

## HOW MUCH DOES POLICY AFFECT GROWTH?\*

WILLIAM EASTERLY\*\*

This paper examines the relationship between policies and growth through a selective survey of the recent growth literature. The survey is partial because it focuses on papers especially relevant to the relationship between policies and growth, including work associated with a World Bank research project, "How Do National Policies Affect Long-run Growth?"<sup>1</sup>. This provides a device to assimilate the vast "endogenous growth" literature that has sprung up virtually overnight in the wake of the seminal articles by Paul Romer (1986, 1987). I first review the theoretical framework relating policies to growth, then discuss empirical evidence, and finally indicate some caveats to the empirical policy/growth association.

### DO POLICIES HAVE GROWTH EFFECTS? WHAT SHOULD WE DO ABOUT IT IF THEY DO?

The hallmark of the new growth theory is that policies have growth effects, unlike the neoclassical model where policies have only level effects. There are two channels by which policies affect growth in the new models:

#### *A linear capital-output relationship*

This was the original channel proposed by Romer (1986, 1987), who supposed that "learning by doing" and other externalities to physical capital investment increased the exponent on capital from its traditional value of one-third to unity. Lucas (1988) subsequently proposed human capital to also be a critical element in production. His model generated endogenous growth through the self-perpetuating nature of education and training; only human capital is needed to produce more human capital. Rebelo (1991) brought this strand of the literature to a natural and elegant conclusion by postulating a

\* Paper presented at the Conference on Determinants of Economic Growth, Pontificia Universidad Católica de Chile, Santiago, Chile, June 8-9, 1992. I am grateful for comments by and discussions with my commentator, Joe Ramos, Vittorio Corbo, Stanley Fischer, Patricio Meller, Patricio Rojas, Rodrigo Vergara, and Carlos Williamson. The author alone is responsible for any errors. Views expressed here are not necessarily those of the World Bank.

\*\* The World Bank.

<sup>1</sup> The research agenda is described in Easterly, King, Levine, and Rebelo (1992).

model in which "everything is capital"; the only input to production is capital, either physical or human. With a linear relationship between capital and output, steady state growth is feasible through investment alone, with no need for Solow's exogenous technological progress<sup>2</sup>.

In linear capital-output models, policies that affect the rate of return to investment will affect growth. For example, a tax on income or on investment goods will lower the after-tax return to investment, lower investment, and thus lower growth. King and Rebelo (1990) showed how potent are the effects of policies on growth in such models.

A natural extension is to suppose more than one type of capital, with production displaying constant returns to scale in all forms of capital. Policies that affect the relative prices of capital goods now have growth effects also (Easterly, King, Levine, and Rebelo (1992), Lee (1992), and Easterly (1992)). Policies that distort relative prices will generally lower growth for a given amount of investment by causing investment to be inefficient. In contrast to the Solow model, where such policies have only level effects, distortions have growth effects because they lower the return from plowing back resources into capital accumulation each period. Policies of this type include foreign exchange controls resulting in large black market premiums, import quotas or tariffs that lead prices to diverge from international ones, and controls on nominal interest rates that cause highly negative real interest rates<sup>3</sup>.

This branch of the endogenous growth literature should include also the "near-endogenous" growth models that have recently become popular. Barro (1991), Barro and Sala i Martin (1992), and Mankiw, Romer, and Weil (1992) postulate neoclassical exogenous growth models in which policy nevertheless has relatively strong growth effects because of an assumption of a high capital (including human capital) share: around 80 percent in the Barro articles and two-thirds in Mankiw et al. The observational implications of these models are close to those of King and Rebelo (1991): while growth is formally exogenous, policies have such strong level effects with a high capital share that it looks like they have growth effects.

The conclusion of this strand of the literature is that the same noninterventionist policies favored by the neoclassical model are still sacrosanct under the new growth models. The only change is that the effect of policies has shifted up a derivative: instead of levels, policies now affect growth rates.

### *Endogenous technological change*

More recent articles by Romer (1990, 1991), Grossman and Helpman (1991), Young (1992) and others stress the role of endogenous technological innovation. These models feature research and development, development of new products and intermediate inputs, and trade between nations of different technological levels. The models always require throwing out the assumption of perfectly competitive markets, because development of new products carries fixed costs. The innovator must have at least a temporary monopoly in the new product to make its introduction worthwhile.

The policy implications of these models could not be more different than those

2 The linear capital-output model is hardly new, of course. Development economists have long used such an assumption, either for convenience or because labor was supposed to be in perpetual excess supply.

3 Easterly, King, Levine, and Rebelo (1992) and Easterly (1991).

of the linear capital-output branch of the literature. Because perfect competition is not feasible with partially nonrival goods like knowledge and with fixed costs to introduction of new products, the standard theorems about the superiority of laissez-faire free markets do not apply. Government intervention can potentially raise growth and improve welfare by fostering more research and development. Trade protection, for example, can either raise or lower growth depending on its effects on incentives for R&D.

However, even the proponents of these models admit that governments will often lack sufficient knowledge to find the right investments to foster technological innovation. Government attempts at industrial policy are more likely to create white elephants than Silicon Valley. The ambiguity of the predictions for policy makes the predictions of these models difficult to verify empirically. While this branch of the literature has generated much excitement, it still has not reached the stage of giving plausible insights into how policies affect growth. It is the more pedestrian "everything is capital" models that yield sharp predictions for policy and growth.

#### EMPIRICAL EVIDENCE ON GROWTH AND POLICIES

The empirical literature relating policies to growth predates the "endogenous growth literature". Development economists, particularly those associated with the World Bank, have for years amassed evidence that outward-oriented, market-friendly policies are good for long run economic growth (see Balassa (1985, 1987) and more recently the 1991 *World Development Report*, and Corbo, Fischer, and Webb (1992)). With the advent of the new growth literature, this already impressive amount of empirical evidence has mushroomed.

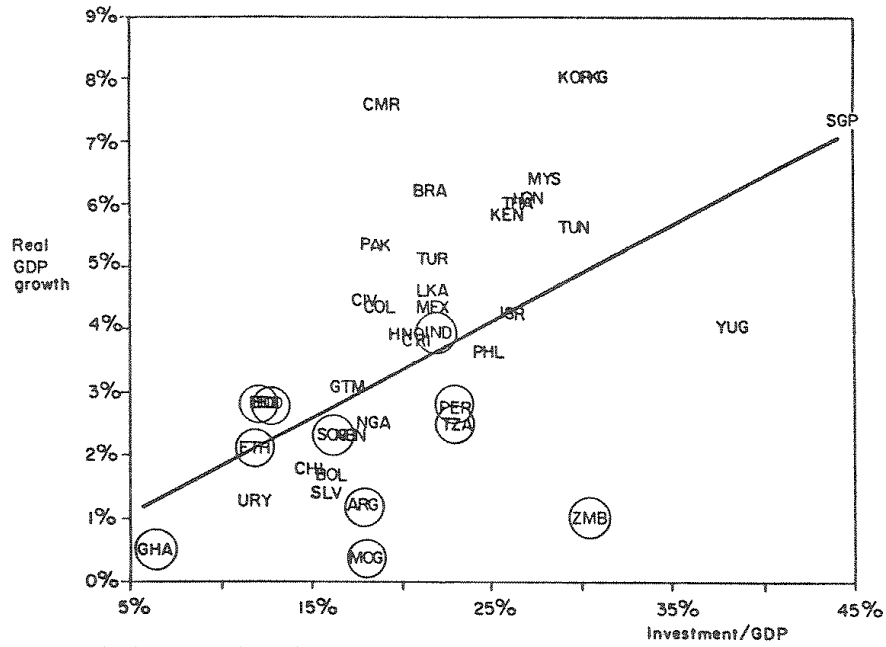
Table I shows some illustrative associations between policy variables and rapid growth, taken from Easterly, King, Levine, and Rebelo (1992) and Levine and Renelt (1992). Countries with rapid growth have nearly double the investment rates, four times the secondary enrollment, nearly double the primary enrollment, half the inflation, one-fifteenth of the black market premium, and twice the export share of countries with slow growth.

TABLE 1  
AVERAGES OF POLICY VARIABLES FOR FAST AND SLOW GROWERS

Cross-Country Averages: 1960-89 (percent)	Fastgrowers	Slowgrowers
Share of investment in GDP	27	17
Secondary school enrollment rates	27	7
Primary school enrollment rates	90	52
Government consumption/GDP	8	12
Inflation (%)	8.4	16.5
Black market exchange rate (%)	4.6	75.0
Ratio of exports to GDP (%)	44	29

Note: Mean per capita growth rate = 1.92 Fastgrowers: One standard deviation greater than or equal to the mean growth rate. (cutoff = 4.0; n = 12) Slowgrowers: One standard deviation less than or equal to the mean growth rate (cutoff = -0.2; n = 15).

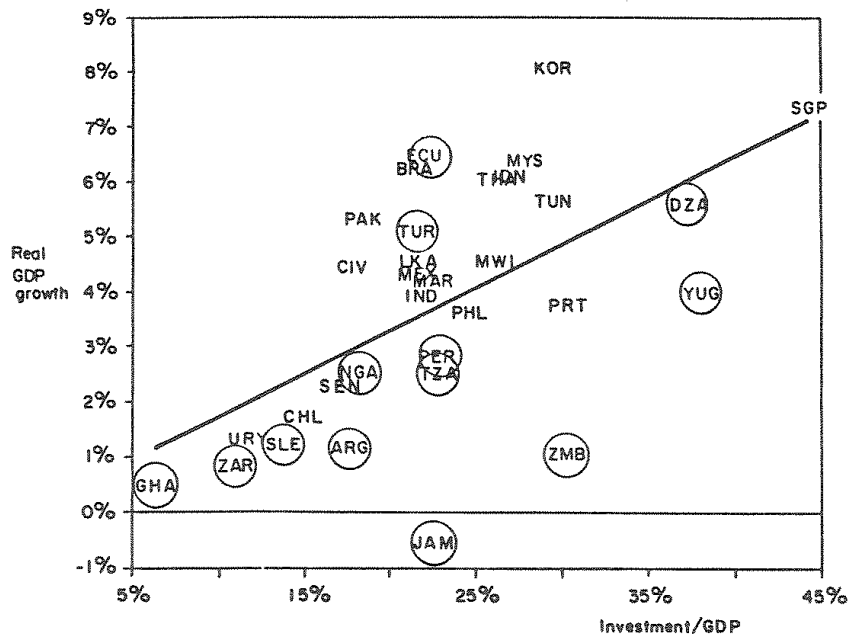
FIGURE 1a  
 REAL GDP GROWTH AND INVESTMENT RATIOS: TRADE POLICY  
 SAMPLE, 1971-86



○ Indicates strongly inward-oriented countries.

SOURCE: WDR 1987 and World Bank data.

FIGURE 1b  
 REAL GDP GROWTH AND INVESTMENT RATIOS: FINANCIAL  
 POLICY SAMPLE, 1971-86



○ Indicates strongly negative real interest rates (less than - 5%).

SOURCE: Geld (1989), WDR 1989 and World Bank data.

The above theory argued that policies can affect growth by lowering the efficiency of investment as well as by lowering total investment. Figure 1a and 1b illustrates this by showing that countries with either strong inward-orientation (as defined by the 1987 *World Development Report*) or highly negative real interest rates (as shown in the 1989 *World Development Report* and Gelb (1988)) will have below average growth for a given rate of investment. To take the most dramatic example, Korea and Zambia had roughly the same rate of investment over this period. Korea was outward oriented and did not have strongly negative real interest rates; Zambia was inward-oriented and financially repressed. Korea grew at 9 percent (gross not per capita) and Zambia grew at 1 percent.

Table I and Figures 1a and 1b showed what are in effect simple correlations. These associations have largely held up in the empirical literature that looks at partial correlations between growth and policy variables in either cross-section or pooled time-series, cross-section regressions. Table II gives some illustrative magnitudes of policy effects on growth from the empirical literature. These effects are close to being additive because they derive from regressions controlling for most of the other policy variables. For example, a policy reform package (say over a decade) that raised both primary and secondary enrollment by 10 percentage points, lowered the black market premium by 20 percentage points, increased equipment investment by 3 percentage points of GDP, and ended negative real interest rates would be predicted to raise per capita growth by a remarkable 3.8 percentage points. This translates into an additional rise in income of 45 percent in one decade and a more than doubling of incomes over 2 decades.

#### POLICY EFFECTS ON GROWTH: CAVEATS

Despite the wealth of evidence suggesting strong positive effects on growth of market-oriented policies, we have to note two strong caveats: first, that policies are not robust in empirical regressions, and second, that policies fail to explain why growth rates are so unstable.

##### *Lack of robustness of policies*

The now classic article of Levine and Renelt (1990, revised 1992) pointed out a disturbing fact about the growth regressions like those featured above. The statistical significance of any individual policy variable in a growth regression vanished when other plausible variables were added. The coefficients also were shown to be highly unstable to the inclusion of other plausible policy variables.

This finding is not as damaging to the case for strong policy effects on growth as it might first appear. Levine and Renelt's result did not overturn the *joint* significance of policy variables. The insight the authors derived is that it is difficult to separate out the effects of individual policy variables, but that the favorable effects of growth of policy packages were still vindicated by the data.

TABLE II  
POLICY VARIABLES AND GROWTH

An increase in:	of:	will change growth by:
Investment/GDP <sup>4</sup>	1 percentage point	.1 to .2 percentage points
Primary enrollment ratio <sup>5</sup>	10 percentage points	.2 to .3 percentage points
Secondary enrollment ratio <sup>6</sup>	10 percentage points	.2 to .3 percentage points
Black market exchange rate premium over official rate <sup>7</sup>	10 percentage points	-.4 percentage points
Ratio of M2/GDP <sup>8</sup>	10 percentage points	.2 to .4 percentage points
Average producer input price compared to world prices <sup>9</sup>	23 percentage points	-1 percentage point
Ratio of government consumption to GDP <sup>10</sup>	10 percentage points	-1.2 percentage points
Ratio of equipment investment to GDP <sup>11</sup>	3 percentage points	1 percentage point
Financial repression <sup>12</sup> interest rates to negative	from having positive real	-1.5 percentage points
Export share to GDP <sup>13</sup>	10 percentage points	.6 percentage points
Trade orientation <sup>14</sup>	from "outward-oriented" to "inward-oriented"	-1.5 percentage points

*Low persistence of country effects*

The second caveat arises from an empirical fact highlighted in Easterly, Kremer, Pritchett, and Summers (1992)<sup>15</sup>. The EKPS paper presents a surprising empirical fact: *growth rates are highly unstable over time, while country characteristics are highly persistent*. As shown in Table III, the correlation across decades of country per capita growth rates is only about .1 to .2, while most country characteristics display cross-decade correlations of .6 to .9. This implies that variation over time in growth rates is

4 Levine and Renelt (1991), Romer (1989)

5 Barro (1991)

6 Barro (1991)

7 Easterly, Kremer, Pritchett, and Summers (1991)

8 King and Levine (1991), Easterly, Kremer, Pritchett, and Summers (1992)

9 Easterly (1991)

10 Barro (1991)

11 DeLong and Summers (1991)

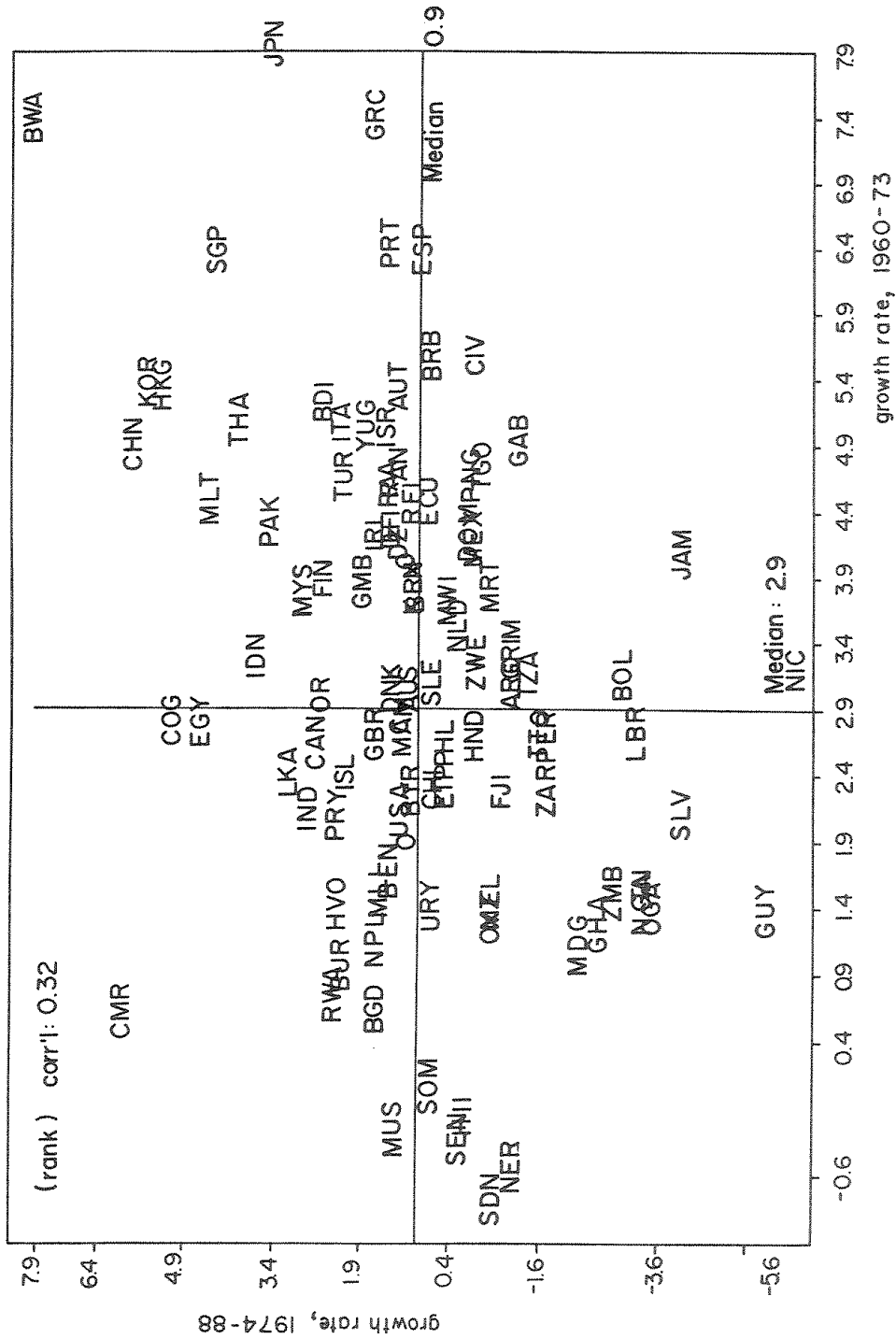
12 Easterly (1992)

13 *ibid.*

14 *ibid.* See also Dollar (1992).

15 Although this fact has been earlier noticed by Fischer (1988), Easterly, King, Levine, and Rebelo (1992), and De Long and Summers (1991).

FIGURE 2  
GROWTH RATE PERSISTENCE  
(boxes are 75th percentiles)



relatively more important than permanent differences in country policies or other characteristics. In other words, it is *not* generally the same countries doing well decade after decade; countries are "success stories" one decade and disappointments the next. As shown in Figure 2, only seven countries (Botswana, China, Hong Kong, Japan, Korea, Singapore, Thailand) were in the top quarter of growth rates in *both* 1960-73 and 1974-88, which would roughly be the expected proportion corresponding to purely random variation. The widespread perception of strong country effects in growth is largely due to these countries; without these countries, the cross-period correlation of growth rates is zero. *No* countries were in the bottom quarter of growth rates in both periods.

EKPS also do some regressions of growth on the policy variables shown in in Table III. The fitted value from such a regression can be interpreted as an index of country policies. The correlation of this index across subsequent periods is also very high (from .45 to .8 depending on the period and what is included). Unmeasured country characteristics (like "culture" must be even more stable<sup>16</sup>. This implies that a surprisingly large fraction of growth rates even over periods as long as a decade remains unexplained<sup>17</sup>.

TABLE III  
PERSISTENCE OF COUNTRY CHARACTERISTICS

	60's w/ 70's	70's w/ 80's
Growth per worker	.15	.09
Primary enrollment	.88	.86
Secondary enrollment	.89	.94
Initial income	.97	.97
Black market premium	.69	.42
Trade share	.91	.92
Revolutions and coups	.70	.61
Assassinations (per million)	.67	.89
M2 to GDP	.95	.77
Government consumption	.90	.90
Inflation	.76	.47
Urban Pop. share	.99	.99

SAMPLE: 45 observations.

One obvious source of random noise in country performance is external shocks, and EKPS indeed found that negative or positive external shocks lower or raise growth by a surprising amount. A negative shock averaging 1 percentage point of GDP per annum over a decade (defined as the change in terms of trade times the initial trade share)

<sup>16</sup> This argument was made for a popular audience in Summers and Easterly (1992).

<sup>17</sup> It may also be that policies have different effects in different periods. See Corbo and Rojas (1992) for an interesting discussion of how inward orientation was less damaging in Latin America in the 40's and 50's.



lowers growth by .8 percentage points per annum in that decade. In the 1980's, shocks explain as much of relative growth performance as shocks do. Moreover, EKPS found that policies themselves are affected by external shocks. The black market premium, for example, is not a pure policy measure, but is itself affected by external shocks.

Low persistence of growth rates (the low cross-decade correlation of growth) is the missing piece of an empirical puzzle. The total variation of growth rates is enormous: the standard deviation of decade-long growth rates in any given decade is around 2.5 percentage points. With such variation in growth, some countries should be surpassing others, drastically altering the ranking of per capita incomes. But this is not happening: for 28 developed and developing countries for which we have data, the rank correlation of per capita income in 1870 with that in 1988 is .82!<sup>18</sup> The reason for the stability of income rankings despite huge variations in growth rates is that growth differences are not persistent.

What does the low persistence of growth rates imply for evaluating country policies? The erroneous assumption that growth rate differentials are persistent often leads to overestimation of prospects for "good" countries, and underestimation for "bad" countries. There was pessimism in the West in the late 1950's on Korea's prospects after a lackluster decade. James Meade, Nobel Laureate in Economics, concluded on the basis of performance in the 1960's that prospects for development of Mauritius were poor; since 1970, Mauritius has one of the fastest growth rates in the world. The risk of a Latin American debt crisis was underestimated prior to 1982 because of optimism derived from rapid growth in the 70's and early 80's. These mistakes may be repeated today with euphoric expectations for East Asia and gloom for Africa and the former Soviet Union.

Since policies are hard to measure, "good" policies are often subjectively attributed to countries doing well. Then, with classic circular reasoning, the association between such subjective measures and the country performance is cited as evidence that good policies work. The finding that growth contains large random elements shows how dangerous such circular reasoning can be. The only convincing evidence for that market-oriented policies foster growth comes from *objective* measures of economic policy.

However, one should not go to the other extreme and claim that performance is random and policy does not matter. Good policies may be neither necessary nor sufficient for at least temporary success. However, good policy dramatically increases the probability of success. Moreover, policy itself can reduce the vulnerability to random hazards like external shocks.

## CONCLUSIONS

The theory and evidence supporting strong policy effects on long-run growth is compelling. It is true that the empirical literature has raised doubts, including the doubts detailed here as to the identifiability of individual policy effects and as to the importance of policy vis-a-vis external shocks. While these doubts make the job of the policymaker more complicated, they do not change the basic prescription for success. Sound fundamentals like deep financial markets, education, goods markets free of price controls, and relatively free trade are still the best bet for healthy growth in the 1990's.

18

The correlation of per capita income in 1960 with that in 1988 for a much larger sample of countries was .92.

## BIBLIOGRAPHY

- Balassa, B. (1978), "Exports and Economic Growth: Further Evidence". *Journal of Development Economics* 5 (June) pp. 181-189.
- Balassa, B. (1985), "Exports, Policy Choices, and Economic Growth in Developing Countries After the 1973 Oil Shock." *Journal of Development Economics* 18 p.23-35.
- Barro, R. J. (1991), "Economic Growth in a Cross-section of Countries", *Quarterly Journal of Economics*, Vol. CVI, Issue 2, May.
- Barro, R. J. and X. Sala-i-Martin (1992), "Convergence". *Journal of Political Economy*.
- Corbo, V., S. Fischer, and S. Webb (1992), *Adjustment Lending Revisited: Policies to Restore Growth*. World Bank, Washington, D.C.
- Corbo, V., and P. Rojas (1992), "Latin America's Economic Growth".
- DeLong, Bradford, and Lawrence H. Summers, "Equipment Investment and Economic Growth", *Quarterly Journal of Economics*, Vol. CVI, Issue 2, May.
- Dollar, D. (1992), "Outward-Oriented Developing Economies Really Do Grow More Rapidly: Evidence from 95 LDCs, 1976-85." *Economic Development and Cultural Change*.
- Easterly, W. (1991), "How much do distortions affect growth?", mimeo, World Bank.
- Easterly, W. (1992), "Endogenous Growth in Countries with Government-Induced Distortions" in V. Corbo, S. Fischer, and S. Webb, *Policies to Restore Growth*, World Bank.
- Easterly, W., Michael Kremer, Lant Pritchett, and Lawrence H. Summers (1992), "Good Policy or Good Luck: Country Growth Performance and Temporary Shocks", mimeo, World Bank.
- Fischer, S. (1991), "Growth, Macroeconomics and Development," NBER Macroeconomics, Cambridge, MA (forthcoming).
- Gelb, A. H. (1989), "Financial policies, growth, and efficiency." *PPR Working Paper No. 202*. Washington, DC: World Bank.
- Grossman, G. and E. Helpman (1992), *Trade, Innovation, and Growth*. MIT Press.
- King, R., and R. Levine (1992). "Financial Indicators and Growth in a Cross Section of Countries", *World Bank Working Paper No. 819*. January.
- King, R., and S. Rebelo (1990). "Public Policy and Economic Growth: Developing Neoclassical Implications." *Journal of Political Economy* 98: pp. S126-150.
- Levine, R. and D. Renelt (1992). "A Sensitivity Analysis of Cross-Country Growth Regressions", forthcoming, *American Economic Review*.
- Lucas, R. (1988), "The Mechanics of Economic Development". *Journal of Monetary Economics*.
- Mankiw, G., D. Romer, and D. Weil (1992). "An Investigation into the empirics of economic growth". *Quarterly Journal of Economics*.
- Murphy, K., A. Shleifer, and R. Vishny (1991), "The allocation of talent: implications for growth," *Quarterly Journal of Economics*, May 1991, Vol CVI, Issue 2, pp. 503-530.
- Rebelo, S. (1991), "Long Run Policy Analysis and Long Run Growth." *Journal of Political Economy*. June.
- Romer, P. (1986). "Increasing Returns and Long-Run Growth." *Journal of Political Economy*. 94 p.1002-1037.
- Romer, P. (1987), "Crazy Explanations for the Productivity Slowdown." in S. Fischer ed. *NBER Macroeconomics Annual* Cambridge MA: MIT Press.
- Romer, P. (1989), "What Determines the Rate of Growth of Technological Change?" *PPR Working Paper No. 279*. Washington, DC: World Bank.
- Romer, P. (1990a), "Endogenous Technological Change." *Journal of Political Economy* 98: pp. S71-S102.

- Romer, P. (1990b), "Capital, Labor, and Productivity." *Brookings Papers on Economic Activity: Microeconomics* Special issue: pp. 337-67.
- Solow, R. (1956), "A Contribution to the Theory of Economic Growth." *Quarterly Journal of Economics* 70 (Feb.):pp. 65-94.
- Summers, Lawrence H. and William R. Easterly (1992), "Culture is not to blame." *Financial Times*. Op-ed page, April 15.
- World Bank (1991), *World Development Report 1991*. New York: Oxford University Press.
- Young, Alwyn (1991), "Learning by Doing and the Dynamic Effects of International Trade," *Quarterly Journal of Economics*, May 1991, Vol CVI, Issue 2, pp. 369-406.