significant at the 1 percent level.

Table A3.
Controlling for GROWTH OF TRADING PARTNERS,
does SPI Granger cause Investment?
(Endogenous variable is ΔINV_t)

	ΔINV_{t-1}	ΔSPI_{t-1}	ΔGTR_{t-1}
All LDCs	.916914*** (3.53772)	.494652** (2.10042)	.219434 (.968316)
Asia	.469499 (1.42426)	.591597 (1.33700)	-.001962 (-.004770)
Latin America	.792024*** (2.93741)	.313558 (.782300)	-.748561 (-1.35130)
Middle East & North Africa	.400863 (1.42097)	.573896 (.930403)	.762555* (1.68708)
Sub-Saharan Africa	1.02009*** (2.89602)	.362235 (1.05716)	.403976 (1.08613)

Notes: All variables are in first-differences (Δ); five-year averages, between 1960-1995, and t-statistics are in parentheses. Instrumental variables estimates shown (Anderson-Hsiao-Arellano). *SPI* is the measure of social and political instability described in the text, and *INV* is the investment as a share of GDP.

* Statistically significant at the 10 percent level.

** Statistically significant at the 5 percent level.

*** Statistically significant at the 1 percent level.

Table A4.
Controlling for GROWTH OF TRADING PARTNERS ,
does investment Granger cause SPI?
(Endogenous variable is ΔSPI_t)

	ΔSPI_{t-1}	ΔINV_{t-1}	ΔGTR_{t-1}
All LDCs	.165976 (1.41303)	.002322 (.091289)	-.096486 (-.983672)
Asia	.296963 (.766835)	.058271 (.776063)	.046298 (.216719)
Latin America	.031645 (.140057)	-.015641 (-.302442)	-.240306 (-.859321)
Middle East & North Africa	.170574 (1.10542)	.010323 (.289720)	.091445 (.536827)
Sub-Saharan Africa	.257419 (1.05863)	-.031727 (-.621936)	-.293152 (-1.43488)

Notes: All variables are in first-differences (Δ); five-year averages, between 1960-1995, and t-statistics are in parentheses. Instrumental variables estimates shown (Anderson-Hsiao-Arellano). *SPI* is the measure of social and political instability described in the text, and *INV* is the investment as a share of GDP.

* Statistically significant at the 10 percent level.

** Statistically significant at the 5 percent level.

*** Statistically significant at the 1 percent level.