Economic Inequality and Its Socioeconomic Impact

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Summary. — Income inequality is of fundamental interest not only to economists, but also to other social scientists. A substantial literature in economics and the social sciences has investigated the relationship between income inequality and economic growth, and a variety of social phenomena. The links between inequality and economic growth are explored as well as those between inequality and such key social variables as political conflict, education, health, and crime. The analysis in this paper follows a two-step process. First, a review of the empirical evidence relating inequality to growth and to each of the above social variables is undertaken. Second, the various causal mechanisms that have been proposed in the social science literature to explain those links are surveyed. © 2002 Elsevier Science Ltd. All rights reserved.

Key words — inequality, income distribution, growth, education, health

1. INTRODUCTION

Income inequality is of fundamental interest not only to economists, but also to other social scientists. A substantial literature in economics and social sciences has investigated the relationship between income inequality and economic growth, and a variety of social phenomena. There are several channels through which economic inequality influences these phenomena. In this paper, we attempt to cross disciplinary boundaries—from economics to such fields as political science, sociology, psychology, criminology, and public health. We explore the links between inequality and economic growth, as well as between inequality and such key social variables as political conflict, education, health, and crime. The analysis in this paper follows a two-step process. First, a comprehensive review of the empirical evidence relating inequality to growth and to each of the above social variables is undertaken. Second, we survey and attempt to synthesize the various causal hypotheses and mechanisms that have been proposed in the social science literature (particularly by economists) to explain the observed relationships between inequality and those socioeconomic variables.

The paper is structured as follows. Section 2 reviews the evidence on the extent and form of inequality in the worldwide distribution of income as well as within countries. Section 3 presents the empirical evidence relating income inequality and economic growth and the various causal mechanisms that have been suggested to explain how inequality affects growth. Section 4 discusses the relationship between income inequality and democracy, social conflict, and political instability—again, through an empirical and theoretical lens. Sections 5 and 6 analyze the effect of income inequality on education and health respectively. Finally, Section 7 scrutinizes the relationship between income inequality and crime.

2. WORLDWIDE AND WITHIN-COUNTRIES DISTRIBUTIONS OF INCOME

(a) *Worldwide income distribution*

A first relevant issue relates to the extent of inequality among different countries and geographical regions of the world—particularly between developed and developing countries. Table 1 presents the income distribution across countries and regions in 1999 with GNP measured at purchasing power parity (PPP). The first noteworthy observation is the large inequality between the advanced industrialized world (the United States, Japan, and Western Europe) and the rest of the world. The former received 49.55% of the world's income with only 12.81% of the world's population. Thus, approximately one-half of global income went to the richest one-eighth of the global population.

Table 1. *World income distribution in 1999*

Country	Population (millions)	% of World population	GNP at PPP (billions of dollars)	% of World GNP	GNP per capita at PPP (thousands of dollars)
US	273	4.57	8,350.1	21.52	30.6
Japan	127	2.13	3,042.9	7.84	24.0
Western Europe	365	6.11	7,834.2	20.19	21.5
Low and middle income countries					
East Asia and Pacific	1,837	30.74	6,423.8	16.55	3.5
Europe and Central Asia	475	7.95	2,654.1	6.84	5.6
Latin America and Caribbean	509	8.52	3,197.1	8.24	6.3
Middle East and North Africa	291	4.87	1,337.5	3.45	4.6
South Asia	1,329	22.24	2,695.0	6.94	2.0
Sub-Saharan Africa	642	10.74	929.3	2.39	1.4
Low and middle income	5,084	85.09	17,323.9	44.64	3.4
High income	891	14.91	21,763.4	56.68	24.4
World	5,975	100.00	38.804.9	100.00	6.5

Source: World Bank (2001), World Development Report.

Sub-Saharan Africa has the lowest GNP per capita (US$1,400), compared with a GNP per capita in the US of US$30,600.

We turn next to a dynamic analysis of the changes in inequality in the worldwide income distribution. We begin by looking at different world income inequality indicators; according to Milanovic (2001), there are three such concepts that need to be discussed:

(i) *Unweighted "inter-national" inequality*

The unweighted inter-national inequality uses GDP per capita from national accounts as the source of data. This indicator disregards country size and within-country inequality. It compares representative individuals across countries in the world, and attempts to see if countries are converging in terms of their income levels. The mathematical form of this indicator and other indicators discussed next are given in the Appendix A.

(ii) *Population weighted inter-national inequality*

Similar to the first concept, this indicator uses data on GDP per capita from national accounts. In this instance, however, countries are weighted by their population size. As in the first measurement above, it is assumed that within-country income distribution is perfectly equal.

(iii) *"True" world inequality*

This third indicator treats every individual the same, regardless of the country, and ranks each individual from the poorest to the richest. In other words, this measurement ignores country boundaries, but includes within-country inequality and is therefore a much more accurate reflection of the true (actual) global distribution of income. The data for this indicator come from national household surveys.

We can now present the changes in the world income inequality according to each of the three indicators as follows:

—Unweighted inter-national inequality increased during 1950–98. The Gini coefficient steadily rises from about 0.45 in 1978 to about 0.53 in 1998 (see Milanovic (2001) Figure 4, p. 21). This indicates a divergence in economic performance between the poor and the rich countries. Indeed, for 1950–98, rich countries grew faster than poor countries; some of the latter, for example, were plagued by slow and/or declining growth rates in the 1980s (Latin America and African countries).
—Weighted inter-national inequality fell over 1965–98. The Gini coefficient drops from 55.6 to 50.1 over this period (see Milanovic (2001) Figure 7, p. 30). Together with the previous result from the first inequality

measure, this reveals that the changes in world population shares of the poor and the rich countries push the weighted international inequality down. The drop in the Gini coefficient for this indicator is driven among other things, by China's remarkable pace of economic growth. Accounting for 0.22 in world population share, the ratio of China's GDP per capita to that of the world increased from 0.14 in 1965 to 0.56 in 1998. —As shown in Table 2, the true world income distribution (by far the best indicator of world income inequality) based on household surveys of 91 different countries, shows an increase in inequality (as measured by the Gini index) from 62.8 in 1988 to 66.0 in 1993. The most important force driving this income inequality is the increasing disparity between countries' mean incomes rather than within-countries' inequality. The evidence also suggests that inequality measures within countries are relatively stable over time.

One of the main reasons for the rise in true world inequality during 1988–93 is the widening income gap between the rich and the poor countries, which is picked up by the first measurement. As shown in Table 3, the ratio of the world income received by the richest 10% of the

world population relative to that received by the poorest 10% increased from 52:1 in 1988 to 64:1 in 1993 (the ratio between the average income of the world top 5% to that of the bottom 5% rose even more from 78 to 1 in 1988 to 114 to 1 in 1993).

A dramatic illustration of worldwide income inequality is that the top 10% of the US population receives an aggregate income equal to the income of the poorest 43% of people in the world, or differently stated, total income of the richest 25 million Americans is equal to the total income accruing to almost two billion people (Milanovic, 1999).

In sum, the level of world income inequality is high, and there has been a steady increase in world income inequality. There is no strong evidence supporting any trend towards greater income equality across countries.

(b) *Within-country income inequality*

The degree of income inequality varies significantly from one country to another. Gini coefficients of intracountry income distributions range between 0.2 and 0.63 (*World Development Report*, 2001). The Slovak Republic, Belarus, Austria and the Scandinavian countries have the most equal income distributions, with Gini coefficients ranging between 0.20 and 0.25. At the opposite end, Sierra Leone, South Africa, Brazil, Guatemala and Paraguay display the highest Gini coefficients between 0.60 and 0.65. The US income distribution is relatively less even than in most Western European countries, i.e., a Gini of 0.41 (see Table 4).

Another measure of economic inequality is the ratio of the richest 10% to that of the poorest 10%. This ratio varies from about 5.5 in Scandinavia to 87 in Sierra Leone. The UK (10.5), the US (17), and Brazil (45) occupy

Table 2. *World income inequality in 1988 and 1993*

	Gini index in 1988	Gini index in 1993
Within-country inequality	1.3	1.3
Between-country inequality	55.1	57.8
Overlap	6.4	6.8
Total world inequality	62.8	66.0
Number of countries in the sample	91	91

Source: Milanovic (1999).

Table 3. *Cumulative percentage of persons and income*

Cumulative percentage of World population (%)	Cumulative percentage of world income	
	1988	1993
Bottom 10	0.9	0.8
Bottom 20	2.3	2
Bottom 50	9.6	8.5
Bottom 75	25.9	22.3
Bottom 85	41	37.1
Top 10	46.9	50.8
Top 5	31.2	33.7
Top 1	9.3	9.5

Source: Milanovic (1999).

Table 4. *Significant differences income inequality within countries*

Countries	Gini coefficient	Ratio of richest 10% to poorest 10%
Belgium, Denmark, Norway, Sweden (1992)	0.25	5.3–5.7
UK (1991)	0.36	10.5
US (1997)	0.41	16.9
Brazil, Guatemala, Paraguay, South Africa (1997)	0.60	42.5–48.7
Sierra Leone (1989)	0.63	87.2

Source: World Bank (2001), World Development Report.

Table 5. *Inequality comparisons of selected middle-income countries*

Measure	Poland	Malaysia	Venezuela	Brazil	South Africa
GNP per capita (US$1999)	3,960	3,400	3,670	4,420	3,160
Gini index	32.9	48.5	48.8	60.0	59.3
% Share of income of poorest 20%	7.7	4.5	3.7	2.5	2.9
% Share of income of poorest 10%	3.0	1.8	1.3	0.9	1.1

Source: World Bank (2001), World Development Report.

intermediate positions within the above range (see Table 4).

It is interesting to observe that some middle-income countries with relatively similar GNP per capita (Poland, Malaysia, Venezuela, Brazil, and South Africa), are characterized by very different degrees of inequality. Table 5 reveals that the Gini coefficients of Brazil and South Africa are much higher than those of Poland and Malaysia, as are the other indicators included in that table.

3. INCOME INEQUALITY AND ECONOMIC GROWTH

(a) *Overview*

Most of the economic literature on the relationship between income inequality and economic growth has its origin in the path-breaking work of Kuznets (1955). In his "inverted-U" hypothesis, Kuznets suggested that economic growth (i.e. a rise in average per capita income) can initially lead to a rise and then fall in income inequality within a country. Since then, however, much evidence has been accumulated against this hypothesis. For instance, using a large-scale crosscountry and time-series data set, Deininger and Squire (1996) find no confirmation of the inverted-U Kuznets curve, but rather a significant relationship between initial income inequality and subsequent growth. Hence, they find that the initial level of income inequality is an important determinant of economic growth (less inequality is conducive to higher growth). The empirical and theoretical evidence on the effects of income inequality on growth are investigated in this section.

The outline of this section is as follows. In the empirical section, we start by examining the conventional wisdom regarding the effect of income inequality on economic growth. Until recently, conventional wisdom claimed that inequality was growth-enhancing. Due to the increased availability of micro-level household survey data, however, the recent literature has re-examined the interactions between inequality and growth. Figure 1 depicts the channels through which income inequality can affect growth.
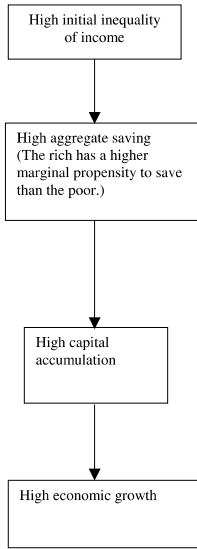
The various channels depicted in Figure 1 are analyzed in detail in the subsequent Section 3(c). Very briefly, Panel A in Figure 1 reflects the classical view that prevailed until recently. A higher presumed marginal propensity to save among the rich than among the poor implies that a higher degree of initial income inequality will yield higher aggregate savings, capital accumulation and growth. In contrast, Panel B summarizes the mechanisms that have been proposed in the recent literature in linking higher initial income inequality with lower growth and conversely. There are four main channels (paths): (i) through the impact of income inequality on encouraging (unproductive) rent-seeking activities that reduce the security of property rights; (ii) through social tensions and political instability that increase uncertainty and discourage investment; (iii) high inequality is likely to be reflected in a relatively poor median, representative voter who will seek redistribution through taxation that, in turn, will bring about further distortions in the economy; and conversely in (iv) a more equal initial income distribution implies a greater income share accruing to the middle class that is likely to reduce fertility and population growth. Galor (2000) made an attempt to reconcile these conflicting approaches (see Panel C). The essence of his "unified model" is that the classical approach holds at low income levels but not at later stages of development.

(b) *The effect of income inequality on economic growth: empirical evidence*

Until recently, the conventional wisdom was that inequality is growth-enhancing. The main
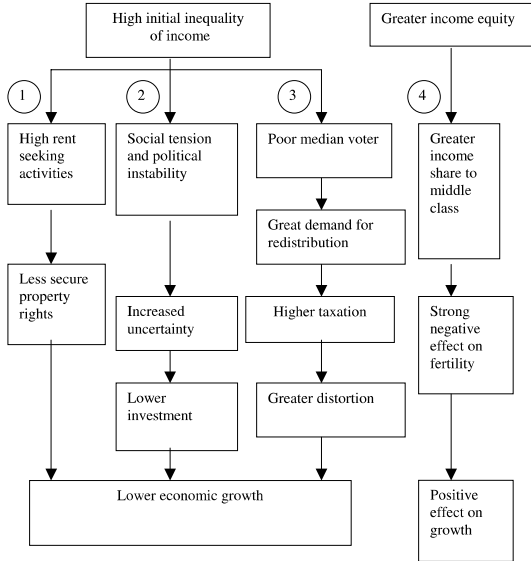
A. Classical Approach:

Kaldor (1956)

B. Modern Approaches :

1) Benhabib & Russtichini (1991), Keefer & Knack (2000)

2) Alesina & Perotti (1993)

3) Alesina & Rodrik (1994), Bertola (1993), Persson & Tabellini (1991)

4) Perotti (1996)

| High initial inequality of income |
| High aggregate saving (The rich has a higher marginal propensity to save than the poor.) |
| High capital accumulation |
| High economic growth |

| High initial inequality of income |

1) High rent seeking activities → Less secure property rights

2) Social tension and political instability → Increased uncertainty → Lower investment

3) Poor median voter → Great demand for redistribution → Higher taxation → Greater distortion

Lower economic growth

| Greater income equity |

4) Greater income share to middle class → Strong negative effect on fertility → Positive effect on growth

C. The "unified model": Galor (2000)

Early stage of economic development:
Physical capital accumulation is a prime engine for growth

High initial inequality of income → High saving → High physical capital accumulation → Higher economic growth

Later stage of economic development:
Human capital accumulation becomes a prime engine for growth due to capital-skill complementarity

Lower human capital accumulation (Under investment in human capital accumulation due to credit market imperfections) → Lower economic growth
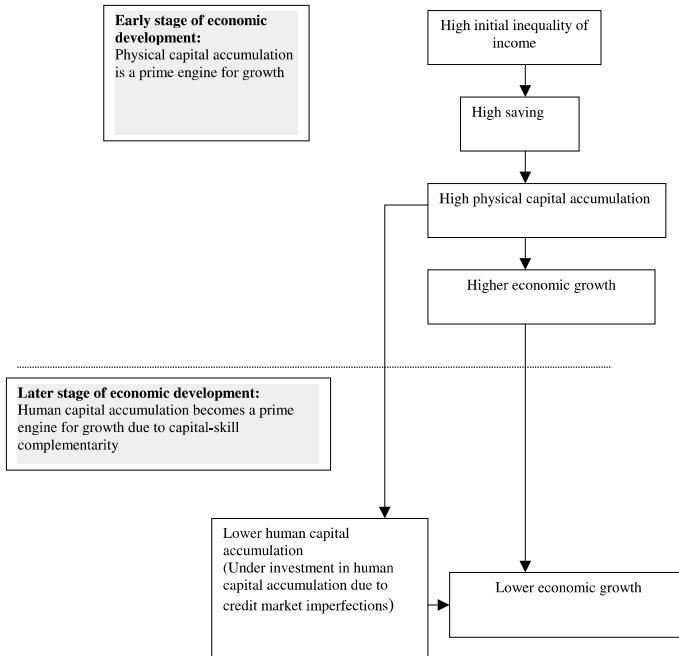
Figure 1. *The channels through which inequality affects growth.*

reason for this was that the presumption that the rich have a higher marginal propensity to save than the poor. Greater inequality would therefore result in greater aggregate savings and investment, and hence would lead to rapid capital accumulation and growth.

Most of the early empirical literature based on household micro-data supports this conventional wisdom on the positive relationship between inequality and personal saving (e.g., Houthakker, 1961; Kelly & Williamson, 1968). On the other hand, based on crosscountry aggregate data, evidence on the effect of inequality on aggregate saving is more mixed. Cook (1995), using data from 49 less developed countries (LDCs) found that inequality has a positive effect. But, recent empirical work by Schmidt-Hebbel and Serven (2000) using both cross-section and panel data, provides no conclusive evidence that income inequality fosters high aggregate savings. Smith (2001), using the Deininger and Squire (1996) data set, examines empirically two hypotheses—subsistence consumption and credit market imperfections—of specific channels for inequality to affect private saving rates. He found that there is econometric evidence that even at low average per capita income (where the average is below the subsistence level but where at least some individuals are above the subsistence level), income inequality is associated with higher aggregate savings—a finding at variance with the modern view. Perhaps a more relevant finding is that inequality only affects private saving rates in countries with low levels of financial market development. This means that "when (poor) individuals cannot borrow against future income, the initial distribution of income affects physical and human capital accumulation and economic growth."

There are also definitional issues that cloud the distinction between consumption and savings. This is particularly true at low income levels where many forms of apparent consumption such as food, health and education make the worker more productive and should therefore be considered more appropriately as forms of savings-cum-investment.

In fact, most of the recent empirical evidence regarding the effect of inequality on growth contradicts the conventional wisdom. Benabou (1996a,b) summarizes the main results from 23 recent studies on the effects of inequality on growth based on cross-sectional ordinary least squares (OLS) covering a variety of countries and periods in time. He concludes that initial inequality is negatively correlated with long-run growth, and the magnitude of the effect is that a one standard deviation decrease in inequality raises the annual growth rate of GDP per capita by 0.5–0.8% points. On the other hand, Barro (1999) using a three-stage least squares estimator which treats the country-specific terms as random, finds that the effect of inequality on growth is negative in poor countries (GDP per capita below or around US$ 2000 at 1985 prices), but is positive in rich countries (GDP per capita above US$ 2000 at 1985 prices). Banerjee and Duflo (2000), however, find that a country's rate of economic growth follows an inverted U-shaped function of lagged inequality.

Why is the conventional wisdom regarding the positive effect of inequality on growth contradicted by the recent empirical evidence? Is there other empirical evidence for such an association besides the saving behavior of households? The following empirical evidence regarding this effect incorporates political instability, voting behavior, and uncertainty over property rights.

Alesina and Rodrik (1994) and Persson and Guido (1994) estimate a negative, reduced-form effect of income inequality on investment and growth rates through the political process. Alesina and Rodrik (1996), using a Gini coefficient of income and land distribution to measure income and wealth distribution, endogenize economic and political variables in a two-equation system and test it on a sample of 71 countries. Their results suggest a negative effect of inequality on political stability, as well as a negative effect of political instability on investment. They also argue that these results coincide with the experience of the East Asian "miracle" countries, which have had relatively more political stability and much less inequality compared to that of Latin American countries at similar income levels.

Using crosscountry data, Svensson (1998) finds that after controlling for the quality of property rights, the measures of political instability employed in his regressions have no direct effect on private investment. Keefer and Knack (2000), using the five indicators proposed by the International Country Risk Guide for measuring the extent of property rights: (i) expropriation risk, (ii) risk of repudiation of contracts by government, (iii) rule of law, (iv) quality of the bureaucracy, and (v) corruption in government, as well as Gini coefficients for income and land inequality from the Deininger–Squire data set also find that the relation-

ship between inequality and growth diminishes considerably after controlling for the security of property rights.

Perotti (1996) finds that a greater income share of the middle class has a strong negative effect on fertility, and this, in turn, has a significant and positive impact on growth. Rodrik (1998) argues that domestic social conflicts caused a growth collapse in many countries after the mid-1970s. His econometric results show that countries which experienced the sharpest drop in growth were those with "divided" societies and with weak institutions of conflict management. The extent to which societies were divided was measured by various indicators of inequality, and ethnic fragmentation; the degree of conflict management was proxied by indicators of the quality of governmental institutions, rule of law, democratic rights, and social safety nets.

(c) The effect of income inequality on economic growth: causal mechanisms

The central question remains: what are the mechanisms through which income inequality affects economic growth? We now turn to examine the economic theories and hypotheses that have been suggested regarding the effect of income inequality on economic growth. As Figure 1 reveals clearly a number of different causal mechanisms and paths have been proposed. We start by analyzing the direct channel through which income inequality affects growth via saving. We then discuss the indirect channels through which income inequality affects growth via redistribution of income, social conflict and political instability.

(i) The direct channel via savings

In standard growth theories, higher saving rates promote investment and economic growth either temporarily in the transition to a new steady state (Solow model) or permanently (endogenous growth models). Therefore, the first task is to explain the relationship between income inequality and saving and more particularly the savings behavior of the rich and the poor.

Kaldor (1956) argues that more inequality favors capital accumulation because the rich have a higher marginal propensity to save than the poor, thereby resulting in rapid economic growth. The following hypotheses explain such behavior: subsistence consumption level, and lifecycle-saving hypothesis including bequests.

The Stone–Geary representative household's utility function takes the form:

$$u(c) = ((c - c')^{(1-\theta)} - 1)/(1 - \theta)$$

where c is the consumption level, $\theta > 0$ (the elasticity of consumption equals the constant $-\theta$), and $c' \geqslant 0$ represents the constant subsistence level of consumption. The intertemporal elasticity of substitution in this utility function is zero when consumption is below the subsistence level, and is positive and increasing when it exceeds subsistence. It therefore implies that the poor cannot afford to save because consumption smoothing cannot occur until subsistence is met.

Like the subsistence-level argument, the life cycle hypothesis claims that income inequality positively affects private saving rates. In this model, bequests from the previous generation enable the current generation to save. In this regard, saving is concentrated among relatively few richer households who are accumulating savings in order to pass on their bequests to their sons and daughters for dynastic motives.

Galor (2000) also argues that for a country in an early stage of development, inequality would promote growth because physical capital is scarce at this stage and its accumulation requires saving. An increased share of the rich in the population would then result in higher saving and rapid growth. On the other hand, at a later stage of development, the increased availability of physical capital raises the return on investment in human capital. But, with credit market imperfections, the poor—who do not have the ability to provide collateral—may find their access to capital curtailed (Galor & Zeira, 1993; Agion & Bolton, 1997). The poor will therefore find it difficult to invest in human capital. Income inequality would then result in a poverty trap and lower growth. The credit-constrained human capital accumulation hypothesis which is discussed in detail in Section 4 (the effect of income inequality on education) is based on the notion that under imperfect information, moral hazard arises because a borrower knows more about the investment opportunity than a lender. That is, a lender absorbs all the risk after entering into a contract; from a borrower's side, a larger middle class mitigates the moral hazard problem because it increases the number of potential investors who are able to offer collateral. From the creditor's side, a larger middle class enlarges the pool of loanable funds. Thus, it reduces the

constraint on the credit market and therefore facilitates lending to the poor.

(ii) *The indirect channels via redistribution of income, social conflict, political instability, and democracy*

How does *income redistribution* affect economic growth? In the classical approach discussed above, income inequality was found to affect overall household savings positively. Hence, a redistribution of income from the rich to the poor would lower aggregate savings, which would in turn reduce investment and economic growth.

We turn next to a more realistic model which incorporates imperfect credit markets. Though the poor and the rich are assumed to possess identical preferences, their savings and investment behavior may differ because they face different institutional constraints such as credit markets. In this model, redistribution from rich to poor would stimulate growth (Agion & Bolton, 1997; Aghion & Howitt, 1998) for the following reasons: large sunk costs preclude the poor from investing in education, and entrepreneurial projects; moral hazard occurs because the more the poor must borrow to undertake investment projects, the more they must share their returns with creditors. Incentives to supply the necessary effort to ensure a high return from the investment are therefore low. In this framework, redistribution toward borrowers would result in a favorable incentive effect and consequently a positive effect on growth.

Benabou (1996a,b) argues that income inequality affects economic growth through its impact on income redistribution and political power. In this section, we explore the existing literature on how income inequality affects economic growth through the socio-political process. In other words, the following questions are addressed: does income inequality affect social conflict, political instability, and democracy? And, do *social conflict*, *political instability*, *and democracy* in turn affect economic growth? The political economy literature brings out insightful indirect relationships between inequality and economic growth.

There are three lines of argument which link inequality and growth in the context of political economy: i.e., through domestic social conflict; demand for fiscal redistribution; and democracy. We will explain these arguments in detail in Section 3 (the effect of income inequality on political conflict, and stability).

The first argument is that a highly unequal distribution of income and wealth causes social tension and increases political instability. This, in turn, raises the risk of the government repudiating contracts, and threatening the security of property rights, thereby discouraging capital accumulation. Moreover, when the gap between rich and poor widens, the latter presumably have a greater temptation to engage in rent-seeking or predatory activities at the expense of the former. This increases the number of people who engage in illegal activities that pose a threat to property rights thereby lowering economic growth (Benhabib & Rustichini, 1991; Fay, 1993). Poor countries may therefore fall into a vicious cycle of lower investment and reduced growth because they are more likely to be politically unstable (Alesina & Perotti, 1996). On the contrary, political stability, which is enhanced by the presence of a wealthy middle class has a positive effect on growth.

The second argument looks at the fiscal channel which links income inequality and economic growth. Persson and Guido (1994) construct a median-voter model where the political process and economic growth are endogenized. This channel is based on the effects of inequality on the demand for fiscal redistribution (Alesina & Rodrik, 1994; Bertola, 1993; Persson & Guido, 1994), implying an inverse relation between inequality and investment in physical capital. The demand for fiscal redistribution financed by distortionary taxation is higher in more unequal societies because the level of government expenditure and taxation results from a voting process in which income is the main determinant of a voter's preferences. In particular, in an unequal society, the poor see large gains from high taxation on the rich. Therefore, the poorer the median voter in relation to the voter with average income, the higher the equilibrium tax rate. This, in turn, leads to an inefficient tax system, distorts economic decisions, discourages investment and therefore growth.

Barro (1999) argues that it is possible that the predicted negative effect of inequality on growth can arise even if there are no transfers in equilibrium. This is because the rich may prevent redistributive policies through lobbying and buying of votes of legislators. But then a higher level of economic inequality would require more of these activities to prevent redistribution of income through the political process. The lobbying activities would consume

resources and promote official corruption. Since these effects would be adverse for economic performance, inequality can have a negative effect on growth through the political process even if no redistribution of income occurs in the equilibrium (Barro, 1999, pp. 6–7).

The last argument relates the effect of income inequality on economic growth through a process of democratization. Bourguignon and Verdier (2000) construct a model to analyze the dynamics of inequality, democratization, and economic growth. In their model, income inequality is associated with democratic institutions, and education is the growth engine and a determinant of political participation. They argue that because an increase in income inequality can intensify the threat of revolution, political elites strategically decide to promote an educated middle class to minimize the risk of revolution. Promoting an educated middle class would result in rapid human capital accumulation, and in turn accelerate economic growth. The economy may therefore shift to a new path of self-sustained growth and democratization because of the positive education externality. They also acknowledge that the omission of physical capital accumulation is the limitation of the model. Given the constraint on an economy's resources, the effect of democratization on growth might be negative if the cost of increasing human capital accumulation is greater than the benefit of reducing the rate of physical capital accumulation.

4. INCOME INEQUALITY, SOCIAL CONFLICT, AND POLITICAL INSTABILITY

As mentioned in the previous section, income inequality is regarded as the crucial factor leading to social conflict, and political instability. High inequality could lead to a lower level of democracy, high rent-seeking policies, and a higher probability of revolution. An economy could fall into a vicious cycle because the breakdown of social cohesion brought about by income inequality could threaten democratic institutions. In this section, we explore further the existing economic, sociological, and political science literature analyzing the relationship between income inequality, democracy, and political violence—first by presenting the empirical evidence before turning to a review of the causal hypotheses.

(a) The effect of income inequality on political conflict, democracy, and stability: empirical evidence

According to Alesina and Perotti (1994), there are two related definitions of democracy, and two ways to measure political instability. The two definitions of a democracy are, respectively, "a nation with regular, free, competitive (multiparty) elections"; and that democracy can be measured by "the degree of civil and economic liberties available to the population." In turn, the two measurements of political instability employ (i) socio-political events such as frequencies of riots, political demonstrations against the government and assassinations, and the death rate during political movements; and (ii) the frequency of government collapse.

A body of empirical evidence has emerged to examine the causal linkage between income inequality, democracy, and political violence. Nagel (1974), drawing on the psychological theory of social comparison,[1] postulates an inverted-U shaped relationship between inequality and political stability; when the level of inequality is relatively low, an increase in inequality intensifies social discontent and hence political instability under the ruling regime—however, when the gap between the rich and the poor becomes substantial, the poor begin to lose the framework for social comparisons. The likelihood of revolution therefore diminishes at a high level of income inequality. At the intermediate level, political instability reaches its peak.

Edward N. Muller is one of the main contributors in this area. In his 1985 paper, using a crosscountry data set spanning two decades (1958–67 and 1968–77), he found a strong positive effect of the total income share of the top 20% of households on the death rate from political violence. He also found that political violence follows a nonmonotonic, inverted-U function of regime repressiveness, which is measured by political and civil rights indices. In his 1988 papers (Muller, 1988a,b), he found inverse causal relationships between political democracy and income inequality in both directions.

Simpson (1990), using a 62 crosscountry dataset for 1965–75, finds that political democracy (measured by political democracy index (PDI)) and education enrollment levels have an inverted-U relationship with income inequality. Acemoglu and Robinson (2000)

document the historical evidence in Europe that the threat of revolution leads to the extension of the franchise (i.e. voting rights). For instance, taking an example of Britain (where the franchise was gradually extended to various parts of the population in 1832, 1867, and 1884—and finally for woman in 1928), the years preceding the electoral reforms were characterized by unprecedented political unrest and social disorder. In their model, Acemoglu and Robinson (2000) show that the extension of the franchise as a commitment device to the redistribution of the power of political elites comes from the threat of revolution, and social pressure due to an increase in inequality. Looking at the political participation channel through which voters can express their preferences for income redistribution, Milanovic (2000), using 79 observations drawn from household budget surveys from 24 democracies to test the median voter theorem, also found that countries with greater inequality of factor income redistribute more to the poor.

Does income inequality increase the risk of large-scale political violence, and civil war? An effort to explain this question would require considering a large number of factors besides income inequality such as the heterogeneity of language, ethnic origins and religion, geography, national history, and levels of education.

Collier (2000) and Collier and Hoeffler (1998) analyze the pattern of conflict using a large new dataset on civil wars during 1965–99. They found that inequality and a lack of democracy had no systematic effect on risk of a civil war, which was classified in their analysis as an internal conflict with at least 1000 battle-related deaths. On the other hand, countries which have a substantial share of their income (GDP) coming from the export of primary commodities, as well as those characterized by geographical dispersion and dominant ethnic or religious groups, were found to be more prone to conflict.

(b) *The effect of income inequality on political conflict, and stability: causal mechanisms*

As mentioned earlier, analyzing the effect of income distribution on democratic institutions is complicated by their two-way causation. If there is a large gap between the rich and the poor in a democracy, the median (representative) voter will have an increased incentive to support heavily progressive taxes or land reform policies due to greater opportuni-

ties for redistribution. Therefore, democratization leads to a direct reduction in inequality via income redistribution or an indirect reduction via education expansion. On the other hand, as mentioned before, income inequality can lead to social revolution and instability of democratic institutions. There may be however, circumstances under which an authoritarian regime may have no choice but to implement policies that reduce income inequality and poverty in its own self-interest. Indonesia is a good example; under Suharto, the survival of the regime hinged on reducing inequality, particularly between the relatively better off center (Java) and the poorer periphery (the outer Islands). Poverty alleviation was also crucial in discouraging a revival of radicalism among the rural population.

There are two main hypotheses on the effects of income inequality on political violence: (i) the relative deprivation hypothesis, and (ii) the resource mobilization hypothesis (Muller, 1985). The relative deprivation hypothesis argues that there exists a direct relationship between various kinds of deprivation-induced discontent and collective political violence. Discontent is not, however, generated from inequality *per se* but rather from the gap between an individual's expected and achieved well-being. This hypothesis is difficult to test empirically because it requires qualitative data. Once this information is gathered, the use of polarization measures may be appropriate. In contrast, the resource mobilization hypothesis argues that the central explanatory variable is the organization of discontent, i.e., the extent to which dissident groups are able to acquire control of the resources necessary to develop strong and effective organizations for obtaining collective goods. The land maldistribution hypothesis developed from this approach is based on the assumption that discontent resulting from a highly concentrated distribution of land and/or lack of land ownership in agrarian societies is an important direct cause of mass political violence. Gamson (1975), Oberschall (1973), and Tilly (1978) reject this reasoning, claiming that inequality and discontent are present in almost every society; thus, the most direct and influential explanatory factor must not be discontent *per se* but rather the organization of discontent.

Muller and Seligson (1987) argue that theories emphasizing land maldistribution as a fundamental precondition of insurgency and revolution are misspecified, claiming that these

theories attribute direct causal significance to an inequality variable that plays only a relatively small and indirect part in the generation of mass political violence. Instead, Muller and Seligson (1987) point to inequality in the distribution of income rather than land as the more important and direct cause of variation in rates of political violence across countries.

Collier (2000, pp. 3–4) argues that inequality does not lead to civil wars. Civil wars occur where rebel organizations are financially viable. In his paper, he states that

> In the economist's view of conflict, grievance will turn out to be neither a cause of conflict, nor an accidental by-product of it. Rather, in a sense grievance is deliberately generated by rebel organizations... The economic theory of conflict argues that the motivation of conflict is unimportant; what matters is whether the organization can sustain itself financially. It is this, rather than any objective grounds for grievance which determine whether a country will experience civil war.

5. INCOME INEQUALITY AND EDUCATION

Wide income disparities tend to coexist with underinvestment in human capital, that translates into lower long-run economic growth. The empirical evidence suggests that there is a high correlation between income and educational levels, as well as between income and educational inequalities. The issue that needs to be investigated is how these variables affect, in turn, economic growth.

Thomas, Wang, and Fan (2000) approach this question by reinterpreting income as years of schooling. The justification for this is that a lack of education leads directly to lower incomes, and thus lower aggregate savings and investment. Conversely, education raises incomes and promotes growth because it helps to unleash the productive potential of the poor. An overly skewed distribution of education tends to have a negative impact on per capita income in most countries (Lopez, Vinod, & Yan, 1998). A greater equity in the distribution of educational opportunities enables the poor to capture a larger share of the benefits of economic growth, and in turn contributes to higher growth rates. In contrast, large-scale exclusion from educational opportunities results in lower economic growth and persistent income inequality.

In this section, we focus on the relationship between income inequality and education. The importance of education for economic growth is well known. In addition to its impact on earning power, schooling is seen as a social equalizer. Before analyzing the relationship between these two variables, the distribution of education across countries is reviewed. Thomas et al. (2000) estimated Gini coefficients of education attainment for 85 countries and found significant differences in the distribution of education across countries over 1960–90. Moreover, they found that education inequality as measured by "education Gini" is negatively correlated with the average years of schooling in a country. This implies that countries with higher levels of educational attainment are most likely to achieve equality in education than those with lower levels of attainment.

Over 1960–90, Gini coefficients of education have fallen, indicating rising educational equality in most countries—but large differences still persist. Over this period, Korea achieved the most rapid decline in the education Gini coefficient, which fell from 0.55 to 0.22. Afghanistan and Mali had the least equitable distributions in the 1990s, with education Gini coefficients of ≈0.90, while the US and Poland revealed the most equal distributions of educational attainments with Gini coefficients of ≈0.1.

(a) The effect of income inequality on education: empirical evidence

Income and education distribution variables are almost perfectly correlated. To put it differently, illiterate people and the poor are synonymous. Empirically, there are four types of education variables used in explaining the income distribution:

> (1) A flow variable of education such as enrollments at different levels of education, (2) a stock variable of education such as the mean or median years of schooling of the labor force, (3) the rate of return on education at different levels of education, and (4) the dispersion of educational attainment (Park, 1996, p. 52).

A large body of empirical research has been conducted on the effect of education on income inequality. For example, Knight and Sabot (1983) observe that there are two effects of educational expansion on income inequality: the composition effect, raising the earnings of those who are more educated, tends to increase income inequality, and the wage compression effect, which follows the expansion of

the educated labor supply relative to demand, tends to decrease income inequality. Using a cross-section data from 59 countries, Park's (1996) econometric results show that a higher level of educational attainment in the labor force has an equalizing effect on income distribution. The larger the dispersion of schooling among the labor force, the greater the income inequality. Using the dataset of Deininger and Squire (1996) and the "world income inequality dataset" (WIID), Checchi (2000) finds that average years of education have a strong negative effect on income inequality.

Less empirical research has been done on the reverse effect of income (or wealth) inequality on education. Deininger and Squire (1998) show that initial inequality in landholdings can help predict both income growth and changes in income inequality. Land inequality also reduces average years of education in their regressions. They explain this evidence by referring to liquidity constraints on educational access. Using US data from the panel study of income dynamics (PSID) for 1970–90, Mayer (2000) finds that a one standard deviation increase in income inequality as measured by the Gini coefficient results in a 10% decline in high school graduation, and a one standard deviation increase in inequality results in a 40% increase in college graduation. But, Acemoglu and Pischke (2000) analyzed the behavior of college enrollments across US states, and do not find any evidence to support the notion that enrollments increase more in states where wage inequality and returns to schooling rises more substantially.

(b) *The effect of income inequality on education: causal mechanisms*

The theories underlying the effect of income inequality on education can be derived from research on the costs and benefits of education. There are two main mechanisms underlying these theories: the price mechanism in the labor market, and the social comparison mechanism. According to the first mechanism, the equilibrium wage rate is derived directly from the demand for and the supply of labor. The second mechanism works through the interpersonal comparisons between the rich and poor, and is characterized by two additional theories: relative deprivation, and role models.

The relationship between education and income equality is linked to the economic returns associated with education. Consider the present

situation where the nature of technological change and the globalization trend are manifested by a rapidly increasing relative demand for technologically skilled workers. If the demand for unskilled labor is contracting, or growing at a slower rate than the demand for skilled labor, then wage inequalities will increase. The gap between rich and poor will then start to widen. Income inequality will continue to grow until the supply of new college graduates depresses the return on schooling. Moreover, as mentioned earlier, if there is a large disparity in the educational opportunities between the rich and the poor, the benefits of economic growth are mainly captured by educated workers. This, in turn, exacerbates income inequality.

The main reason for underinvestment in education is that credit markets are imperfect. The poor possessing little or no collateral, in the setting of a developing country, are practically sealed off from the formal credit market. Poor households are constrained for cash and, as they are unable to borrow, have a hard time sending their children to school or keeping their children in school. These stylized conditions lead to a vicious cycle where initial inequality and poverty result in underinvestment in education among the poor which further exacerbate inequality.

A household's demand for education is not, however, only a function of household income and household access to borrowing. It is also a function of expected returns to the family from schooling, in the form of higher future income for educated children (Birdsall, 1999).

Thus *ceteris paribus*, as the investment rate of return to education rises, parents would have stronger incentives to send their children to school, and thus have a greater demand for quality education. Their willingness to pay for their children's education would rise, thereby resulting in a higher level of educational attainment in the population.

On the supply side of skilled labor education may act as a signal because of imperfect information (Spence, 1974). That is, a greater share of highly educated workers within a cohort may signal to the employers that those with less education have lower ability, and hence the latter's earnings may be reduced accordingly. This may also lead to larger earnings inequalities between high and low education workers.

The nature of the political process may also affect the relationship between education and income inequality.

When the distribution of income is highly unequal, the provision of subsidized basic education to a large segment of the school-age population implies a relatively large tax burden on the rich. High income families are likely to resist. One result can be the underfunding of education—and the decline in quality described above. A second result can be the channeling of public subsidies to higher-education institutions where the children of wealthier families are more likely to be the beneficiaries (Birdsall, 1999, p. 20).

Inequality may affect voters' willingness to support redistributive policies which could affect the tax rate (Perotti, 1996; Alesina & Rodrik, 1994). Likewise, high levels of inequality may encourage the rich to enroll their children in private schools, making them less interested in supporting public schools.

The general consensus among social scientists, economists and policy makers is that inequality is socially costly (Acemoglu, 2001, p. 5).

We now turn to the theories of social comparison: relative deprivation, and role models As Mayer (2000, pp. 6–7) point out:

Relative deprivation theory holds that high levels of inequality make the poor feel worse off, thereby increasing their alienation and stress (Jencks & Mayer, 1990). One version of this hypothesis is that children feel deprived when they cannot have the same material possessions as other children in their school or neighborhood. Another version is that relative deprivation can also make poorer parents feel stressed and alienated, lowering their expectations for their children or reducing the quality of their parenting (McLoyd, 1990). The role model hypothesis holds that children model their behavior on the behavior of those around them. Role models can either be positive or negative... If children are more influenced by negative than positive role models, increasing inequality could thus reduce the frequency of behavior that parents usually promote.

6. INCOME INEQUALITY AND HEALTH

A large body of empirical evidence (Preston, 1975; Pritchett & Summers, 1996; Adler, Boyce, Chesney, Folkman, & Syme, 1993) supports that, other things being equal, the level of income has positive effect on health. The mechanism of this association is straightforward.

Income directly affects health because it influences individuals' consumption of commodities that affect their health or cause malnutrition. Recently, however, there has been great interest in understanding the relationship between income inequality and health *per se* among economists, sociologists, and other researchers. Some studies have examined the effects of income inequality on individuals' health differences, health at the societal level, and crosscountry (or crossstate) variations in health. In this section, we will explore the existing evidence regarding the effect of income inequality on the average level of health in the population. We will also investigate the mechanisms of such an association by drawing on existing theories in economics, psychology, and political science.

(a) *The effect of income inequality on health: empirical evidence*

Preston (1975) attempts to characterize the crosscountry relationship between life-expectancy and income per head. The concavity of this relationship among the poorest countries means that increases in average income are strongly associated with increases in life expectancy; however, the relationship grows weaker as income per head rises. There is no strong relationship between these two variables in richer countries. Preston therefore argues that the level of income strongly affects health in low-income countries, but weakly affects health in rich countries. His analysis suggests that the health of individuals in a society depends on the degree of income inequality in that society. This negative effect of income inequality on health becomes more important in a richer society.

Empirical evidence suggests that there is high correlation between income inequality and health indicators (e.g., morbidity, mortality) across countries, and within countries and communities (Wilkinson, 1996; Kaplan, Pamuk, Lynch, Cohen, & Belfour, 1996; Kennedy, Kawachi, & Prothrow-Stith, 1996; Lynch, Kaplan, & Pamuk, 1998). Kennedy *et al.* (1996) and Kaplan *et al.* (1996) have also suggested that income inequality predicts excess mortality within individual countries after controlling for the level of income. Kennedy *et al.* (1996) result shows that, at the state level, income inequality in the US was strongly correlated with total mortality rates even after controlling for median income, poverty rates, smoking prevalence, and race. Kawachi, Levine, Miller,

Lasch, and Amick (1994) carried out an analysis of income inequality in the US and its relation to social capital, as defined by levels of civic trust and density of associational membership. Their data on social capital were obtained from 39 states in a survey conducted by the National Opinions Research Center between 1986 and 1990. Their result suggests that: a low level of civic trust was highly correlated with the degree of income inequality in each state, and density of associational life, as gauged by the per capita membership in such organizations as church groups and sports clubs was correlated with income inequality. In turn, both the degree of civic distrust and density of associational life were strongly correlated with overall mortality.

Judge, Mulligan, and Benzeval (1998, see Table 1, pp. 570–571) summarize 12 studies examining the relationship between measures of income inequality and average levels of population health across developing and developed countries. Ten out of 12 studies in their summary found some evidence of an association between income inequality and average levels of population health. Using selected health indicators derived from the World Bank data (life expectancy and infant mortality), as well as income distribution indicators from Atkinson, Rainwater, and Smeeding (1995), they found that income inequality was not a significant determinant of average population health in rich industrialized countries. They did remain convinced, though, that at the individual level, low incomes are associated with poor health and that the overall shape of the income distribution might be expected to influence average national health.

Gravelle, Wildman, and Sutton (2000), using income inequality data for 75 countries from the Deininger and Squire (1996) and World Tables for 1980–82 and 1989–90, found that the estimated relationship between income inequality and life expectancy is dependent on the dataset used, the functional form estimated and the way in which the epidemiological transition is specified. The association is insignificant in all of their models. They argue that these results do not disprove the relationship between income inequality and health, but aggregate level studies are incapable of distinguishing between the direct effect of income inequality on individual health and nonlinearity in the individual health–income relationship. There are serious methodological difficulties in using aggregate cross-sections as means of testing hypotheses about the effect of income inequality on individuals' health.

(b) The effect of income inequality on health: causal mechanisms

We have learned from the empirical evidence that income has a positive and direct effect on health. This empirical evidence is supported by the absolute income hypothesis. There is a two-way causality between these two variables: low income leads to poor nutrition, and poor health reduces earnings potential. A different pathway between incomes and health has been proposed by Wilkinson (1996). He argues that income inequality per se has a negative effect on health. He also argues that individuals who live in a more unequal society have a higher probability of death. This is the so-called relative income hypothesis. In spite of the evidence presented above, however, Deaton (2001) finds that while income inequality is important, there is no conclusive evidence that it poses a direct risk to individual health because of the following mechanisms: (1) a nonlinearity between income level and health, (2) redistribution of income through public goods and the "urban bias," (3) psychosocial stress, and (4) relative deprivation. These mechanisms are discussed in detail below.

First, we have learned from the absolute income hypothesis that poverty is what drives mortality. As a result, income has a much bigger effect on health at lower rather than higher levels of income. Deaton (2001) argues that the nonlinear nature of this income effect may explain why income is less important to health in rich countries.

Second, "income inequality may make it more difficult for people to agree on the provision of public goods such as health, water supply, waste disposal, education, and police (Deaton, 2001, p. 22). A highly skewed income redistribution may reduce the provision of public goods and therefore worsen health. Moreover, differential access to resources and services, and unequal treatment between the rich and the poor may result in less effective preventive health care (e.g., childhood vaccinations), and more costly disease control (e.g., tuberculosis treatments).

Third, Wilkinson (2000) argues that psychosocial stress (level of depression, isolation, insecurity, and anxiety) is another pathway through which inequality affects health. "Equality is seen as a precondition for the existence of stress-reducing networks of friend-

ships, while inequality and relative deprivation are seen as compromising individual dignity, and promoting shame and violence'' (Deaton, 2001, p. 27).

Finally,

> The relative deprivation theory of mortality risk has three important implications: (i) within groups, mortality risk is a convex and declining function of income; (ii) conditional on an individual's relative income, inequality matters for individual health; and (iii) for groups, mortality risk is independent of group income, but is directly related to the Gini coefficient (Deaton, 2001, p. 29).

A reduction in deprivation (through, e.g., land ownership, democratic rights, women's agency) may therefore also lead to improved health in the population contributing to relief from ill-health.

7. INCOME INEQUALITY AND CRIME

The effect of income inequality on violence at the macro level (political conflict, and civil war) was discussed in Section 4. We now turn to the effect of income inequality on violence at the micro-level. Income inequality has also been found to affect such behavioral outcomes as higher rates of homicide and violent crime (Wilkinson, Kawachi, & Kennedy, 1998).

(a) *The effect of income inequality on crime: empirical evidence*

Conventional wisdom maintains that income inequality has a positive effect on crime, but the effects of income inequality on property crime should be distinguished from those on violent crime.

Fleisher's (1996) econometric results show that the size of the difference between the average income of the second lowest quartile and that of the highest quartile of households tends to increase city arrest and court-appearance rates. But, the coefficient became statistically insignificant when the regressions were run for high-income communities alone. Ehrlich (1973) uses an income distribution variable to capture the opportunity costs of crime and finds it to have a positive and statistically significant effect on crime. That is, individuals at the lower end of the income distribution will be more prone to commit a crime because the cost in terms of legal income forgone is quite low. Similar to

Fleisher's (1996) results, Ehrlich found that a measure of income inequality—the percentage of families below one-half of the median income—was associated with higher crime rates.

This argument does not, however, establish a causal link between income inequality and crime *per se*, but instead uses inequality as a proxy for the opportunity cost of crime. Using a dataset of crime rates for a large sample of countries for 1970–94 based on information from the United Nations World Crime Surveys, Fajnzylber, Lederman, and Loayza (1998) show that income inequality has a positive effect on crime rates, both on intentional homicide and robbery. Moreover, they show that the level of income per capita is not a significant determinant of national crime rates.

There are some caveats in the literature, however. Using data from all metropolitan counties and FBI uniform crime reports in 1991, Kelly (2000) finds that income inequality has no effect on property crime, but has a strong and robust impact on violent crime, with an elasticity above 0.5. In contrast, poverty and police activity have significant effects on property crime, but little on violent crime. Crimes against persons as well as property crimes are correlated with poverty. To distinguish the effects of inequality from those of poverty, Kelly includes several measures of deprivation—unemployment and poverty rates, percentage of the nonwhite population, and percentage of female-headed families—in the regressions. Police expenditure per capita is used as a measure of the deterrent effect of police activity. Ultimately, the differing effects of inequality on property and violent crime are extremely robust, with similar patterns of significance obtained whether inequality is measured using income or education, and regardless of the combination of other explanatory variables used. Doyle, Ahmed, and Horn (1999) also estimate a model of property crime using panel data for the US for 1984–93, finding that income inequality has no independent effect on crime rates. They did find strong evidence, however, that favorable labor market conditions have significant and negative effects on both property crime and violent crime.

(b) *The effect of income inequality on crime: causal mechanisms*

The relationship between income inequality and crime can be described by three branches of theories: (i) Becker's (1968) economic theory of

crime, (ii) Merton's (1938) strain theory, and (iii) Shaw and McKay's (1942) social disorganization theory. Property crime is well explained by Becker's economic theory of crime, while violent crime is explained more by strain and social disorganization theories.

In the Becker's economic theory of crime, legal wages represent the opportunity cost to crime. In his Nobel lecture, Becker (1993, p. 390) emphasized that

> Rationality implied that some individuals become criminals because of the financial and other rewards from crime compared to legal work, taking account of the likelihood of apprehension and conviction, and the severity of punishment.

Becker's (1968) model was developed further by Ehrlich (1973); the latter argued that payoffs to crime, especially property crime, depend primarily on the "opportunities provided by potential victims of crime" (Ehrlich, 1973, p. 538) as measured by the median income of families in a given community. In other words, the level of legal income expected by an individual includes the income level of potential victims. The higher this level, the higher the incentive to commit crimes, particularly crimes against property. Thus, for a given median income, income inequality can be an indication of the differential between the payoffs of legal and illegal activities.

Fleisher (1996) was a pioneer in the study of the effects of income on individuals' decisions to commit criminal acts, that

> The principal theoretical reason for believing that low income increases the tendency to commit crime is that... the probable cost of getting caught is relatively low... because (when low-income individuals) view their legitimate lifetime earning prospects dismally they may expect to lose relatively little earning potential by acquiring criminal records; furthermore, if legitimate earnings are low, the opportunity cost of time actually spent in delinquent activity, or in jail, is also low (Fleisher, 1996, p. 120).

Income inequality also reduces social capital, e.g., the degree of trust and mutual support among individuals. Since incarceration entails loss of income, individuals with low earnings potential have a greater incentive to take the risk of committing burglary, a lower opportunity cost if caught, and a higher utility if successful (Chiu & Madden, 1998). The net benefit of contemplated crime for an individual against another person can be modeled as proportional to the income difference between them (within a community, the average of such incentives over all people is the Gini coefficient of income—Deaton, 2001). Moreover, this model shows how low-income individuals' incentives to commit crime increase if the gap between the rich and the poor is greater.

In sum, the basic assumptions from the above models are that potential criminals act rationally, basing their decision to commit a crime on an analysis of the costs and benefits associated with a particular criminal act. There are two key factors that affect individual career choices: the probability that criminals get caught, and the relative returns to legitimate alternatives. Although the individuals are risk neutral, they will commit a crime whenever its expected net benefits are large enough. Increases in relative differential inequality rises the level of crime because the alternative to crime is less attractive for criminals, and the potential proceeds from crime are greater.

A rise in inequality may also have a crime-inducing effect by reducing the individual's moral threshold through a so-called "envy effect". Therefore, a rise in inequality will have a positive impact on individuals' propensity to commit a crime.

As Kelly (2000, p. 530) points out,

> Strain theory argues that, when faced with the relative success of others around them, unsuccessful individuals feel frustration with their situation. The greater the inequality, the higher this strain, and the greater the inducement for low-status individuals to commit crime. Social disorganization theory argues that crime occurs when the mechanisms of social control are weakened. Factors that weaken a community's ability to regulate its members are poverty, racial heterogeneity, residential mobility, and family instability. In this case, inequality is associated with crime because it is linked to poverty-areas where high inequality tends to have high poverty rates.

NOTES

1. Nagel (1974, p. 454) refers to Festinger's theory of social comparison which states that "The tendency to compare oneself with some other specific person decreases as the difference between his opinion or ability and one's own increases."

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APPENDIX A
WORLD INEQUALITY INDICATORS
(MILANOVIC, 2001, PP. 12–15)

Mathematically, these three indicators can be represented as follows:

$$\text{GINI} = \sum_{i=1}^{n} G_i p_i \pi_i + \sum_{i}^{n} \sum_{j>i}^{n} \frac{(y_j - y_i)}{y_i} \pi_i p_j + L$$

$$= \sum_{i=1}^{n} G_i p_i \pi_i + \frac{1}{\mu} \sum_{i}^{n} \sum_{j>i}^{n} (y_j - y_i) p_i p_j + L$$

where G_i = Gini coefficient of country i, p_i = country i's population share (in total world population), π_i = country i's share of world income, μ = mean world income,

$$\sum_{i=1}^{n} G_i p_i \pi_i = \text{weighted sum of within-country}$$
$$\text{inequalities}$$

$$\sum_{i}^{n} \sum_{j>i}^{n} \frac{(y_j - y_i)}{y_i} \pi_i p_j = \text{between-country}$$
$$\text{inequality}$$

L = residual (overlapping component); it takes into account the possibility that an individual living in a richer country may have an income lower than that of an individual in a poorer country.

The Gini coefficient for the first measure is

$$\frac{1}{\mu_1} \frac{1}{n^2} \sum_{i}^{n} \sum_{j>i}^{n} (y_j y_i)$$

where μ_1 is mean unweighted world income.

The Gini coefficient for the second measure is

$$\frac{1}{\mu} \sum_{i}^{n} \sum_{j>i}^{n} (y_j - y_j) \pi_i p_j + L$$

The Gini coefficient for the third measure is

$$\sum_{i=1}^{n} G_i p_i \pi_i + \frac{1}{\mu} \sum_{i}^{n} \sum_{j>i}^{n} \frac{(y_j - y_i)}{y_i} \pi_i p_j + L$$