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3 Macroeconomic Instability and Social Progress

Mauricio Cárdenas and Miguel Urrutia

3.1 Introduction

The organizers of this conference suggested that we explore the extent to which the adjustment of the last eight years in developing countries has resulted in increased poverty and inequality. Upon reflection we concluded that many of the costs of adjustment cannot be blamed on the adjustment process itself, but on the policies that made such adjustment inevitable. In other words, the social costs are more related to the size of the adjustment required by the misguided policies that lead to that adjustment.

The object of the paper is then to determine whether a certain set of long-term policies that have a built-in bias against large macroeconomic imbalances tend to be related to a better than average rate of progress of social indicators.

A recent paper by Stanley Fischer (1991) tested the relationship between macroeconomic policies and growth. His cross-section analysis and some case studies suggest that reasonable macroeconomic stability is probably necessary for sustained growth, but beyond that, the overall economic strategy pursued by the country—market and outward orientation, the size and role of government both in providing physical and social infrastructure especially for human capital and in limiting its role in other areas—is crucial.[1]

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1. Levine and Renelt (1992) provide a comprehensive review of the empirical cross-country growth literature. Using a variant of Leamer's (1983) extreme-bounds analysis, they find that most results from existing studies are not robust to the choice of variables in the regression. A strong relation between growth and investment, and between investment and trade openness, is one of the few results robust to small changes in the conditioning information set.

In this paper we explore the role of macroeconomic policy in social progress. Although one would expect that macroeconomic stability contributes to social progress through its effect on economic growth, some authors have postulated that stabilization generates social costs that overcompensate for the social benefits generated by economic growth. Therefore, we explore the relationship between macroeconomic stability and social progress, after controlling for the effects on economic growth.

The paper adopts two different approaches for testing the hypothesis. In the first part, cross-section analysis is used to see whether countries with less variance in some crucial macroeconomic variables have higher rates of growth in their human development index (independently from the effect of economic growth on this index). In the second part of the paper, the economic growth and social progress of four developing countries dependent on coffee exports are analyzed with a view to evaluating the social impact of institutional arrangements that attempt to diminish the fluctuations in various macroeconomic variables as changes in terms of trade occur. The hypothesis is that countries that avoid large swings in income, consumption, imports, and fiscal deficits may achieve greater social progress in the medium and long run.

The interesting question is not what are the costs of adjustment, but what are the costs of institutional arrangements that avoid having to carry out periodic large macroeconomic adjustments. If social indicators improve more in countries that minimize the variance of some strategic macroeconomic variables, then there would seem to be a good case for the argument that the costs of policies and institutions that facilitate macroeconomic stability are less than the benefits of such stability.

3.2 Social Progress in a Cross-Section of Countries

As mentioned in the introduction, this part of the paper explores the relationship between macroeconomic stability and social improvement in a large sample of countries. Our measure of social progress (i.e., the dependent variable) is the human development index (HDI), as calculated by the United Nations Development Programme (see UNDP 1991 for the exact methodology). The index aggregates a set of social indicators that measure life expectancy, educational achievement, and income. The index is comparable between countries and through time.

This comparability is achieved by measuring all of the country social indicators against the best and worst country indicators in the time period studied. The formula used to measure social progress between 1970 and 1985 is based on the construction of the following indices:

$$Z_{ijt} = \frac{(X_{ijt} - \min_{jt} X_{ijt}}{(\max_{jt} X_{ijt} - \min_{jt} X_{ijt})}, \tag{1}$$

where i stands for the specific social indicator, j refers to a country, and t refers to a year. More precisely, X_1 is life expectancy, X_2 is adult literacy rates, and X_3

is the log of income per capita. The presumption is that the valuation of income diminishes as income rises above an international poverty line (i.e., diminishing utility of income). HDI_{jt} gives identical weights to each of the three indicators; that is,

$$HDI_{jt} = \frac{1}{3}\sum_{i} Z_{ijt}. \tag{2}$$

In this paper social progress is measured by the percentage change in the HDI between 1970 and 1985. UNDP measures such progress for 110 developing countries.

3.2.1 Social Progress and Macroeconomic Performance: Preliminary Results

In the spirit of the new growth literature, we start by exploring the effects on social progress of differences in the average *levels* in inflation rates, fiscal deficits, government expenditures, and GDP growth rates, across countries. Also, we include the level of the HDI in 1970 (*HDI*70) as an additional determinant of social progress. The hypothesis in this case is that countries that were relatively worse off at the initial date have experienced faster social progress. This result would then mimic a recent empirical finding on growth dynamics, which indicates a force toward convergence in per capita income (after controlling for differences in other important determinants of growth rates).[2]

Gregory Ingram (1992) has shown that in fact there is better evidence for convergence of social indicators than of rates of growth. In the case of growth rates, high-income countries show some convergence, but developing countries show divergence of growth rates. On the other hand, there is a sharp convergence in life expectancy across countries, and that variable is one of the three components of our HDI. Ingram suggests that such convergence is due to the international transmission of techniques that reduce infant mortality at relatively low costs in terms of nontradable inputs. Such techniques include inoculation, oral rehydration therapy, and the provision of potable water and rudimentary waste-disposal facilities.

Furthermore, Ingram also finds convergence in primary school enrollment rates, another of the components of the social indicator used in the study.

In all cases cross-section data was used to test the statistical significance of the relationship of the independent variables with the HDI. The statistical relationships tested were of the type

$$Y_{it} = \alpha + \beta x_{it} + \mu_{it}, \tag{3}$$

where i denotes a country and t a time period; α is a constant; Y is the percentage change in the HDI between 1970 and 1985, x is a matrix of the independent variables used (explanatory variables), and μ is the error in the regression.

2. See, for example, Romer (1989); Barro (1991); Mankiw, Romer, and Weil (1992); Easterly, Kremer, Pritchett, and Summers (1992).

White tests were implemented to check for problems of heteroskedasticity (frequent in this type of estimations). The regressions reported have common variance of the residuals, which means there are no problems with heteroskedasticity.

The empirical evidence confirms that in the case of the HDI there is a tendency toward convergence. In fact, a representative regression gave the following results:[3]

$$(4)\quad HDI = \underset{(8.5)***}{66.0} - \underset{(-7.5)***}{0.88HDI70} - \underset{(-1.1)}{0.02AVGINF} + \underset{(2.14)**}{0.58AVGG},$$

$R^2 = 0.57$; $n = 50$; D.W. = 1.54; $F = 20.18***$; where one additional percentage point in the *HDI*70 diminishes the rate of growth in the HDI by 0.88 percentage points. Average CPI inflation rate over the period 1970–85 (*AVGINF*) does not come out significant, but has the expected negative sign. Average government expenditures as percentage of GDP (*AVGG*) are positively correlated with the change in the HDI. This is interesting because it indicates that government expenditures help in promoting social progress. However, when those expenditures are financed through inflationary mechanisms, the effects may be undermined.

3.2.2 Macroeconomic Instability and Social Progress: The Evidence

This section of the paper tests the hypothesis that countries with greater *stability* in some crucial macroeconomics variables achieve greater social progress. The idea is that a country that develops institutional and political arrangements that allow it to avoid large swings in government expenditure or fiscal deficits may be able to achieve greater social progress (regardless of the *level* of those indicators). For example, the presumption is that large fluctuations in GNP also are harmful for social progress.

In relation to this last point, we try to see whether large terms of trade (TT)[4] shocks also hinder social progress, either directly or through the effect on GNP instability. The effect of instability of inflation rates on social progress was also tested.

Interestingly enough, when we include the measures of instability of some of the macroeconomic variables discussed above, it becomes possible to explain a relatively large proportion of the variations in the HDI. For instance, the following equation produced an R^2 of 0.84 with $N = 36$ (D.W. = 1.6; $F = 13.8***$):

$$HDI = \underset{(6.4)***}{74.1} - \underset{(-8.59)***}{0.99HDI70} + \underset{(2.72)***}{3.15AVGGNP}$$

3. Throughout the paper asterisks denote significance at these levels: * = 10%, ** = 5%, and *** = 1%.

4. Measured as the ratio of the unit price of export to the unit price of imports.

$$
\begin{array}{ll}
(5) & \quad + \underset{(0.84)}{1.74}DVGNP - \underset{(-1.77)*}{3.78}DVFD + \underset{(1.79)*}{1.66}AVGFD + \underset{(2.4)**}{1.14}AVGG \\
& \quad - \underset{(-0.44)}{0.77}DVG - \underset{(-1.24)}{4.25}DVTT + \underset{(0.97)}{0.01}DVINF
\end{array}
$$

where the prefixes *DV* and *AVG* denote the standard deviation and the average of that variable over the period 1970–85. *GNP* is the growth rate of output, and *FD* is the fiscal deficit as a percentage of GNP.

The results show, as expected, that high growth of GNP is positively related to improvements in the HDI, as well as to the level of public expenditure as a proportion of GNP. This latter result suggests that the HDI improves only with active involvement of the government in social expenditure, a circumstance that is accompanied by high government expenditure as a proportion of GNP.

Instability in the fiscal deficit deteriorates the HDI, as well as high average levels of fiscal deficit. (The fiscal deficit has a negative sign, so a positive relation between the average fiscal deficit and HDI improvement is to be expected.) The instability in government expenditures, terms of trade, and inflation variables have the right (negative) signs but are not statistically significant.

In equation (6) we use coefficients of variation, or the standard deviation divided by the average (*CV* is the prefix in this case), as a measure of instability, instead of deviations. This would be more appropriate in variables such as inflation, which may have very different levels across countries. Equation (6) is an alternative to equation (5) ($R^2 = 0.81$; $N = 36$).

$$
\begin{array}{ll}
 & HDI = \underset{(6.78)***}{77.0} - \underset{(-8.52)***}{1.0}HDI70 + \underset{(2.82)***}{3.26}AVGGNP + \underset{(1.00)}{0.13}\,CVGNP \\
(6) & \quad - \underset{(-0.65)}{0.3}\,CVFD + \underset{(2.3)**}{1.99}AVGFD + \underset{(2.96)***}{0.94}AVGG - \underset{(-1.18)}{5.1}CVTT \\
 & \quad - \underset{(-0.28)}{1.31}CVINF
\end{array}
$$

The results are quite similar. Once again, in addition to average GDP growth, the average relative level of government expenditure is related positively to improvement in the HDI and average fiscal deficits are related negatively with improvements in the HDI. In both equations the initial level of the HDI affects HDI growth negatively and in a significant manner, confirming the tendency for convergence in our social indicator.

An interesting question is whether the relationship between the different variables and the HDI differs across continents. To see whether this is the case, we decided to test for regional differences in the effects of these variables. This involved using a set of regressors based on the interaction of *HDI*70, *CVFD*, *AVGFD*, and *CVINF* with the regional dummies for Africa (*DAF*), Latin America (*DAL*), and Asia (*DAS*). For example, the effect of the coeffi-

cient of variation of the fiscal deficit in Latin America is captured by the variable *CVFD*DAL* = *CVFDAL*. The regression gives an impressive R^2 of 0.71 with $N = 54$.

$$
\begin{aligned}
HDI = {} & 74.4 - 0.93HDIAF_{70} - 0.38HDIAS_{70} - 0.73HDIAL_{70} \\
& (9.4)^{***} \quad (-3.2)^{***} \quad (-1.31) \quad (-5.05)^{***} \\
& - 4.72CVFDAF - 0.08CVFDAS + 0.12CVFDAL \\
& \qquad (-3.94)^{***} \quad (-0.04) \quad (0.22) \\
& - 2.3AVGFDAF + 0.35AVGFDAS + 0.88AVGFDAL \\
& \qquad (-2.25)^{**} \quad (0.4) \quad (0.82) \\
& - 18.7CVINFAF - 14.54CVINFAS - 4.44CVINFAL \\
& \qquad (-.355)^{***} \quad (-0.81) \quad (-0.8)
\end{aligned}
\tag{7}
$$

By region it appears that the low initial social conditions in Africa and Latin America explain a good part of social improvement in those regions. In Africa variation in fiscal deficits are negatively related to social progress, and the levels of fiscal deficits (which have a negative sign) are related to lower improvements in social indicators.

Variations in inflation are also negatively related to changes in the HDI in Africa. It would therefore appear that in Africa macroeconomic instability is clearly related to lack of improvement in the HDI. Surprisingly, these relationships are not clear in the case of Latin America.

Since we were able to create a complete data base for eighteen Latin American countries, a separate set of regressions was run for the region. One specification that gave relatively good results was the following ($R^2 = 0.74$; $N = 18$):

$$
\begin{aligned}
HDI = {} & 60.94 - 1.06HDI_{70} + 4.85AVGGNP + 0.1CVGNP \\
& (4.8)^{***} \quad (-3.84)^{***} \quad (2.03)^{**} \quad (0.93) \\
& - 0.23CVFD + 0.36AVGFD + 0.96AVGG - 4.22CVINF \\
& \qquad (-0.52) \quad (0.4) \quad (1.9)^{*} \quad (-0.81) \\
& - 3.5CVRER \\
& \qquad (0.66).
\end{aligned}
\tag{8}
$$

The *HDI*70 variable confirms the convergence of social indicators, and the positive relationship between GNP growth and improvement in social indicators again suggests that high growth rates are a good way to improve social indicators. In Latin America the average level of government expenditures also explains social progress, suggesting that low fiscal burdens are not conducive to improvements in HDI. The signs on the macrovariables are the correct ones, but the coefficients are not significantly different from zero. In this equation we included the stability of the real exchange rate (RER) on the assumption that stable RERs minimize long-run macroeconomic imbalances. The positive sign suggests as much, but the t-statistic is quite low.

3.2.3 Cross-Section Results: Summary

The cross-country empirical analysis confirms that there is convergence in social indicators and that, in addition, high growth rates of GNP improve these indicators. However, there is some evidence suggesting that countries with high levels of government expenditure and low levels and variations in fiscal deficits tend to experience more rapid improvement in the HDI.

Fischer (1991) has given some evidence of the positive effect of macroeconomic orthodoxy on growth rates. Our analysis points toward the effects of macroeconomic orthodoxy on the improvement of social indicators, independent from the effect of macroeconomic policies on growth. This result is strong for Africa, and is less robust in the case of Latin America. However, there seems to be little evidence that low variations on GNP per capita growth are related to social improvement. We analyze this point in more detail in section 3.3.

Some comments should be made with respect to the HDI. The index, which covers a large sample of countries, is somewhat primitive. UNDP has tried to improve the indicator by adding an index of income distribution and indicators of gender discrimination or human freedom. The improved index, however, covers a much smaller sample of countries. Although it would be interesting to do the type of cross-section studies discussed here once an HDI with more components is available for a sufficiently large sample of countries, further work should be carried out in the development of an HDI that better reflects welfare.

In particular, life expectancy at birth is converging across countries, but the health conditions of a person sixty-five years old may be very different in countries with different levels of access to health services. In a developing country the older person may have deficient eyesight that could be corrected at low cost, or arthritic conditions that could be improved through medical treatment. Some index of health condition, even if subjective, should be used with the life expectancy index.

A social indicator should also include some index of housing quality. Such an indicator should also include an index of human freedom and violence, factors that clearly affect people's welfare. In summary, much work is still pending with respect to social indicators. The HDI was chosen for the analysis in this paper primarily because it was available for a large number of countries, but there is a clear awareness of its imperfections.

3.3 Business Cycles and Social Progress in a Group of Coffee-Producing Countries

An interesting feature of the analysis carried out in the first part of this paper is the lack of an empirical relation between the standard deviation in the rate of growth in GDP (arguably a proxy for the business cycle) and our measure of social progress. In this section we look in detail at this issue, refining the

concept of business cycle and reducing the sample to four developing countries with remarkable similarities in their economic fluctuations. In particular we analyze the behavior of some leading social indicators and try to test whether macroeconomic stability (i.e., less variance in the cyclical component of GDP) is helpful in explaining differences in the rates at which income distribution, health, education, and demographic indicators improve over time.

The emphasis of this section is that the link between growth and improvement in social indicators is not a policy-free result. For example, in regard to the Kuznets curve, some countries (e.g., Indonesia) have been able to avoid the worsening in income distribution as growth takes off. If health and education are normal goods, then one would expect business and social cycles (as well as the trends in the corresponding indicators) to be correlated. Macroeconomic stability would then provide the appropriate environment for sustained social policies, a key condition for social progress.

The analysis focuses on the experiences of Colombia, Costa Rica, Côte d'Ivoire, and Kenya, four countries that are highly dependent on coffee for foreign exchange, fiscal revenue, and rural income. Consequently, temporary fluctuations in world coffee prices affect key macroeconomic variables (including the business cycle) in a similar way. In a typical pattern, high export prices result in above-trend levels of output, consumption, investment, and government expenditures. In addition, the income effect on imports, as well as changes in the RER, often cause countercyclical movements of the balance of trade (giving rise to a procyclical pattern in foreign lending).

Colombia provides, however, an exception to the rule. In fact, the historical evidence shows a countercyclical management of both the fiscal accounts and (public) external borrowing. In addition, private consumption in Colombia is substantially smoother than in the other three countries. Consequently, the amplitude of the business cycle in this country has been lower than in Costa Rica, Côte d'Ivoire, and Kenya. The frequency has been, however, remarkably similar in these otherwise structurally different countries (see table 3.1).[5] In sum, given the common external shock (which drives the frequency of the cycle), macroeconomic policies have had an effect in reducing (or augmenting) its impact (i.e., the amplitude of the cycle).

It is customary to think about macroeconomic stability as a desirable out-

5. In fact, as can be observed in table 3.1, the two Latin American countries are clearly more industrialized (and urbanized). Manufacturing sectors in Côte d'Ivoire and Kenya account for 10–13% of GDP, only half of the shares observed in Colombia and Costa Rica. The degree of openness is lower in Colombia, a relatively larger economy with trade coefficients that fluctuate around 13–15%. In contrast, imports and exports usually account for more than 30% of GDP in the other three countries. Colombia is, however, the country with the highest share of coffee in total exports. Inflation rates and money growth have traditionally been the highest in Colombia, with the exception of Costa Rica during the last decade. Per capita income is highest in Costa Rica, US$1,550 in 1987, followed by Colombia (US$1,230). The figure for Côte d'Ivoire (US$750) is high by sub-Saharan African standards, which on average correspond more closely to the level reported for Kenya (US$330).

Table 3.1 Structural Characteristics (averages)

	1950–59	1960–69	1970–79	1980–87
Colombia				
GDP composition (%)				
Agriculture	32.5	27.8	23.7	22.5
Manufacturing	18.4	20.9	22.7	21.4
Trade coefficients (% of GDP)				
Exports of goods and NFS	14.5	12.6	15.0	13.9
Imports of goods and NFS	13.5	13.5	14.0	13.7
Coffee exports/total exports of goods (%)	81.3	66.7	55.8	49.1
Inflation rate (%)	8.6	11.2	19.3	22.6
Growth in M1 (%)	14.9	17.7	14.3	25.2
Population (total, midyear, millions)	12.911	17.708	24.298	25.175
Costa Rica				
GDP composition (%)				
Agriculture	N.A.	24.6	21.4	20.5
Industry[a]	N.A.	17.9	25.2	27.8
Trade coefficients (% of GDP)				
Exports of goods and NFS	24.2	24.0	29.7	34.8
Imports of goods and NFS	26.1	29.4	37.9	37.2
Shares in total exports of goods (%)				
Coffee	43.6	43.0	29.5	27.7
Bananas	42.2	25.1	23.9	22.5
Inflation rate (%)	2.0	2.0	9.8	29.2
Growth in M1 (%)	8.2	7.6	21.0	29.8
Population (total, midyear, millions)	1.016	1.467	1.949	2.455
Côte d'Ivoire				
GDP composition (%)				
Agriculture	N.A.	36.6	31.0	27.6
Manufacturing	N.A.	10.2	7.5	10.8
Trade coefficients (% of GDP)				
Exports of goods and NFS	N.A.	33.0	38.4	38.7
Imports of goods and NFS	N.A.	28.1	35.7	36.7
Shares in total exports of goods (%)				
Coffee	54.3	38.7	28.9	18.6
Cocoa	25.6	19.6	19.0	28.5
Inflation rate (%)	N.A.	3.4	11.7	6.9
Growth in M1 (%)	N.A.	12.3	21.6	4.3
Population (total, midyear, millions)	2.957	3.881	6.626	9.61
Kenya				
GDP composition (%)				
Agriculture	N.A.	37.4	35.8	32.8
Manufacturing	N.A.	10.5	11.3	13.1
Trade coefficients (% of GDP)				
Exports of goods and NFS	N.A.	30.6	29.9	25.6
Imports of goods and NFS	N.A.	29.9	33.4	29.7
Shares in total exports of goods (%)				
Coffee	N.A.	17.6	23.4	26.2
Tea	N.A.	9.6	11.8	17.9

(continued)

Table 3.1 (continued)

	1950–59	1960–69	1970–79	1980–87
Inflation rate (%)	N.A.	1.8	6.0	11.2
Growth in M1 (%)	N.A.	N.A.	17.3	11.3
Population (total, midyear, millions)	6.913	9.392	13.218	19.349
Memo items (current US$)		1970	1980	1987
Colombia				
Current GNP per capita		340	1220	1230
External debt (outstanding at end of year, millions)				
Public/publicly guaranteed long-term		1297	4088	13828
Private nonguaranteed long-term		283	515	1524
Costa Rica				
Current GNP per capita		560	1950	1550
External debt (outstanding at end of year, millions)				
Public/publicly guaranteed long-term		134	1692	3629
Private nonguaranteed long-term		112	412	290
Côte d'Ivoire				
Current GNP per capita		270	1170	750
External debt (outstanding at end of year, millions)				
Public/publicly guaranteed long-term		255	4328	8449
Private nonguaranteed long-term		11	414	3264
Kenya				
Current GNP per capita		130	410	330
External debt (outstanding at end of year, millions)				
Public/publicly guaranteed long-term		319	2238	4482
Private nonguaranteed long-term		88	437	496

Sources: World Bank, World Tables (1976 and 1987); International Monetary Fund, International Financial Statistics; and World Bank, *World Development Report 1989.*

[a]Data on manufacturing sector is not available before 1970.

come, justified by the presumption that preferences are well behaved so that individual agents value less variability in their consumption profiles. Also, economic theory has suggested that less unstable (or risky) environments are more favorable to investment (hence, to growth). An alternative way of thinking about this issue, suggested in the introduction, establishes a connection between macroeconomic stability and social progress. Thinking along these lines, this section of the paper tries to answer three interesting questions. First, is it generally true that social progress is greater during periods of macroeconomic stability? Second, is there evidence suggesting that the growth rate in the trend component of some social indicators over the period 1960–89 is higher in the country with greatest macroeconomic stability (i.e., Colombia)? Third, is there a relationship between the "social" cycle (the cyclical component of those indicators) and the business cycle? In a corollary to this last point,

do the "social" cycles in these countries seem to be correlated? Or in other words, do external shocks have an effect on social indicators?

Section 3.3.1 presents the main results of the GDP trend-cycle decomposition. Section 3.3.2 describes the sharp differences in the levels of the main social indicators across this group of countries. In fact, almost always Costa Rica ranks first, closely followed by Colombia, while the two African countries are substantially behind. A key distinction between their actual socioeconomic stance and its rate of improvement is established. The remainder of the paper tests the hypotheses outlined in the previous paragraph. Section 3.3.3 pools cross-section and time series data to see whether, across countries, periods of lower variance in the business cycle are matched with greater rates of growth in the social indicators. Section 3.3.4 looks at the time series evidence on the behavior of those indicators, country by country. This section discusses separately the main properties of the trend and cyclical components of some social indicators.

3.3.1 Business Cycle Fluctuations in Colombia, Costa Rica, Côte d'Ivoire, and Kenya

This section presents the main results of a standard Beveridge-Nelson GDP trend-cycle decomposition for the four coffee-producing countries under analysis. The exercise is somewhat limited by the availability of data, particularly for Kenya and Côte d'Ivoire, where the tests have to be carried out with a maximum of thirty observations (World Bank Data covers the period 1950, 1955, 1960–89). To have a uniform source and time period, the exercises were restricted in all cases to the period 1960–89.[6]

Interestingly, the tests fail to reject in all cases (with the exception of Côte d'Ivoire under some specifications) the presence of unit roots, indicating that a *difference-stationary* representation is preferred. Consequently, the model estimated for the log of GDP corresponded to

$$\Delta y_t = \mu + \sum_{i=1}^{k} \gamma_i \Delta y_{t-i} + \sum_{i=1}^{h} \Psi_i \varepsilon_{t-1} \varepsilon_t, \tag{9a}$$

$$(1 - \gamma_1 L - \ldots - \gamma_k L^k)\Delta y_t = \mu + (1 + \Psi_1 L + \ldots + \Psi_h L^h)\varepsilon_t, \tag{9b}$$

$$\Delta y_t = \frac{\mu}{1 - \gamma_1 L - \ldots - \gamma_k L^k} + \frac{1 + \Psi_1 L + \ldots + \Psi_h L^h}{1 - \gamma_1 L - \ldots - \gamma_k L^k} \varepsilon_t, \tag{9c}$$

where k and h give the order of the autoregressive and moving-average polynomials, respectively. Sixteen ARIMA permutations were estimated, for values of k and h between zero and four, as well as the corresponding measures of persistence suggested in the literature (see Campbell and Perron 1991).

6. It is possible to reconstruct the Colombian national accounts since 1930 (see, e.g., Cuddington and Urzúa 1989). Bulmer-Thomas (1987) has calculated historical GDP data (1920–84) for Costa Rica (and four other Central American countries).

Table 3.2 **Trend-Cycle Decomposition: log(GDP)**

Country	Period	ARIMA	Measures of "Persistence"		Cyclical Component in % Deviation from Trend		
			Beveridge-Nelson	Cochrane	Standard Deviation	Min.	Max.
Difference-stationary models							
Colombia	1960–89	(0,1,1)	0.783	0.558	1.69	−1.88	2.97
Colombia	1960–89	(1,1,3)	0.183	0.016	4.71	−6.29	8.03
Costa Rica	1960–89	(0,1,1)	0.341	0.085	8.04	−12.86	13.33
Costa Rica	1960–89	(0,1,2)	0.514	0.189	6.63	−10.45	10.97
Côte d'Ivoire	1960–89	(0,1,1)	0.756	0.528	5.68	−10.33	7.87
Côte d'Ivoire	1960–89	(0,1,3)	0.447	0.176	10.38	−19.27	15.05
Kenya	1960–89	(2,1,0)	0.759	0.543	1.57	−3.18	5.11
Kenya	1960–89	(1,1,2)	0.537	0.225	3.21	−6.64	7.67
Trend stationary models							
Colombia	1960–89	(0,0,1)	0.000	0.000	4.73	−2.90	10.60
Costa Rica	1960–89	(0,0,1)	0.000	0.000	9.87	−9.96	20.36
Côte d'Ivoire	1960–89	(0,0,1)	0.000	0.000	15.22	−10.45	39.49
Kenya	1960–89	(0,0,1)	0.000	0.000	7.50	−11.76	14.12

Source: Data for the group of less-developed countries come from the World Bank National Accounts database.

Table 3.2 reports the results for those models able to produce white-noise residuals where the coefficients of persistence lay between zero and one.[7] Figure 3.1 depicts the corresponding trend-cycle GDP decomposition for a selected group of ARIMA models using the 1960–89 data. A cursory look at this figure suggests a remarkably similar pattern in the cyclical component. In addition, the evidence seems to suggest that business cycle fluctuations have been relatively less volatile in the case of Colombia (as indicated by the standard deviation of the cyclical component of GDP). However, the measures of persistence and, consequently, the variability of the business cycle seem to depend critically on the particular ARIMA specification, so that caution should be exercised in the interpretation of these results.

Table 3.3 shows the correlation coefficients between the business cycles of the countries in question. It is worth noticing the high correlation (above 87%) in the temporary component of GDP of Colombia, Costa Rica, and Côte d'Ivoire. In the case of Kenya these coefficients are somewhat lower (ranging between 67% and 74%).[8]

To support the hypothesis of a common external shock, table 3.4 displays the results of regressing the alternative measures of the business cycle on the cyclical component of real (world) coffee prices (contemporaneous and

7. More-than-permanent innovations were excluded on the grounds that innovations to coffee prices have zero persistence and, arguably, are the main force driving the business cycle.

8. Interestingly, the correlation coefficients between these cycles and those of their main trading partners (France, Germany, the United States, and the United Kingdom) are much lower (and even negative for some model specifications). See Cárdenas (1991) for more on this issue.

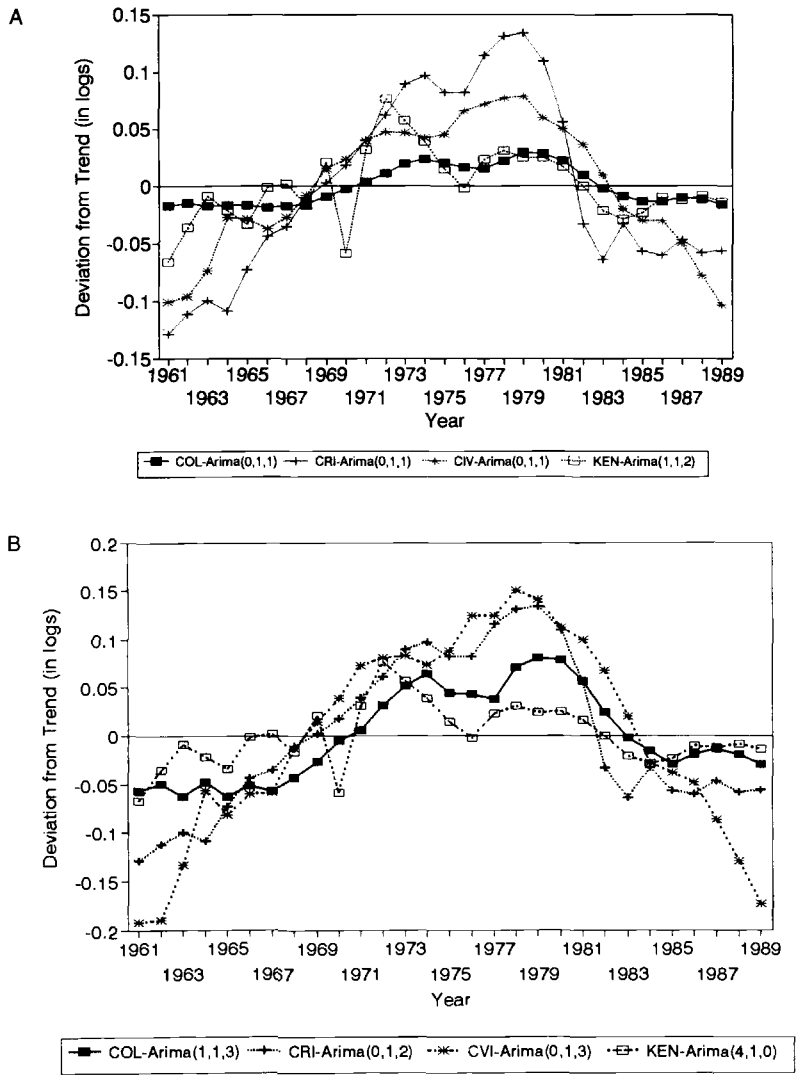

Fig. 3.1 Coffee producers: Cyclical component of GDP
Source: World Bank Andrex database.

lagged) and on the U.S. real Treasury bill rate. The set of explanatory variables also includes the cyclical movements in coffee production.[9] The evidence indicates that this set of right-hand-side variables has substantial explanatory

9. Arguably, variations in the size of the crop can induce business cycles either directly (coffee is an important component of GDP) or because coffee production is effectively the tax base for (coffee) taxation purposes.

Table 3.3 **Correlation Coefficients, GDP Cyclical Component, 1960–89**

		Colombia (0,1,1)	Colombia (1,1,3)	Costa Rica (0,1,1)	Costa Rica (0,1,2)	Côte d'Ivoire (0,1,1)	Côte d'Ivoire (0,1,3)	Kenya (2,1,0)	Kenya (1,1,2)
Colombia	(0,1,1)	1.000							
Colombia	(1,1,3)	0.984	1.000						
Costa Rica	(0,1,1)	0.907	0.905	1.000					
Costa Rica	(0,1,2)	0.906	0.900	0.999	1.000				
Côte d'Ivoire	(0,1,1)	0.869	0.847	0.897	0.896	1.000			
Côte d'Ivoire	(0,1,3)	0.876	0.865	0.904	0.902	0.996	1.000		
Kenya	(2,1,0)	0.106	0.126	0.276	0.281	0.216	0.218	1.000	
Kenya	(1,1,2)	0.672	0.671	0.736	0.740	0.661	0.665	0.755	1.000

Table 3.4 **Business Cycle and Coffee Prices, 1961–88 (t-statistic under the corresponding coefficient)**

Country	Constant	Cycle in Coffee Prices	Cycle in Coffee Production	U.S. Real Interest Rate[a]	R^2	F-Stat	Log-Likelihood
Colombia	0.0092	0.0163	0.0428	−0.0051	0.4292	5.7657	80.0058
	2.6409**	1.8110*	0.8906	−3.0700***			
Costa Rica	0.0380	0.0668	0.0177	−0.0205	0.6226	12.6466	49.2508
	3.7723**	2.4081**	0.5026	−4.8134***			
Côte d'Ivoire	0.0334	0.1189	0.0774	−0.0136	0.5140	8.4609	39.8671
	2.3471**	2.8688**	2.0047*	−2.4968**			
Kenya[b]	0.0110	0.0290	0.0187	−0.0046	0.6520	8.2429	73.7648
	2.4327**	1.9272*	1.2673	−2.4490**			

Sources: See text.

Notes: ARIMA models used in the derivation of the dependent variable (coefficients are similar for other specifications): Colombia (0,1,1); Costa Rica (0,1,2); Côte d'Ivoire (0,1,2); Kenya (1,1,2). Dependent variable: GDP cyclical component.

[a]Treasury bill rate deflated with the U.S. CPI.

[b]Two dummy variables (for 1970 and 1972) were used in the regressions for Kenya. The observed deviations from trend for those years are unusual (low and high, respectively), maybe due to measurement errors, or factors outside the scope of this project (e.g., the liquidation of commonly owned assets with Uganda and Tanzania, after the breakup of the economic integration in 1972). Explanatory variables in the case of Kenya have been lagged one year.

*Significance at 10%. **Significance at 5%. ***Significance at 1%.

power, accounting for more than 60% of the variance in the business cycle in Costa Rica and Kenya (51% in Côte d'Ivoire and 43% in Colombia).

In particular, coffee price shocks have a positive and significant impact on the business cycle, possibly with a one-year lag as in the case of Kenya. The size of the coefficient is smaller in Colombia (regardless of the model used in obtaining the cycle). In fact, other things constant, a 100% deviation from trend in coffee prices results in 1.6% deviation from trend in Colombia's GDP. The same shock would lead to a change in GDP (over trend) of 6.7% in Costa Rica, 11.9% in Côte d'Ivoire, and 2.9% in Kenya.

The coefficients on the cyclical component of coffee production[10] are positive (as expected) but low in statistical significance. In fact, only for Côte d'Ivoire can one reject the hypothesis of a nonzero coefficient with 90% confidence. This is interesting, for Côte d'Ivoire is the country where coffee taxation is the most pervasive (followed by Colombia, which also has the second largest coefficient on that variable).

Finally, the coefficients for the interest rate variable come out negative, as

10. Presence of a unit root in the production series was rejected only for Côte d'Ivoire. Consequently, cycles in coffee output were derived using a difference-stationary model (ARIMA [0,1,3]) for Colombia, Costa Rica, and Kenya. For Côte d'Ivoire a trend-stationary specification (ARMA [0,1]) was chosen.

expected, and significant. The size of the coefficient is larger for Costa Rica and Côte d'Ivoire, the two countries with the worst debt indicators in the group.

3.3.2 Social Indicators

In spite of the similarities in their business cycles, the group of four coffee producers show large disparities in the degree of development. In fact, most social indicators are quite different for the two African and the two Latin American countries, indicating the presence of other historical, political, and economic factors (ignored in this study) that play a decisive role in determining the scope of social progress.

To control for differences in methodology in the construction of the social variables, the same data source (the World Bank's Andrex database) is used in all cases (the original database covers 1950–89, but social variables are rarely available for the entire period).

This section describes the main facts regarding the level of those variables. The analysis is restricted to variables available for more than two years, so that a rough measure of the improvement throughout time is possible. Finally, the analysis is divided in four areas: income distribution, health, education, and demographic indicators.

Income Distribution

Figure 3.2 shows the pattern of income distribution at three points in time during the sample period. Figure 3.2A refers to an early period (1959–64), figure 3.2B to a midpoint (1969–73), and figure 3.2C to the latest available data (1986–88, except for Kenya where no information is available after 1976). By all standards, income distribution was more concentrated in Colombia during the early part of the period than in any other country under analysis. In fact, the share of the top quintile was 67.7%, while the poorest 20% (40%) of the population had only 2.1% (6.8%) of total income. Côte d'Ivoire lay at the other extreme with a relatively more egalitarian distribution of income (the share of the top quintile was approximately 50%, while the share of bottom quintile was 11.7%). Costa Rica was an intermediate case (no data is available for Kenya during this period).

The data for the midpoint (1969–73) show that, in spite of the reduction in the gap between Colombia and the other countries, the ranking in the distribution of income remained unchanged (from more to less egalitarian: Côte d'Ivoire, Kenya, Costa Rica, and Colombia). By the late 1980s this pattern had changed dramatically, to the point that the disparities among Colombia, Costa Rica, and Côte d'Ivoire (and 1976 Kenya) had disappeared. This process reflects a substantial improvement in the income distribution of Colombia and a worsening in the other countries throughout the period.[11]

11. See Londoño (1992) for a detailed analysis of the changes in income distribution in Colombia.

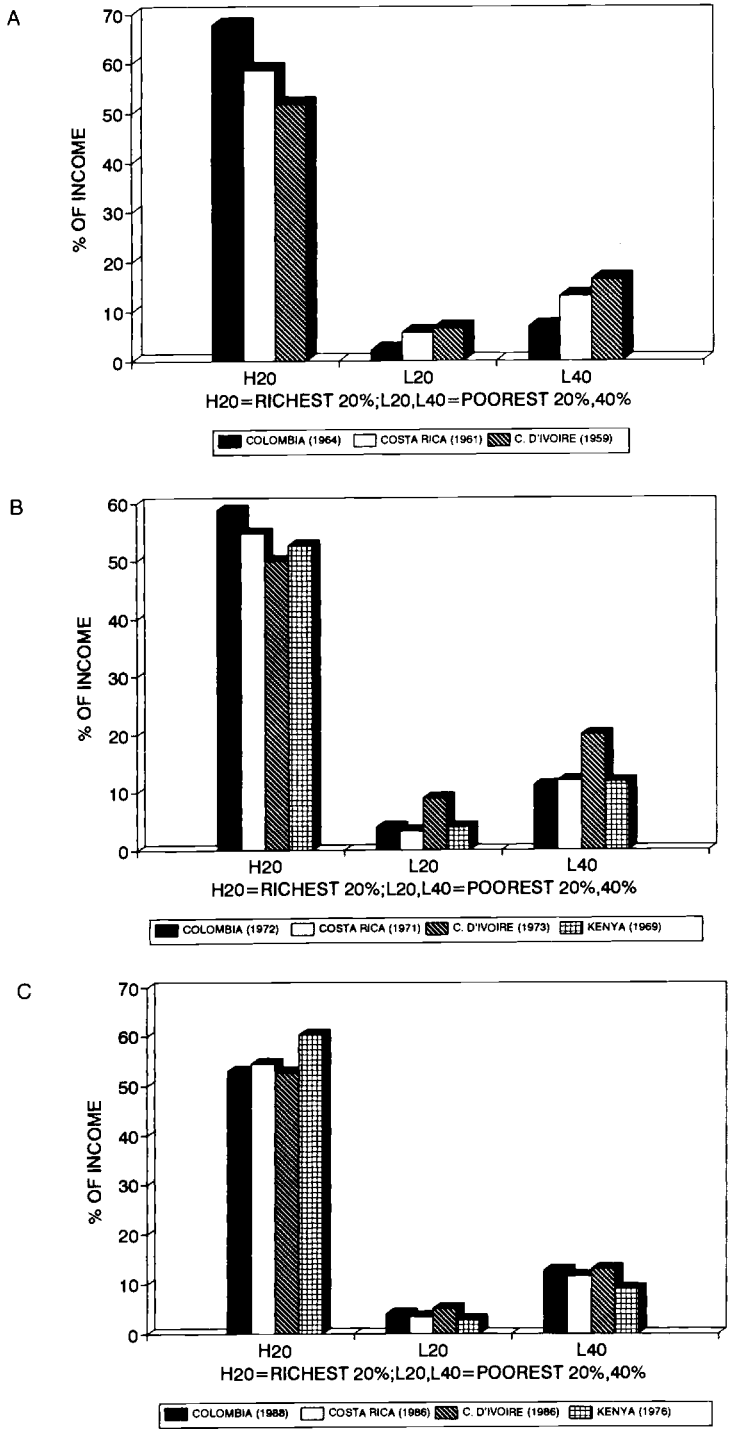

Fig. 3.2 Share of income: (A) early period; (B) middle period; (C) late period
Source: World Bank Andrex database.

Health

Figure 3.3 plots infant (age 0 to 1) mortality rates per thousand live births for the countries under analysis during 1951–89. The figure suggests that this indicator has been declining steadily in all cases, except for Colombia and Costa Rica during the 1980s. Costa Rica seems to have more instability in this indicator (perhaps due to better data), but ranks first, followed by Colombia, during the entire period. Infant mortality is much higher in Côte d'Ivoire and Kenya (100 and 80 deaths per thousand live births in 1989, respectively). The same pattern is observed for crude death rates per thousand people.

Life expectancy at birth (in years) shows an almost identical (but reciprocal) pattern. Life expectancy in 1989 ranged between seventy-five years (Costa Rica) and fifty-one years (Côte d'Ivoire). The rate of progress has been steady in all countries, and there is no tendency (in the sample period) toward convergence. Finally, data on the number of physicians per thousand people (figure 3.4) restates the fact that Costa Rica has much better health indicators. In this case progress in Colombia was very slow between 1960 and 1975 (although major improvements have taken place since 1975), while progress in health coverage (measured by the number of physicians) has been negligible in Côte d'Ivoire and Kenya.

Education

Data on education play a critical role in the analysis of this part of the paper for several reasons. First, the number of variables available provide a more comprehensive picture of the characteristics of social progress. Second, the number of observations per variables is much higher. And third, the data seem to be of better quality, evidencing fluctuations in the behavior of the indicators throughout time.[12]

Once again, educational levels reflect great disparities among the countries under analysis. For example, the number of teachers in primary education per thousand people aged 5–14 (figure 3.5A), arguably a proxy for the coverage and quality of education, shows interesting tendencies. In fact, one can observe some movement toward convergence in Costa Rica (which started at a much higher level than the others), Colombia, and Kenya. In this last country progress has been impressive (moving from four teachers in 1960 to over twelve in 1985). Costa Rica has fallen in absolute terms since the late 1970s, while Colombia stagnated after making strong improvements in the 1960–78 period. Côte d'Ivoire also improved until the early 1980s but then declined (in absolute terms). Its rate of progress has not been strong enough to overcome the low starting point.

Figure 3.5B shows the corresponding indicator for teachers in secondary education (divided by population aged 15–19). A cursory look at the plot sug-

12. Contrary to most of the health variables, which look like fitted values more than actual data.

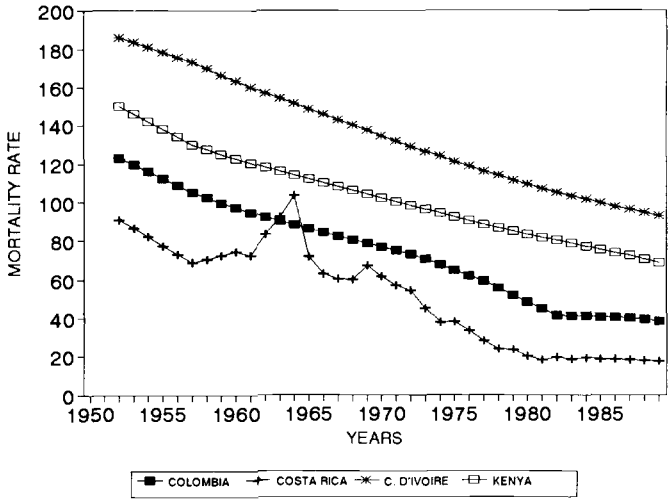

Fig. 3.3 Infant (0–1 year) mortality rate per thousand people
Source: World Bank Andrex database.

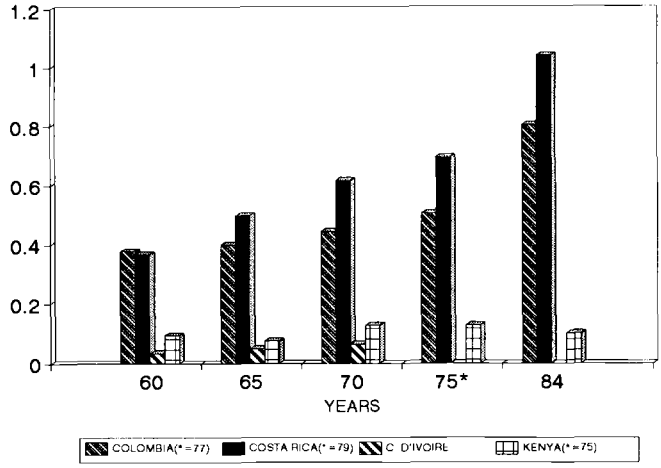

Fig. 3.4 Number of physicians per thousand people
Source: World Bank Andrex database.

gests that the two blocs (Africa and Latin America) are more dissimilar than before. Progress has been steady in Colombia but in the other countries seems more erratic.

Figure 3.6 displays the gross enrollment rates in primary and secondary education. As opposed to the previous indicator, this variable isolates advances in coverage of education (from those relating to the quality of education). In the

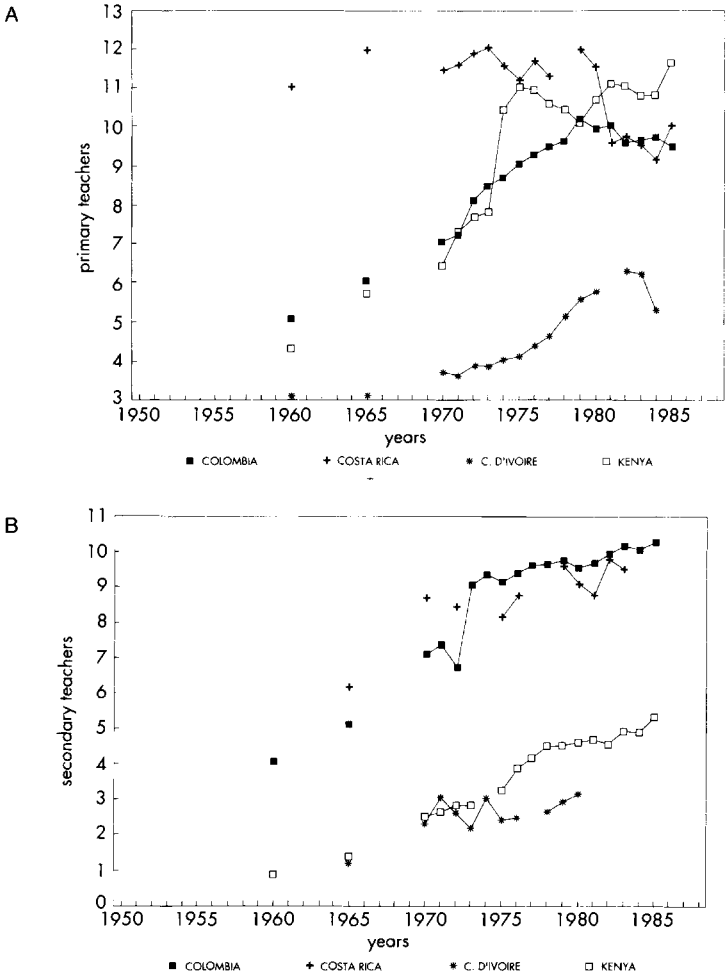

Fig. 3.5 Teachers per thousand people: (A) primary school (children aged (5–14); (B) secondary school (children aged 15–19)
Source: World Bank Andrex database.

case of primary education the ratio tends to stabilize (in the long run) around values of 100%, after periods of higher enrollment ratios (while older pupils become literate). This is why stability in Costa Rica is no sign of stagnation (the relevant variable in this case is secondary education enrollment rates). Improvement in the coverage of primary education has been impressive in Colombia and Kenya. However, in this last country the tendency was reversed in the late 1970s (and the ratio started to fall), while illiteracy rates were still higher than 50%. In this sense the continuity in the Colombian improvement (on this front) seems to be the exception rather than the rule. This is restated

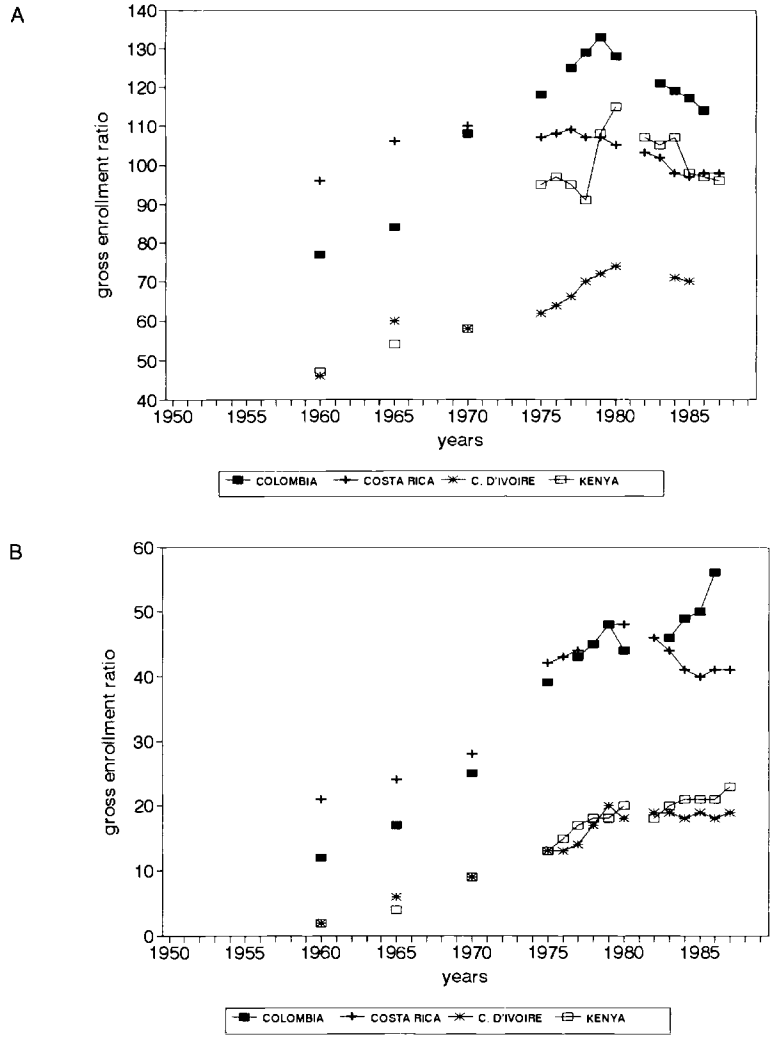

Fig. 3.6 Gross enrollment ratio: (A) primary school; (B) secondary school
Source: World Bank Andrex database.

when one looks at the gross enrollment ratios in secondary education (fig. 3.6B). In fact, Colombia now has the highest ratio, surpassing Costa Rica and evidencing a substantial improvement since 1960.

Demographic Indicators

It is well known that population variables involve complex determinants (such as the age structure of the population and women's labor force participation, not to mention cultural issues). Nonetheless, these variables can give an

idea of how economic forces tend to affect family-size decisions and, in a narrow sense, reflect what we mean by "social" progress. Looking at two indicators, crude birth rates per thousand people and total fertility rates, we observe two interesting stylized facts. First, both rates were quite stable throughout the period 1951–89 in Côte d'Ivoire and Kenya (declining in this last country since 1982). Second, and in sharp contrast, the rates have decreased substantially in Colombia and Costa Rica throughout the period. The decline has been, however, steadier in the former than in the latter country. In fact, contrary to what happened at the beginning of the sample, crude birth rates are now lower in Colombia than in Costa Rica.

3.3.3 Macroeconomic Stability and Social Progress: Cross-Section Results

This section presents the results of testing the first hypothesis mentioned in the introduction (i.e., whether social progress is greater in periods of macroeconomic stability). The tests are carried out by pooling cross-section and time series data and estimating regressions of the form

$$y_{it} = \alpha + \beta x_{it} + u_{it}, \tag{10}$$

where y_{it} is the average annual change in the social indicator (e.g., share of income by the richest quintile) in country i during subperiod t (e.g., 1960–65), α is a constant, x_{it} is the standard deviation in the business cycle of country i during subperiod t, and u_{it} is the error in the regression. Two alternative measures of the business cycle were used (corresponding to a difference-stationary [*std1*] and a trend-stationary [*std2*] decomposition).[13]

The dependent variables chosen can be classified in three groups: income distribution, health, and education. The change in the variable was defined in absolute terms in some cases (e.g., the income distribution indicators and some education variables) and in percentage terms in others (e.g., health indicators).[14] The main results are summarized below (all of them should be taken with care, as they are based on very few observations).

Income Distribution

Figure 3.7 plots the absolute changes in the share of income of the fifth quintile (*H20*), and the first and second quintiles (*L40*) against the standard deviation of the business cycle. It is apparent that the data point corresponding to Côte d'Ivoire during 1985–86 is highly implausible, as it reflects a substantial improvement in income distribution in a very short period of time (from one year to the next). This data point was ignored in the linear regressions

13. The exact models used were the following ARIMA $(p,1,q)$ processes: Colombia (1,1,3), Costa Rica (0,1,1), Côte d'Ivoire (0,1,3), and Kenya (1,1,2). As shown in table 3.2, these models correspond to those with greater variance. The trend-stationary decomposition corresponds to MA(1) models in all cases.

14. That is, y_{it} is alternatively $(z_{i,1965} - z_{i,1960})/5$ or $(z_{i,1965}/z_{i,1960} - 1)/5$, depending on the particular indicator z.

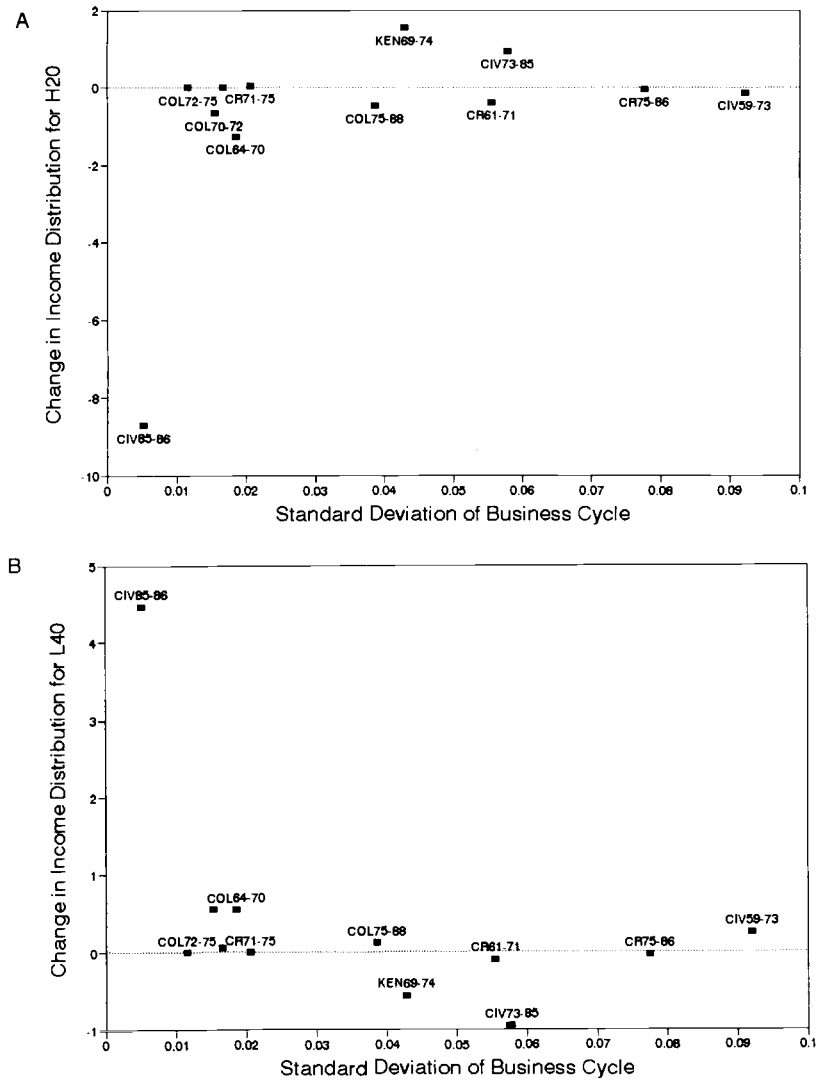

Fig. 3.7 (A) Change in *H20* versus standard deviation of business cycle; (B) change in *L40* versus standard deviation of business cycle
Source: World Bank Andrex database.

between the two variables, on the grounds that it is probably a measurement error (for our purposes it would have been better to leave that point in the sample, since we would have obtained a steeper slope).

The regressions came out with the right sign in all cases, implying that higher variance in the business cycle increases income concentration (the share

of the richest quintile increases while that of the bottom 40% decreases). The results are relatively neutral to the specification of the business cycle (we report those obtained with a trend-stationary decomposition).

$$H20_{it} = -0.4E - 02 + 0.108^{*}\ std2_{it}; \quad (11)$$
$$(-0.67) \qquad (1.23)$$

$R^2 = 0.15$; D.W. = 1.50; Q (significance level) = 0.81; $N = 11$.

$$L40_{it} = 0.13E - 01 - 0.28^{*}\ std2_{it}; \quad (12)$$
$$(0.96) \qquad (-1.36)$$

$R^2 = 0.17$; D.W. = 1.74; Q (significance level) = 0.80; $N = 11$.

The coefficients on the business cycle are small and show relatively low statistical significance (ranging from 20% to 24%). Everything else constant, a 1 percentage point increase in the standard deviation of the business cycle raises the share of income of the top quintile by 0.001 percentage points (per year) and decreases the share of the bottom 40% by 0.003 percentage points.

Health

Contrary to the previous results, improvements in health do not seem to be dependent on the size of the business cycle. This is not surprising given Costa Rica's impressive record in health coverage (and its also impressive economic fluctuations). The estimated regressions use the percentage change in the number of physicians per thousand people (*Phy*) as the dependent variable. Surprisingly, when the standard deviations of the difference-stationary business cycles are used as regressors, the results show a positive (and significant) correlation between the two variables. That is,

$$Phy_{it} = -0.2e - 02 + 1.45^{*}\ std1_{it}, \quad (13)$$
$$(-0.11) \qquad (2.18)^{**}$$

$R^2 = 0.28$; D.W. = 2.64; Q (significance level) = 0.99; $N = 14$.

Interestingly, the variance in the business cycle explains 28% of the variance in health progress (as measured by the number of physicians relative to population).[15]

Education

The evidence on improvements in education is somewhat mixed, depending on the indicator chosen. For example, the absolute change in the illiteracy (*ILL*) ratios (illiterate population as percentage of the population older than fifteen) shows a negative correlation with the variance in the business cycle. That is, literacy rates rise with macroeconomic instability.

15. This result is even stronger when the absolute change (rather than the percentage change) in the health indicator is used.

(14) $$ILL_{it} = \underset{(-0.86)}{-0.29} - \underset{(-2.35)^{**}}{11.88^{*}}\, std2_{it},$$

$R^2 = 0.38$; D.W. = 1.00; Q(significance level) = 0.78; $N = 11$.

The opposite is true for changes in enrollment rates in secondary education, where the number of observations is substantially larger than in the previous regressions. Two alternative measures of these enrollment ratios were used: (2) gross enrollment ratios (*GERS1*) as obtained directly from the database (which use as denominator the total population in the country-specific age bracket corresponding to that level of education); and (2) enrollment rates (*GERS2*) obtained dividing enrollment levels by the total population aged fifteen to nineteen (so that we control for country-specific variables). In both cases we used the absolute changes in the ratios as dependent variables. The results are summarized by the following two equations, which are robust to the specification of the business cycle (we report those obtained with a trend-stationary model).

(15) $$GERS1_{it} = \underset{(4.25)^{***}}{1.43} - \underset{(-1.97)^{*}}{13.81^{*}}\, std2_{it};$$

$R^2 = 0.17$; D.W. = 1.92; Q (significance level) = 0.95; $N = 21$.

(16) $$GERS2_{it} = \underset{(4.05)^{***}}{1.1} - \underset{(-2.40)^{***}}{15.22^{*}}\, std2_{it};$$

$R^2 = 0.23$; D.W. = 1.74; Q (significance level) = 0.22; $N = 21$.

These results indicate that the amplitude of the business cycle explains as much as 23% of the variance in enrollment ratios in secondary education. Other things constant, a 1% increase in the standard deviation of the cycle reduces enrollment ratios by 0.14–0.15 percentage point (per year).

Figure 3.8 plots the absolute change (per year in five-year intervals) in gross enrollment ratios in primary education for each country against the standard deviation in the business cycle for that country and subperiod. A cursory look suggests the lack of correlation between the two variables. As mentioned in the previous section, this could reflect that, for reasons different than the business cycle (i.e., changes in literacy ratios), gross enrollment ratios in primary education have been declining in Colombia and Costa Rica since the late 1970s. It is perhaps more puzzling to explain why the number of teachers (in primary and secondary education) relative to population have no apparent relation to the business cycle.

3.3.4 Macroeconomic Stability and Social Progress: Time Series Evidence

In this section we look at the time series evidence on the behavior of the same group of leading social indicators. The analysis starts with a deterministic trend-cycle decomposition of those variables available for a relatively long period of time (lack of data prevents use of unit root tests and difference-

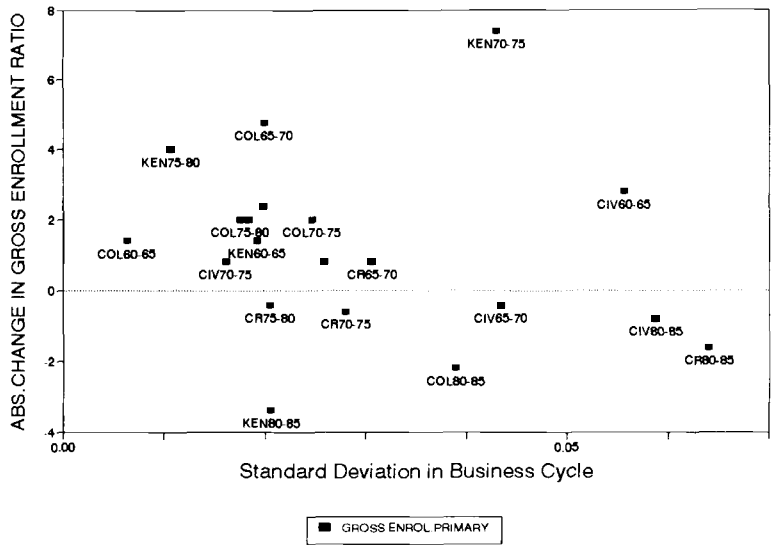

Fig. 3.8 Change in gross enrollment ratios in primary education versus standard deviation of business cycle
Source: World Bank Andrex database.

stationary models). Therefore, the decompositions were carried out using a standard trend-stationary specification. Table 3.5 presents the results of fitting linear trends to eleven social indicators.

Trend Components

The trend coefficients measure the average annual rate of change for a particular indicator, and the standard deviation of the residuals is a measure of the amplitude in the cyclical component of the same variable. It is interesting to observe that, for all the indicators related to secondary education, Colombia has the highest rate of improvement among the group of coffee-producing nations under analysis. The number of teachers in secondary education (per thousand people) increases at a rate of 0.26 per year, while the rates in Kenya, Costa Rica, and Côte d'Ivoire are 0.19, 0.15, and 0.09, respectively. Each year there are, on average, 8.5 additional pupils enrolled in secondary education (per one thousand people in the age group fifteen to nineteen) in Colombia (5.3 in Kenya, 4.4 in Costa Rica, and 2.1 in Côte d'Ivoire). The perhaps more accurately measured gross enrollment ratios in secondary education (as given by the World Bank) show an annual increase of 1.7 percentage points in Colombia (almost twice the figure for Costa Rica and Côte d'Ivoire).

The regressions for gross enrollment rates in primary education indicate that Kenya has the best record regarding improvements in basic education coverage (2.3 additional pupils per year per one hundred people of primary school age).

Table 3.5 **Deterministic Trend-Cycle Decomposition for Leading Social Indicators, 1950–89 (all variables in rates)**

	Trend	t-Stat	R^2	N	Standard Deviation of Residuals: Levels	Standard Deviation of Residuals: %
Teachers in primary education per 1000 people aged 5–14						
Colombia	0.203	9.812	0.857	18	0.568	7.67
Costa Rica	−0.090	−3.071	0.386	17	0.797	7.47
Côte d'Ivoire	0.149	8.212	0.828	16	0.454	8.23
Kenya	0.304	8.853	0.830	18	0.941	11.82
Teachers in secondary education per 1000 people aged 15–19						
Colombia	0.257	10.439	0.872	18	0.675	10.66
Costa Rica	0.150	4.630	0.728	10	0.569	7.50
Côte d'Ivoire	0.088	3.007	0.501	11	0.408	19.05
Kenya	0.189	21.474	0.968	17	0.241	13.12
Enrollment in primary education per 1000 people aged 5–14						
Colombia	2.604	3.182	0.403	17	18.058	6.75
Costa Rica	−1.734	−3.862	0.499	17	9.911	3.02
Côte d'Ivoire	4.450	11.371	0.896	17	8.638	4.31
Kenya	12.210	7.570	0.793	17	35.597	12.08
Enrollment in secondary education per 1000 people aged 15–19						
Colombia	8.527	8.430	0.826	17	22.325	12.38
Costa Rica	4.441	3.090	0.389	17	31.711	15.03
Côte d'Ivoire	2.123	13.044	0.966	8	2.772	13.32
Kenya	5.326	11.595	0.900	17	10.136	15.01
Gross enrollment ratio: primary						
Colombia	1.672	4.014	0.617	12	11.250	10.54
Costa Rica	−0.177	−1.066	0.080	15	4.829	4.71
Côte d'Ivoire	0.964	6.440	0.822	11	3.621	6.17
Kenya	2.300	5.914	0.729	15	11.316	14.00
Gross enrollment ratio: secondary						
Colombia	1.664	13.991	0.951	12	3.212	13.64
Costa Rica	0.850	4.536	0.632	14	5.449	15.26
Côte d'Ivoire	0.665	10.932	0.902	15	1.770	26.00
Kenya	0.803	18.097	0.962	15	1.292	24.04
Crude birth rate per 1000 people						
Colombia	−0.643	−32.834	0.968	38	1.324	3.77
Costa Rica	−0.591	−12.955	0.823	38	3.083	7.99
Côte d'Ivoire	−0.078	−20.107	0.918	38	0.263	0.51
Kenya	−0.091	−3.899	0.297	38	1.581	3.15

(continued)

Table 3.5 (continued)

	Trend	t-Stat	R^2	N	Standard Deviation of Residuals: Levels	Standard Deviation of Residuals: %
Crude death rate per 1000 people						
Colombia	−0.276	−26.856	0.952	38	0.694	3.11
Costa Rica	−0.208	−20.594	0.922	38	0.684	8.92
Côte d'Ivoire	−0.397	−72.120	0.993	38	0.372	1.00
Kenya	−0.401	−189.780	0.999	38	0.143	3.57
Infant (0–1) mortality rate						
Colombia	−2.347	−52.921	0.987	38	2.998	6.18
Costa Rica	−2.259	−14.849	0.860	38	10.282	22.16
Côte d'Ivoire	−2.607	−76.455	0.994	38	2.305	0.71
Kenya	−2.064	−48.627	0.985	38	2.869	0.86
Total fertility rate						
Colombia	−0.127	−23.360	0.938	38	0.367	7.69
Costa Rica	−0.131	−21.505	0.928	38	0.413	7.38
Côte d'Ivoire	0.011	6.997	0.576	38	0.102	1.42
Kenya	−0.011	−2.304	0.129	38	0.327	4.34
Life expectancy at birth						
Colombia	0.502	30.696	0.961	40	1.194	2.59
Costa Rica	0.510	73.472	0.993	40	0.506	1.06
Côte d'Ivoire	0.462	54.466	0.987	40	0.620	1.50
Kenya	0.514	73.194	0.993	40	0.512	1.73

The figure for Colombia is 1.7 percentage points, and Côte d'Ivoire follows with 1 percentage point per year.

Colombia also shows the fastest decrease in crude birth rates per one thousand people (−0.64 per year). In regard to (crude) death rates the record is less impressive. In this case, Colombia ranks third after Kenya and Côte d'Ivoire. The improvements in infant mortality rates and in life expectancy are very similar across countries. On average, each year the number of babies that die per one thousand born falls by 2–2.6 in these countries. Also, each year babies can expect to live half a year more than those born the year before.

All in all, there seems to be a negative correlation between the trend coefficient in these variables and the standard deviation of the business cycle. Colombia, the country with more macroeconomic stability, fares relatively well in terms of long-term social progress, as measured by the trend component of those indicators.

Cyclical Components

The fluctuations in the social indicators around their long-run path (i.e., the residuals of the linear trend regressions) can be interpreted as an approxima-

tion to the concept of "social" cycle. Consequently, the standard deviation of those residuals (shown in the last two columns of table 3.5) measures the relative stability of each particular social indicator.

It is interesting to observe that when the regressions are estimated in logarithmic form (so that the standard deviation is expressed in percentage deviations from trend), Colombia's social indicators stand out as being relatively more stable. Frequently, it has the least variance (e.g., enrollment rates in secondary education), or is close to the minimum level (e.g., teachers in primary and secondary education). There are, however, some indicators that show a relatively high variance (e.g., fertility rates, life expectancy).

In addition, the evidence suggests that those indicators where fastest progress has been achieved are also the ones with more stability. In a way, there is some indication that social stability is associated with social progress (although we do not have enough information to provide a definite proof for this point).

Another remarkable fact about the "social" cycle is its high degree of correlation across countries. Table 3.6 shows the correlation matrices for the cyclical components of the leading social indicators. The correlations are usually high and positive, suggesting the presence of a common determinant. As in the case of business cycles, the correlations are particularly high between Colombia and Costa Rica. The pattern for Côte d'Ivoire and Kenya is more erratic, occasionally showing negative coefficients. On average, and for most indicators, there is evidence of strong comovements in these indicators.

One way of exploring for possible common determinants in the fluctuations of social indicators is by estimating regressions where the "social" cycle is the dependent variable and the business cycle and a constant are used as regressors. The presumption is that business cycles can explain social cycles. Since we saw that the frequency of the business cycles is led by external shocks, these regressions would suggest that those shocks also affect social indicators. In a way, stabilization policies would be justified not only on the grounds of (private) consumption smoothing, but also given the effect of the stability in social indicators on their long-run performance.

As shown in table 3.7 the evidence strongly supports this hypothesis. A large fraction of the variance in social cycles can be explained by business cycles. For example, in the case of secondary education enrollment rates, R^2 is higher than 0.48 in all cases (as high as 0.72 in Costa Rica). In general, the regressions for Colombia and Costa Rica are highly powerful in explaining the dependent variable: social and business cycles are very highly correlated in these two countries (for several indicators R is higher than 0.75).

The regressions are perhaps less robust for Côte d'Ivoire and Kenya, especially in regard to variables related to the number of teachers in primary and secondary education. The regressions that use gross enrollment ratios (primary and secondary) are, however, uniformly significant. In conclusion, fluctuations in world coffee prices do seem to have procyclical effects on enrollment ratios.

Table 3.6 **Cyclical Component in:**

	Colombia	Costa Rica	Côte d'Ivoire	Kenya
Teachers in primary education per 1000 people aged 5–14				
Colombia	1.000			
Costa Rica	0.815	1.000		
Côte d'Ivoire	−0.165	−0.254	1.000	
Kenya	0.636	0.317	−0.258	1.000
Teachers in secondary education per 1000 people aged 15–19				
Colombia	1.000			
Costa Rica	0.094	1.000		
Côte d'Ivoire	−0.229	0.760	1.000	
Kenya	0.353	0.425	0.255	1.000
Enrollment in primary education per 1000 people aged 5–14				
Colombia	1.000			
Costa Rica	0.542	1.000		
Côte d'Ivoire	0.370	−0.276	1.000	
Kenya	0.344	−0.203	0.308	1.000
Enrollment in secondary education per 1000 people aged 15–19				
Colombia	1.000			
Costa Rica	0.932	1.000		
Côte d'Ivoire	−0.120	0.094	1.000	
Kenya	0.113	0.354	0.569	1.000
Gross enrollment ratio: primary				
Colombia	1.000			
Costa Rica	0.805	1.000		
Côte d'Ivoire	0.417	0.516	1.000	
Kenya	0.581	0.272	0.408	1.000
Gross enrollment ratio: secondary				
Colombia	1.000			
Costa Rica	0.665	1.000		
Côte d'Ivoire	0.393	0.759	1.000	
Kenya	0.394	0.755	0.566	1.000
Crude birth rate per 1000 people				
Colombia	1.000			
Costa Rica	0.579	1.000		
Côte d'Ivoire	0.269	0.513	1.000	
Kenya	−0.320	−0.367	0.216	1.000
Crude death rate per 1000 people				
Colombia	1.000			
Costa Rica	0.778	1.000		
Côte d'Ivoire	0.685	0.734	1.000	
Kenya	−0.335	−0.531	−0.303	1.000
Infant (0–1) mortality rate				
Colombia	1.000			
Costa Rica	0.138	1.000		
Côte d'Ivoire	0.479	−0.092	1.000	
Kenya	0.537	−0.242	0.737	1.000

Table 3.6 (continued)

	Colombia	Costa Rica	Côte d'Ivoire	Kenya
Total fertility rate				
Colombia	1.000			
Costa Rica	0.811	1.000		
Côte d'Ivoire	0.601	0.144	1.000	
Kenya	0.144	−0.227	0.806	1.000
Life expectancy at birth				
Colombia	1.000			
Costa Rica	0.669	1.000		
Côte d'Ivoire	−0.797	−0.174	1.000	
Kenya	0.866	0.468	−0.919	1.000

Note: Original variables in rates.

In addition, large fluctuations in social indicators do impose constraints on their long-term improvement.

3.4 Conclusions

This paper suggests that macroeconomic stability is a necessary (but not sufficient) condition to achieve social progress. As the recent literature on the political economy of stabilization has shown, the mechanisms for achieving stability have to do both with institutions and policies. In particular, institutions should give policymakers the incentives to stabilize the economy. Institutions, in this sense, are not neutral to the results. Different arrangements give rise to different macroeconomic outcomes. Institutions, therefore, can be ranked according to the policies and the performance of the main macroeconomic indicators.

Two important institutions in the developing world are tax systems and commodity stabilization boards. Commodity stabilization mechanisms have the purpose of taxing windfall gains when prices are high, and cushioning the income of commodity producers when prices decrease, by subsidizing local prices with the savings accumulated during the good times. In many countries the stabilization objectives of the marketing boards are soon abandoned, and such institutions become taxing mechanisms that distort farm prices and maintain expensive bureaucracies. But in some cases, the stabilization mechanism does work according to theory, and helps avoid large changes in the aggregate consumption of commodity producers. Commodity boards that reflect the preferences of coffee producers (as in Colombia) are more likely to perform well by stabilizing producers' incomes (and hence the economy). This is not true in places where the management of the board reflects the preferences of a highly impatient policymaker. In fact, in such cases it is likely that the board introduces more instability, by generating a highly procyclical pattern in government expenditures (as in Côte d'Ivoire).

Table 3.7 Social Cycle versus Business Cycle, 1960–85 (all variables in rates)

	Coefficient	t-Stat	R^2	N	Standard Deviation Residuals
Teachers in primary education per 1000 people aged 5–14					
Colombia	11.900	6.748	0.752	17	0.287
Costa Rica	7.323	3.962	0.529	16	0.500
Côte d'Ivoire	0.803	0.451	0.015	15	0.420
Kenya	7.914	1.197	0.087	17	0.926
Teachers in secondary eduction per 1000 people aged 15–19					
Colombia	9.922	3.004	0.376	17	0.538
Costa Rica	2.205	0.882	0.089	10	0.543
Côte d'Ivoire	0.891	0.438	0.021	11	0.404
Kenya	1.122	0.644	0.029	16	0.238
Enrollment in primary education per 1000 people aged 5–14					
Colombia	377.403	7.140	0.773	17	8.610
Costa Rica	61.650	1.993	0.209	17	8.813
Côte d'Ivoire	68.357	2.438	0.284	17	7.310
Kenya	148.096	0.589	0.023	17	35.192
Enrollment in secondary education per 1000 people aged 15–19					
Colombia	393.596	4.280	0.550	17	14.979
Costa Rica	371.415	6.571	0.742	17	16.103
Côte d'Ivoire	−6.197	−0.357	0.021	8	2.743
Kenya	58.303	0.823	0.043	17	9.915
Gross enrollment ratio: primary					
Colombia	197.440	5.822	0.790	11	5.226
Costa Rica	35.755	4.350	0.612	14	2.438
Côte d'Ivoire	7.446	0.541	0.035	10	3.479
Kenya	292.961	3.347	0.483	14	8.438
Gross enrollment ratio: secondary					
Colombia	48.006	3.198	0.532	11	2.313
Costa Rica	57.563	5.349	0.722	13	2.951
Côte d'Ivoire	14.095	3.302	0.476	14	1.312
Kenya	32.962	3.248	0.468	14	0.978
Teachers in primary education per 1000 people aged 5–14					
Colombia	10.812	7.940	0.798	18	0.256
Costa Rica	6.566	5.067	0.631	17	0.484
Côte d'Ivoire	−0.983	−1.139	0.085	16	0.434
Kenya	5.583	2.123	0.220	18	0.831
Teachers in secondary education per 1000 people aged 15–19					
Colombia	9.626	3.607	0.449	18	0.501
Costa Rica	1.914	0.948	0.101	10	0.540
Côte d'Ivoire	0.697	0.461	0.023	11	0.404
Kenya	0.793	1.030	0.066	17	0.233

Table 3.7 (continued)

	Coefficient	t-Stat	R^2	N	Standard Deviation Residuals
Enrollment in primary education per 1000 people aged 5–14					
Colombia	365.280	8.210	0.818	17	7.704
Costa Rica	46.910	1.949	0.202	17	8.853
Côte d'Ivoire	42.865	2.202	0.244	17	7.509
Kenya	154.599	1.466	0.125	17	33.293
Enrollment in secondary education per 1000 people aged 15–19					
Colombia	377.330	4.469	0.571	17	14.621
Costa Rica	278.272	5.839	0.694	17	17.527
Côte d'Ivoire	−5.674	−0.456	0.033	8	2.725
Kenya	39.959	1.314	0.103	17	9.599
Gross enrollment ratio: primary					
Colombia	192.390	9.095	0.892	12	3.695
Costa Rica	34.563	4.658	0.625	15	2.956
Côte d'Ivoire	8.367	1.271	0.152	11	3.334
Kenya	126.190	4.840	0.643	15	6.760
Gross enrollment ratio: secondary					
Colombia	39.555	2.934	0.463	12	2.355
Costa Rica	42.408	5.109	0.685	14	3.058
Côte d'Ivoire	7.195	2.917	0.396	15	1.376
Kenya	12.882	3.711	0.514	15	0.900

Some tax systems can also be more stabilizing than others. If the income tax is a large proportion of tax revenues, the system works as an automatic (income and consumption) stabilization device. On the other hand, a tax system very dependent on trade taxes may be destabilizing. Tax revenues decrease precisely when export prices decrease, generating a fiscal deficit at the same time as a trade deficit.

Institutional change is, however, a difficult task. In some countries it is particularly difficult to pass a tax reform or to devalue the currency. There may be very strong pressure groups that oppose devaluations, such as the army or an urban middle class, and no institutional mechanisms for treating devaluation decisions in such a way that these groups have no veto power. In other countries, tax reforms are very difficult to implement. For example, in Venezuela, a value-added tax has been discussed and proposed for many years, but it has never been passed by Congress. In other countries the congress has an interest in certain social expenditure programs for electoral reasons, and tax reforms are possible.

In addition, government (social) expenditures are important for promoting social progress and human development. The conclusion that we obtain from

our analysis is that macroeconomic stability has to be matched with sustained programs on the part of the state. However, the effects of public expenditures that are not properly financed and rely heavily on the inflation tax are completely undermined. Moreover, the paper provides a strong argument for diminishing fiscal deficits.

Political structure may determine the level and degree of fluctuation of fiscal deficits, variables that we have shown affect social progress. Countries that have difficulty adjusting tax systems may thus have to live with discontinuity in crucial social programs, and this affects their social welfare indicators.

The difficulty in solving budget deficits may also create an inflation bias, insofar as the government tries to use the inflation tax instead of adjusting other taxes. This inflation bias would also appear to affect negatively the indicators of social progress.

Policies also play a role. As has been mentioned, a bias toward stability would recommend to policymakers exchange rate and commercial policies that favor export diversification. Such policies would tend to diminish the variations in tax revenues, balance-of-payments disequilibria, income, and consumption that large changes in terms of trade generate. Clearly policies that attempt to maintain fairly constant RERs also generate stability in the balance of payments and tax revenues from trade taxes. Policies with a strong ideological bias against large fiscal deficits (but not necessarily expenditures) and inflation probably also favor social progress, if we accept some of the empirical relations found in this paper. This does not mean, however, that fiscal balance should always be pursued. As the Colombian experience illustrates, a countercyclical fiscal policy is the key to macroeconomic (business cycle) stability. What it means is that budget surpluses and deficits should not be too large and cancel out intertemporally (over relatively short periods of time).

Many of these stabilizing institutions and policies have costs. This would certainly be the case of marketing boards, or a political bias toward increases in tax burdens, which would be the corollary of political arrangements that facilitate revenue-enhancing tax reforms. The question is whether the social benefits generated by stabilizing institutions and policies are greater than the costs. The empirical evidence here suggests that the benefits of fiscal stability may be worth the costs. The case studies of the coffee producers indicate the mechanisms that compensate terms of trade shocks may also have social benefits.

Appendix
Data Sources

GNP per Capita. International Monetary Fund, *International Financial Statistics Yearbook 1990* (data 1970–85).

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