Political instability and economic growth in developing economies: some specification empirics

A.K. Fosu*

African Economic Research Consortium (AERC), 8th Floor, International House, P.O. Box 62882, Nairobi, Kenya

Received 27 January 2000; accepted 15 July 2000

Abstract

The paper empirically explores the specification of the relationship between political instability (PI) and economic growth, using data on different events of coups d'état in sub-Saharan Africa. It finds that when a principal component of the various PI events is employed in an augmented production function, basic specification tests are met. However, specifying PI using the separate events, such as ‘successful’ coups, results in a potentially misspecified relationship, reduced model fit, and underestimation of the adverse PI effect. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Political instability; Growth; Specification empirics

JEL classification: O40

1. Introduction

The role of political variables in economic performance has been receiving increasing attention in the literature. In particular, recent research suggests that political instability (PI) is deleterious to economic growth in developing economies (e.g. Alesina et al., 1996; Fosu, 1992; Barro, 1991). Although PI may be defined generally to include any type of insurrection or revolution, military-led coups d'état have been particularly characteristic of the developing economies of Sub-Saharan Africa (SSA) during the post-independence period.¹

This form of elite PI is observed to be growth-inhibiting in developing countries (Alesina et al.,
Successful’ coups (involuntary changes in government) are usually used as a measure of PI (e.g. Alesina et al., 1996). However, other potential forms of PI, such as abortive coups and officially reported coup plots, not readily available in published form, may also exert de-stabilizing influences on the economy. If so, then they may embody sufficient significant informational content to be incorporated into the measure of PI.

The relatively detailed unpublished data on SSA available in McGowan (1986) makes potentially feasible an in-depth analysis of the implications of the various forms of coup events for growth. Using these data, for example, Fosu (1992) employs a binary variable (high- versus low-PI) to estimate a substantial effect of PI on growth in SSA. The dichotomous nature of the PI variable, however, fails to fully exploit the informational value of these various forms of ‘elite’ PI.

The present paper examines the ‘sufficiency’ nature of the different forms of PI by subjecting the estimation of the PI-growth equation to basic specification tests. The paper explores especially the extent to which the other potential forms of coups — abortive coups and coup plots — might add to the information content of successful coups, usually employed in the literature as the PI measure.

2. Model

Consider the simple Cobb–Douglas production function:

\[ Q = AL^bK^c \]  

(1)

where \( Q \) is output, \( L \) labor, and \( K \) capital; \( A, b, \) and \( c \) are the parameters to be estimated. The ‘growth’ version of Eq. (1) is:

\[ q = a + bl + ck \]  

(2)

where \( l \) and \( k \) are the respective growth rates of labor and capital; \( a, b, \) and \( c \) are the estimable parameters.

Eq. (2) is the classical production function, an augmented version of which has been estimated in many studies. Instead of specifying PI as an additional variable in Eq. (2), however, we shall assume that the parameters — \( a, b, \) and \( c \) — are functions of PI, the rationale of which is provided below. For simple linear mappings of these respective parametric PI relationships: \( a = a_1 + a_2p, b = b_1 + b_2p, \) and \( c = c_1 + c_2p, \) we have the following augmented production–function specification:

\[ q = a_1 + a_2p + b_1l + b_2pl + c_1k + c_2pk + u \]  

(3)

where \( q \) is output growth, \( p \) measures PI, \( l \) and \( k \) are the respective growth rates of labor and capital, and \( u \) is the appended stochastic perturbation term.

\(^2\)For studies that argue that political instability ‘causes’ economic performance, rather than the reverse, see, for example, Cukierman et al. (1992).

\(^3\)Abortive coups are sometimes indistinguishably reported together with successful coups, though. The important point here, however, is that all three PI events may contain useful information.

\(^4\)The data are compiled from intervention events reported in primarily several issues of Keesing’s Contemporary Archives, Africa Research Bulletin, and the New York Times.

\(^5\)The version usually estimated is the export-augmented model; for an application appearing in this journal see, for example, Fosu (1990a).
Eq. (3) is to be estimated using different measures of \( p \). Basic specification tests will then be employed to explore the appropriateness of choosing a given PI event. In particular, we examine the extent to which involuntary changes in government (‘successful’ coups) may constitute a sufficient PI statistic in the growth equation.

The parameter \( a_1 \) measures general influences on growth common to the units of observation, such as disembodied Hicks-neutral technological change. Its sign is indeterminate, generally. The traditional labor and capital coefficients, \( b_1 \) and \( c_1 \), are expected to be non-negative. More important for the present purposes, however, are the other parameters.

The independent effect of PI is measured by \( a_2 \). Its sign should be non-negative, given that in very dismal economic conditions with extremely low growths of the production factors, a coup event may raise expectations of a possible government change, which might actually help to resuscitate growth (Fosu, 1992).

In contrast, \( b_2 \) and \( c_2 \), which measure the respective effects of PI on the impacts of labor and capital, are expected to be non-positive. For example, increased policy uncertainties and political risks associated with high PI are likely to raise the marginal rate of time preference, especially for risk-averse investors. This would, in turn, increase the rate of substitution of shorter-term but less productive investment projects for some longer-term projects that may be relatively productive (Fosu, 1992). In addition, production inefficiencies generated by PI, such as disruptions of the production schedule, would reduce the respective marginal products of the production inputs (Fosu, 1992)."
GDP growth; \( l \) is the growth of the labor force; and \( k \) is the gross domestic investment expressed as a proportion of GDP (e.g. Fosu, 1990b, footnote. 11; Ram, 1985, footnote 6).9

The PI variable \( p \) is measured using frequencies of successful coups (SCOUPS), involving actual involuntary government changes; abortive coups (ACOUPS); and officially reported coup plots (CPLOTS) over the sample period. The (first) principal component based on all these coup events is first employed;10 then each coup event is specified in a separate equation in order to assess the event’s relative importance. Parsimonious results from estimating Eq. (3) are reported in Table 1.11

Table 1 shows that all the estimated parameters exhibit the anticipated signs. In particular, we note

Table 1
Political instability and economic growth (1960–1986): regression results (absolute values of the \( t \) ratio in parentheses)\(^a\)

<table>
<thead>
<tr>
<th>Eq. (( p = ) PI variables)</th>
<th>Const.</th>
<th>( l )</th>
<th>( k )</th>
<th>( p )</th>
<th>( p^*k )</th>
<th>( AR^2 )</th>
<th>SEE</th>
<th>WR(^2 )</th>
<th>RESET</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) (( p = ) PIPRIN)</td>
<td>-1.69</td>
<td>0.009</td>
<td>0.321</td>
<td>0.452</td>
<td>-0.040</td>
<td>0.578</td>
<td>1.20</td>
<td>9.2</td>
<td>5.76</td>
</tr>
<tr>
<td>(1.37)</td>
<td>(0.02)</td>
<td>(4.60)</td>
<td>(2.33)</td>
<td></td>
<td>(3.39)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(B) (( p = ) SCOUPS)</td>
<td>-1.82</td>
<td>0.044</td>
<td>0.292</td>
<td>0.923</td>
<td>-0.064</td>
<td>0.427</td>
<td>1.40</td>
<td>12.2</td>
<td>6.79</td>
</tr>
<tr>
<td>(1.20)</td>
<td>(0.08)</td>
<td>(3.49)</td>
<td>(1.64)</td>
<td></td>
<td>(2.07)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(C) (( p = ) ACOUPS)</td>
<td>-1.02</td>
<td>0.456</td>
<td>0.214</td>
<td>0.270</td>
<td>-0.036</td>
<td>0.490</td>
<td>1.32</td>
<td>19.9</td>
<td>7.99</td>
</tr>
<tr>
<td>(0.80)</td>
<td>(0.90)</td>
<td>(3.08)</td>
<td>(0.73)</td>
<td></td>
<td>(1.78)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(D) (( p = ) CPLOTS)</td>
<td>-1.77</td>
<td>0.517</td>
<td>0.244</td>
<td>0.333</td>
<td>-0.029</td>
<td>0.453</td>
<td>1.36</td>
<td>9.3</td>
<td>12.57</td>
</tr>
<tr>
<td>(1.34)</td>
<td>(1.07)</td>
<td>(3.77)</td>
<td>(1.58)</td>
<td></td>
<td>(2.27)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) The symbols \( l \), \( k \), and \( p \) denote labor growth, capital growth, and political instability, respectively; \( l \) is measured as the mean annual growth rate of the labor force, \( k \) as the annual mean gross domestic investment as a percentage of GDP, and \( p \) as the frequency of the events of coups d’état over the sample period. SCOUPS, ACOUPS, and CPLOTS denote successful coups, abortive coups, and officially reported coup plots, respectively. PIPRIN is the (first) principal component of these three events. The sample size is 31 countries. \( AR^2 \) and SEE are the usual regression statistics, the adjusted coefficient of determination and standard error of estimate, respectively. WR\(^2 \) is the White Heteroscedasticity specification test statistic, which is distributed asymptotically as chi-square with \( [K(K + 1)/2 − 1] \) (equals 14 here) degrees of freedom, where \( K \) is the number of regressors in the original regression, including the constant. RESET is the log-likelihood ratio test for model specification, and is distributed here as chi-square with three degrees of freedom for a fourth-order augmented specification of the fitted value. See text for data sources.

\(^b\) Significant at the 0.01 two-sided level.
\(^c\) Significant at the 0.05 two-sided level.
\(^d\) Significant at the 0.10 two-sided level.

Note that using the investment/GDP ratio for \( k \) implies that the coefficient of \( k \) is the marginal product of capital.

As the PI events are highly collinear, entering them together in the regression results in severe multicollinearity. Hence, a principal component of the events is employed here. The method of principal components allows the underlying data to determine the weights of the various events, so that the variation of the events is maximized. The first principal component used here explains 66% of the variation; the weights are all positive.

Restricting \( b \) in Eq. (3) to zero improves the goodness of fit of the model in each case, suggesting the extraneous nature of the interactive labor–PI interactive variable. Hence, only the results based on the version with this restriction are reported here.
that the coefficient of \( p \) in each of the equations is non-negative, while that of the interactive \( p^*k \) variable is negative, suggesting that all of the PI events influence economic growth through their adverse impacts on the marginal product of capital.

According to the goodness of fit statistics, \( AR^2 \) and SEE, equation (A), which includes the index of the three PI events PIPRIN, provides the best representation of the PI–growth relationship. In addition, it is the only equation that passes both the White Heteroscedastic and RESET specification tests. This outcome is reassuring, for it suggests that the use of the index that incorporates all three PI events not only obviates concerns of heteroscedasticity but also of other general misspecification problems, including endogeneity of the regressors and nonlinearity of the model (White, 1980; Ramsey, 1969).

In contrast, the models containing the separate-events PI variables fail the RESET specification test, though they satisfy the White test. Thus none of the PI events specified separately seem as reassuring as the overall index in representing the PI–growth relationship. Furthermore, note that the model containing SCOUPS, equation (B), actually displays the least goodness of fit, suggesting that SCOUPS may embody the least information content for growth purposes. In addition, the adverse PI impact is underestimated when it is measured using SCOUPS alone. Hence, employing the more comprehensive PI measure in the growth equation is advisable.

4. Conclusion

In the light of the increasing interest in the relationship between political instability (PI) and economic growth, the present paper has explored specification empirics associated with this relationship. The availability of a detailed unpublished historical account of coups d’etat in sub-Saharan African (SSA) economies for 1960–1986 has rendered feasible the present relatively in-depth examination of the subject.

The good news is that when a principal component involving all the various events of coups d’etat — ‘successful’ coups, abortive coups, and coup plots — is employed interactively in an augmented production function framework, there appears to be no misspecification of the relationship. This is, of course, quite reassuring. Such reassurance ebbs, however, when PI is measured by the separate coup events.

In particular, relying strictly on just actual involuntary government changes as a measure of PI, as is

\[12\] The relatively low precision of the \( k^*p \) coefficient associated with ACOUPS (equation (C)) is due to a high collinearity between \( p \) and \( p^*k \). Constraining the \( p \) coefficient to zero improves the goodness of fit modestly; \( AR^2 \) rises to 0.499, while SEE falls slightly to 1.31. More important, the precision of the \( p^*k \) coefficient estimate substantially improves, with the absolute value of the \( t \) ratio rising to 3.08 under the constrained model.

\[13\] From equations (A) and (B) of Table 1, the respective partial derivatives of \( q \) with respect to PIPRIN and SCOUPS are given as \((0.452 - 0.040k)\) and \((0.923 - 0.064k)\). At the respective sample mean values of 18.61, 3.36, 4.08, and 1.81 for \( k \), \( q \), PIPRIN, and SCOUPS, the absolute partial elasticities at the means are computed as 0.354 and 0.145 for PIPRIN and SCOUPS, respectively. Using the PIPRIN equation, we note that the partial effect of PI is negative for all \( k \) > 11.3, a condition which is satisfied for all, except three, of the countries in the sample. Thus for nearly all the sample countries, PI is deleterious to growth. (Incidentally, the estimate of the mean contribution of PIPRIN to the reduction in \( q \) over the sample period may be computed as \((0.452 - 0.040k)\) 4.08 = 1.19 percentage points, remarkably close to the 1.14 estimate based on a dichotomous index of PI reported in Fosu (1992, p. 835).
usually done in the literature, may entail a misspecification of the PI–growth relationship. In addition, such practice appears to result in a relatively poor fit for the model and to underestimate the impact of PI on growth. The other potential coup events apparently contain important information that should not be ignored in constructing the PI measure for use in the growth equation.

Acknowledgements

The author is Director of Research, African Economic Research Consortium (AERC), Nairobi, Kenya, and Professor of Economics (on leave), Department of Economics, School of Business Administration, Oakland University, Michigan, USA. Part of the research for the current paper was conducted while the author was Visiting Associate Professor at the University of Rochester, New York.

References

McGowan, P.J., 1986. Intervention Event File. Arizona State University, Department of Political Science, Tempe, AZ.