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**The effects of wealth and gender
inequality on economic growth:
A survey of recent empirical studies**

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The effects of wealth and gender inequality on economic growth: A survey of recent empirical studies

David Kucera¹

1. Introduction

One objective of the International Institute for Labour Studies' Decent Work research programme is to evaluate whether and how there are trade-offs or complementarities among the four Decent Work pillars: fundamental rights at work, employment and income opportunities, social dialogue, and social protection. Within this broader objective is a focus on the effects of fundamental rights at work on employment and income opportunities. One component of this was the construction of country-level indicators of fundamental rights at work. Qualitative indicators were constructed by coding textual sources, and quantitative indicators were derived from more readily available data sources. These indicators address aspects of freedom of association and collective bargaining, child labour, forced labour, and discrimination and inequality in employment and occupation. The qualitative indicators were constructed for the 1990s but are more difficult to construct for earlier years, given the poorer quality or outright unavailability of key textual sources. These indicators can be useful in the analysis of those aspects of employment and income opportunities that lend themselves to study via contemporaneous cross-country econometric models. For instance, a study was undertaken that addressed the effects of fundamental rights at work on labour costs and flows of foreign direct investment (Kucera, 2001). But given their limited availability over time, these indicators are not useful in addressing aspects of employment and income opportunities for which one must consider more long-run variation.

Key among these aspects of employment and income opportunities is economic growth. Economic growth is generally defined as an increase in per capita national income, that is, average income per person in a country. This definition holds for all the studies surveyed in this paper. Economic growth should thus be central to considerations of employment and income opportunities. As such, it was thought useful to undertake a series of papers that could shed light on the effects of fundamental worker rights and core labour standards on economic growth. The first of these papers was a literature survey by Galli titled "The Economic Impact of Child Labour" (2001). Following along these lines, the present paper provides a survey of recent macro-econometric studies on the effects on growth of wealth inequality (as indicated by income and land distribution) and gender inequality in education and earnings.

As regards worker rights, inequality is linked to both discrimination as well as the structure of collective bargaining. The ILO tends to use a very broad definition of discrimination. This is apparent from Convention 111, titled "Discrimination (Employment and Occupation)," one of the key conventions undergirding "fundamental rights at work." Convention 111 states:

For the purpose of this Convention the term *discrimination* includes...any distinction, exclusion or preference made on the basis of race, colour, sex, religion, political opinion, national extraction or social origin, which has the effect of nullifying or impairing equality of opportunity or treatment in employment or occupation...For the purpose of this Convention the terms *employment* and *occupation* include access to vocational training, access to employment and particular occupations, and terms and conditions of employment [italics in original].

¹ For their valuable comments, thanks to Rossana Galli, Rolph van der Hoeven, and the participants of the Institute's "Decent Work" research meeting, held in Geneva on May 29-30, 2001.

The references to “equality of opportunity” and “access to vocational training” are worth noting, for several of the hypothesized links between inequality and growth are through such causal channels, particularly as regards educational opportunities and the contribution of human capital development to economic growth. Also relevant to both overall earnings inequality and gender earnings inequality is the structure of collective bargaining, particularly the centralization of wage setting. For more centralized structures of wage setting are associated with less earnings inequality among industries and firms as well as narrower gender earnings gaps, at least in studies of richer countries (Blau and Kahn, 1995). Thus insights into the effects of collective bargaining on growth can be gleaned, to an extent, through an understanding of the effects of inequality on growth (though collective bargaining structures might affect growth through multiple and offsetting causal channels).

This paper is structured as follows. Section 2 describes competing hypotheses of how wealth inequality has been argued to affect growth and then surveys recent macro-econometric studies on these issues. This section also briefly addresses recent work arguing that policies relating to the inequality-growth relationship be informed by implications for poverty reduction, in particular by considerations of how a given rate of growth can more rapidly reduce poverty in more egalitarian societies and how alternative growth-redistribution scenarios vary in their effectiveness in reducing poverty (van der Hoeven, 2000; Dagdeviren, van der Hoeven and Weeks, 2001). Section 3 surveys literature on the effects of gender inequality in education and earnings on growth and section 4 concludes.

2. Wealth inequality and growth

Competing hypotheses and contrary empirical evidence characterize the study of the effects of wealth inequality on growth. The competing hypotheses can be put into four categories relating to the median voter theorem, undeveloped credit and insurance markets, social instability, and savings rate effects on investment. Each of these is considered in turn, followed by a summary of recent macro-econometric studies.

The median voter theorem. The median voter theorem addresses the macroeconomic effects of redistributive taxes depending on the extent to which median income is less than mean income. Alesina and Rodrik describe this as follows:

The median voter theorem, according to which the tax rate selected by the government is the one preferred by the median voter, provides a useful benchmark.... The more equitable is distribution in the economy, the better endowed is the median voter with capital. Consequently, the lower is the equilibrium rate of capital taxation, and the higher is the economy’s growth (Alesina and Rodrik, 1994, p. 466).

Alesina and Rodrik’s interpretation of the median voter theorem suggests a negative relationship between initial inequality and subsequent growth, with taxation lower and thus growth higher in more equal countries. However, insofar as greater equality is the outcome of prior redistributive taxation, one might also expect a positive relationship between inequality and growth, a carry-over effect of such supposedly growth-thwarting taxation (Barro, 2000, pp. 6-7). In addition, if higher tax rates resulting from inequality are spent on boosting a country’s developmental capabilities, such as through spending on education or infrastructure, then this might also lead one to expect a positive relationship between inequality and growth (Forbes, 2000, p. 870). Worth noting is that the hypothesized effects of inequality on growth depends critically on the span of years considered as well as the lag between initial inequality and subsequent growth, with short-run and long-run effects possibly pointing in opposite directions. For instance, negative effects through taxation may be immediate, whereas positive effects

through education spending are likely to manifest themselves more in the long run, as those receiving education make their way into the workforce.

It turns out that there is fair amount of empirical evidence against the median voter theorem hypothesis of the inequality-growth relationship. One implication of the median voter theorem is that it ought to apply more strongly to democracies than non-democracies. While Persson and Tabellini (1994) found a more strongly negative relationship between initial inequality and subsequent growth in democracies than non-democracies, this result was not consistently reproduced by subsequent studies. Indeed, both Larrain and Vergara (1998, pp. 134-136) and Deininger and Squire (1998, pp. 272-273) find the opposite result, with the negative relationship holding more strongly for non-democracies than democracies. Another piece of evidence against the median voter theorem regards the relationship between redistributive taxes and growth. Contrary to the assumptions of this hypothesis, studies on this relationship generally find that countries with higher redistributive taxes (measured by tax rates and transfer payments) tend to grow more rapidly (Perotti, 1996, p. 170; Bénabou, 1996, p. 51; Aghion, Caroli and García-Peñalosa, 1999, p. 1619). In addition, studies find mixed results on the relationship between inequality and redistributive taxes (Bénabou, 1996, p. 51; Tanninen, 1999, p. 1114). Barro provides one possible explanation for these last findings, writing, "If more economic resources translate into correspondingly greater political influence, then the positive link between inequality and redistribution need not apply" (Barro, 2000, p. 7).

Undeveloped credit and insurance markets. Undeveloped credit and insurance markets are also hypothesized to mediate the relationship between inequality and growth. One argument made is that in countries with more unequal wealth distribution, especially less developed and more rural countries, there will be a larger share of poor persons without the means to finance investments – especially investments in education and human capital and agricultural land and equipment – and thus slower economic growth.

The mediating link through education and human capital on both short- and long-run growth is developed in a theoretical model by Galor and Zeira (1993). The authors' results are based on two main assumptions: first, the imperfection of credit markets and, second, the indivisibility of investments in human capital. The first assumption underlies the result that inequality is negatively related to growth in the short-run and the two assumptions together underlie the result that inequality is negatively related to growth in the long-run.

Deininger and Squire also emphasize the importance of education and human capital development as a mediating link between credit constraints and growth. They provide two pieces of indirect evidence to support this argument. First, that land inequality in richer countries (the OECD region) is not found to deter growth, as poverty in these countries tends not to be of such severity to deter school attendance. Second, countries with greater inequality in land distribution tend to have lower school attendance (Deininger and Squire, 1997, pp. 40-41; 1998, p. 273). The evidence is indirect in that one can potentially account for it without reference to credit markets. In particular, the argument that credit constraints hinder growth more in countries with greater inequality is premised on the idea that there tends to be a higher share of poor persons in such countries. But poverty itself, with or without developed credit markets, may well be the more immediate cause of low school attendance (and lesser human capital development more generally), both because educational opportunities may be fewer and of lower quality in regions where the poor are concentrated (such as rural communities or poor areas in cities) and because poor parents tend to be more reliant on the work of their children, and such work may interfere with children's school attendance or with their having the time and energy to do homework. A related point is that the costs of sending children to school (including forgone earnings from children's work) may be largely private, borne by families, whereas many of the benefits of education are public, accruing to society as a whole.

Another possible way that undeveloped credit and also insurance markets can constrain growth is through hindering productive investments in agricultural land and equipment. In traditional agricultural production, economies of scale tend not be important, and family-owned farms tend to be most efficient (Bardhan, 1996, p. 1349; Bénabou, 1996, p. 19). Thus credit that enables farmers to buy land and equipment is likely to boost productivity. As Bénabou writes, “it appears to be a robust finding that credit rationing and the lack of adequate insurance significantly constrain the investments of farmers away from profit-maximizing levels and compositions” (Bénabou, 1996, p. 19). Insurance markets are relevant in the context of greater inequality in that they enable the undertaking of higher risk but potentially more productive investments (Bardhan, 1996, p. 1346). Partly because of difficulties in measuring the extent to which credit and insurance markets are developed, much of the evidence on these causal linkages is roundabout or anecdotal (Bénabou, 1996, pp. 18-19).

These considerations point to negative effects of inequality on growth in the context of undeveloped credit markets, but there may also be positive effects. For in the absence of developed credit markets, large-scale investments are arguably more readily financed when there are greater concentrations of wealth (Aghion, Caroli and García-Peñalosa, 1999, p. 1620). The impact of large-scale investments on growth is particularly important when production is characterized by economies of scale.

Social instability. The third hypothesis as to why inequality hinders growth is that inequality causes social instability that in turn impedes growth. This hypothesis is well-described by Alesina and Perotti in their study of these issues (Alesina and Perotti, 1996, p. 1204):

Income inequality increases social discontent and fuels social unrest. The latter, by increasing the probability of coups, revolutions, mass violence or, more generally, by increasing political uncertainty and threatening property rights, has a negative effect on investment and, as a consequence, reduces growth.

Empirical studies addressing these issues generally measure social instability in two ways: first, by indices based on counting the incidence of various events argued to reflect social instability, such as the number of strikes, protests, and changes of government; and second, through measures of country risk (economic and political) such as those produced by Standard and Poor’s and Institutional Investor for international investors (Bénabou, 1996, p. 31). The empirical relationship between these measures and economic growth appears clearcut, showing a consistently negative effect of social instability on growth (Alesina and Perotti, 1996; Perotti, 1996, pp. 175-176; Bénabou, 1996, p. 51).

Banerjee and Duflo hypothesize a non-linear relationship between growth and changes in (rather than levels of) inequality, in particular that growth is an inverted U-shaped function of changes in inequality (Banerjee and Duflo, 2000). Their reasoning is related to the social instability hypothesis, but the authors argue that all changes in inequality — that is, all redistribution — is potentially destabilizing, whether it leads to more or less inequality. The authors write that the linearity assumption of prior studies “is a natural consequence of assuming that the main cost of redistribution comes from the waste that results from high taxation. Our view, by contrast, is that redistributing a significant amount in either direction is almost always costly, since it usually comes with some degree of upheaval” (*ibid.*, p. 9). Here the authors refer to the more immediate impact of redistribution on growth, negative whether redistribution increases or decreases inequality. However the authors also argue that the more long run impact on growth of reducing inequality may well be positive, for instance if such redistribution is used to finance education spending and thus contribute to human capital development (*ibid.*, p. 10).

Savings rate effects on investment. It has also been argued that since the rich tend to save at a higher rate than the poor, a greater concentration of wealth in the hands of the rich tends to translate into higher average rates of savings and investment in the economy as a whole (Aghion, Caroli and García-Peñalosa, 1999, p. 1620; Barro, 2000, p. 8). This argument augments that regarding the more ready financing of large-scale investments in the context of greater inequality and undeveloped credit markets, with both arguments pointing to a positive relationship between inequality and growth. These notions underlie what Aghion, Caroli and García-Peñalosa describe as “The traditional view in economic theory...that there is a fundamental *trade-off* between productive efficiency (and/or growth) and social justice,” meaning, by “social justice,” wealth equality (Aghion, Caroli and García-Peñalosa, 1999, p. 1620).

Whether higher rates of savings translate into higher rates of investment depends, though, on aggregate demand, and inequality can affect aggregate demand. In particular, a greater concentration of wealth in the hands of the rich can either dampen or boost aggregate demand, depending on whether a country is in a scenario of “wage-led” or “profit-led” growth. Three factors determining these contrasting scenarios are described by Blecker and are worth quoting at length, as they represent a less-commonly discussed dimension of the effects of inequality on growth.

Underconsumptionism. The greater is the difference between the savings rates out of profit and wage income, the more likely such a system is to be wage-led. Narrowing the gap between these two savings rates makes the system more likely to be profit-led. *The investment function.* A strong accelerator effect (usually modeled as the response of the desired accumulation rate to the utilization rate) makes a system more likely to be wage-led. In contrast, a strong profitability effect (the response of the desired accumulation rate to the profit share) makes a system more likely to be profit-led. *International competitiveness.* Exposure to strong international competition implies that rising wages (adjusted for productivity) tend to reduce net exports, thus slowing growth; this tends to make the economy more likely to be profit-led since a wage cut (or a devaluation) is expansionary. Insulation from competitive pressures, either through protectionism or other means, makes a wage-led outcome more likely (Blecker, 1996, pp. 24-25).

The four above sets of hypotheses suggest the possibility of both positive and negative effects of wealth inequality on growth, partly depending on short-run versus long-run considerations. Addressing the varying importance of these effects is therefore largely an empirical question.

Empirical evidence. Though fleeting, the 1990s saw something of a turnabout in what Aghion, Caroli and García-Peñalosa call the “traditional view” of the inequality-growth trade-off, largely on the basis of contrary empirical evidence. With the development of more comparable cross-country datasets, a number of studies examined the effects of inequality on growth via cross-country econometric models of economic growth. These studies most often look at initial inequality in the 1960s as a determinant of subsequent growth up to the mid-1980s or early-1990s — that is, they looked at long-run relationships. Using measures of income inequality and inequality in land distribution as proxies for wealth inequality, a consistent, if not altogether statistically robust, finding of these studies is that countries with less initial inequality tended to grow more rapidly than those with more initial inequality (Bénabou, 1996, p. 51; Aghion, Caroli and García-Peñalosa, 1999, p. 1617). Bénabou, for instance, surveys twelve studies that come to this conclusion. Regarding the consistency of these findings and the magnitude of the effect, Bénabou writes that “These regressions, run over a variety of datasets and periods with many different measures of income distribution, deliver a consistent message: initial inequality is detrimental to long-run growth. The magnitude of this effect is consistent across most studies: a one standard deviation decrease in inequality raises the annual growth rate of GDP per capita by .5 to .8 percentage points” (Bénabou, 1996, p. 2).

More recent studies call into question the statistically significant negative relationship between income inequality and growth. Of particular importance are studies by Deininger and Squire (1998), Barro (2000), Forbes (2000), and Banerjee and Duflo (2000), each surveyed in turn and with main methods and conclusions presented in table 1.

Deininger and Squire (1998). Deininger and Squire argue that previously used data on income inequality are of “doubtful quality” (Deininger and Squire, 1998, p. 259). The authors compiled an income inequality dataset for which the “high-quality” observations only include data meeting three quality requirements — that the data be based on household surveys (though observations may be for households or individuals within households), cover all income sources, and be representative of the entire population of a country (*ibid.*, pp. 262-263, 268). This “high quality” data has observations spanning the 1960s to the 1990s, enabling panel data analysis. However, the authors construct their model in straight cross-sectional form, using as a dependent variable average growth rates for the 1960 to 1992 period. From their “high quality” income inequality data, the authors use period average Gini coefficients² on income inequality as proxies for initial income inequality, which the authors argue is reasonable given the stability over time in these measures (*ibid.*, p. 268). The authors also use Gini coefficients of inequality of land distribution.

Without regional dummy variables in their model, the authors are able to reproduce the findings of earlier studies of a statistically significant negative long-run relationship between income inequality and growth, with coefficient estimates on the Gini coefficients of a similar magnitude. But the statistical significance of the results falls away with the inclusion in their model of regional dummies for Latin America, Africa, and Asia — the first two regions having relatively high inequality and low growth and Asia having relatively low inequality and high growth (Deininger and Squire, 1998, pp. 263, 269-270). The negative coefficient estimates on income inequality also become statistically insignificant with the simultaneous inclusion in the model of inequality of land distribution — with or without the inclusion in the model of regional dummies, for samples of all countries and only developing countries. The coefficient estimates on land inequality, in contrast, hold up as significantly negative in all these model specifications as well as through other tests of robustness, and suggest that a one standard deviation decline in land inequality would be associated with a 0.46 percentage point increase in the annual growth rate of per capita income (*ibid.*, pp. 270-271, 285).³ In an earlier study, Alesina and Rodrik also found the negative effect of land inequality on growth to be stronger than that for income inequality (Alesina and Rodrik, 1994, p. 481). The difference in results for land and income inequality may be important, for land appears more relevant than income as an indicator of wealth in poorer and more agrarian countries. As Deininger and Squire write, “The literature has long recognized that it may be the distribution of assets [such as land], rather than income, that underlies a systematic effect of inequality on growth, for example, by restricting

²Gini coefficients are commonly used in this literature and range in value between 0 and 100, with 0 indicating minimum and 100 indicating maximum inequality (Gini coefficients are sometimes scaled to range between 0 and 1). Barro provides a qualitative description of the Gini coefficient as follows: “One familiar interpretation of this coefficient comes from the Lorenz curve, which graphs cumulated income shares versus cumulated population shares, when the population is ordered from low to high per capita incomes. In this context, the Gini coefficient can be computed as twice the area between the 45-degree line that extends northeastward from the origin and the Lorenz curve. This shows that the Gini coefficient equals a weighted average of all absolute differences between per capita incomes (expressed relative to economywide per capita income), where the weights are the products of the corresponding population shares” (Barro, 2000, pp. 14-15).

³The correlation between Gini coefficients on income and land inequality are not, incidentally, very high, with a correlation coefficient of 0.39 for the fifty-seven countries for which data on both are available (Deininger and Squire, 1998, p. 269).

access to credit markets and thus the ability to finance productive, but indivisible investments” (ibid., p. 264).⁴

Barro (2000). Barro uses the Deininger and Squire dataset in a panel data analysis of the effects of income inequality on both growth and the ratio of investment to national income (2000). Barro adds to the “high-quality” observations a number of additional observations that appeared to meet Deininger and Squire’s three quality criteria but were excluded from the “high-quality” category because primary data sources could not be identified (ibid., p. 14). This broadens the sample to include a number of additional poorer countries. In the original “high-quality” data, for instance, roughly half the countries are OECD countries and there are no countries from Sub-Saharan Africa. Barro’s country list, in contrast, includes twenty Sub-Saharan African countries.

There are however comparability problems even with Deininger and Squire’s “high-quality” data, such as that they combine income data for households and individuals as well as for before- and after-tax income. These problems can substantively affect empirical results. For instance, Atkinson and Brandolini find that the relationship between inflation and income inequality varies considerably depending on whether one uses the Deininger and Squire’s “high-quality” data or other data that do not suffer from these definitional inconsistencies (Atkinson and Brandolini, 1999, p. 8). Barro attempts to adjust for this by using two dummy variables to address the household versus individual and before-tax versus after-tax definitional differences in income and finds that this does not substantively affect his results on the income inequality-growth relationship (Barro, 2000, pp. 17, 21). However, Atkinson and Brandolini argue that such dummies do not adequately address these definitional differences, because they assume the differences are constant across countries and over time. This is not likely to be the case, though, for differences between before-tax and after-tax income, which result from countries’ tax policies and may vary in response to differences in income inequality and in turn affect countries’ income inequality. Atkinson and Brandolini write “In our view, the solution to the heterogeneity of available statistics [and the Deininger and Squire dataset in particular] is unlikely to require simple additional or multiplicative adjustment. In order to assess differences in income distribution, what is needed is a data-set where the observations are as fully consistent as possible” (Atkinson and Brandolini, 1999, p. 24). It follows that results based on the Deininger and Squire dataset, even those based solely on the “high-quality” observations, might be substantively otherwise using more consistent data.

Barro constructs a panel of three periods, evaluating average growth and investment ratios from 1965 to 1975, 1975 to 1985, and 1985 to 1995, with Gini coefficients on income inequality for around 1960, 1970, and 1980 for the three respective ten-year sub-periods. Thus the relationship examined between income inequality and growth, with a ten-year average lag, is not as long run than cross-country models looking at initial inequality and subsequent average

⁴From a policy perspective, lessening inequality depends not only on possible growth benefits for the economy as a whole but also on constraints on redistribution. As regards the viability of different forms of land reform, Bardhan writes: “Given the strength of opposition of vested interests many regard the political prospects for land reform in most developing countries as bleak, and therefore drop it altogether from the agenda of poverty alleviation. This is not always wise. Some aspects of land reform (like extension of tenurial security) may be less difficult to implement than others (like land ceilings). Besides, in the dynamics of political processes and shifting coalitions, the range of feasibility often changes; and options kept open contribute to the policy debate and may influence the political process” (Bardhan, 1996, p. 1350). Relevant in this regard is Deininger and Squire’s argument that policies for redistributing land that discourage investment may do more harm than good for the poor. This is based on their estimates that one standard deviation decrease in land inequality has less of an effect on increasing the incomes of the poorest in a country than a one standard deviation increase in investment (Deininger and Squire, 1998, pp. 262, 284). Finally, the feasibility of several instruments of wealth distribution is considered in Dagdeviren, van der Hoeven and Weeks (2001, pp. 19-23). These are progressive taxation, transfer payments, consumer subsidies, land reform, education and health, and infrastructure and public works. The authors consider these instruments in the context of alternative growth-redistribution scenarios and conclude that “the mechanisms to achieve the redistributions are feasible for most countries” (ibid., p. 23).

growth for a period of several decades. Barro includes time dummy variables in a random effects model specification, with the coefficient estimates on income inequality thus addressing variation over time within countries and variation across countries but being predominately driven by the latter. Barro uses three-stage-least squares estimation, with instrumental variables being mainly lagged independent variables (Barro, 2000, p. 11).

Without a fertility rate variable in his model, Barro is able to reproduce the results of prior studies of a significant negative relationship between income inequality and growth. The coefficient estimate on income inequality suggests that a one standard deviation decline in the Gini coefficient would be associated with a 0.4 percentage point annual increase in GDP per capita growth, similar to the findings of studies surveyed by Bénabou (Barro, 2000, pp. 17-18). However the inclusion in the model of the fertility rate (which is significantly negative in the growth model and positively correlated with income inequality) reduces the coefficient estimate on income inequality to zero. Barro proceeds to test for non-linearities in the income inequality-growth relationship depending on countries' income levels. He finds a statistically significant difference between countries above and below a roughly \$2,000 (1985 U.S. dollars) per capita income threshold, which holds with or without the inclusion of the fertility rate. Summarizing the difference between the income inequality-growth relationship for poorer and richer countries, Barro writes that "a one-standard-deviation increase in the Gini value would affect the typical country's growth on impact by a magnitude of around 0.5 percent per year (*negatively for poor countries and positively for rich ones*)" (*ibid.*, p. 18, emphasis added). That is, the negative relationship between income inequality and growth, such as in studies summarized by Bénabou, holds for poorer countries in Barro's study, while the opposite result holds for richer countries. As a possible explanation, Barro suggests the stronger effect of undeveloped credit markets in poorer countries.

In a model of investment relative to GDP, Barro finds no statistically significant relationship with income inequality, for the sample of all countries or only poorer or richer countries. These results on investment hold with or without the inclusion in the investment ratio model of the fertility rate. Barro relates this finding to the savings rate effect on investment, writing, "Thus, there is no evidence that the aggregate saving rate, which would tend to influence the investment ratio, depends on the degree of income inequality" (*ibid.*, p. 19). Barro also explores whether income inequality might influence growth through human capital development. In a panel model of male schooling at the secondary level and above (a significantly positive determinant of growth), however, no statistically significant relationship is found with income inequality.⁵

Forbes (2000). Forbes uses the "high-quality" Deininger and Squire dataset observations in panel data growth models for the 1965 to 1995 period, split into either five- or ten-year sub-periods with a one sub-period lag between inequality and growth and so evaluating short- and medium-run time frames (Forbes, 2000). Forbes main results derive from fixed effects and related models with time dummy variables which address more restricted income inequality-growth variation than does Barro and prior studies, focusing on the relationship between within-country changes in income inequality and subsequent growth. Using these data and methods, Forbes finds a statistically significant *positive* relationship between income inequality and growth, suggesting that a one standard deviation increase in income inequality as measured by the Gini coefficient would be associated with a more than one percentage point increase in the annual growth rate (*ibid.*, p. 878). This finding is similar to that of a study by Li and Zou, which also addresses the relationship between within-country changes in income inequality and growth (Li and Zou, 1998). Forbes finds that the positive relationship between

⁵In contrast, Perotti does find a statistically significant long-run relationship between income inequality and education, with more inequality associated with less education (1996, pp. 179, 182). The measure of inequality is the share of income in the third and fourth quintiles in or around 1960; the measures of education are, separately, the female and male secondary education enrollment ratios, taking average values for 1965 and 1985.

within-country changes in income inequality and growth holds for sub-samples of richer and poorer countries, at the same time acknowledging that coverage is scant for poorer countries among the Deininger and Squire “high-quality” observations (Forbes, 2000, pp. 882-883).⁶

A caution worth sounding about Forbes and Li and Zou’s results is that the measurement error of the income inequality data, including the Deininger and Squire “high-quality” data, is likely to be more problematic in analyzing time-series than cross-country variation. The point is well made by Rodriguez, who writes:

[T]he methods and coverage of the surveys on which the Gini indices are based tend to vary substantially over time, and these variations are particularly important in developing countries. Therefore it is possible that most of the cross-time variation that is being picked by the panel data studies is not genuine variation in inequality – indeed one problem using time variation to control for endogeneity effects is that Gini indices tend to be very stable over time, except for changes in methods and coverage of surveys (Rodriguez, 2000).

Barro chooses to analyze primarily cross-country variation on related grounds, that fixed effects estimates, such as in Forbes and Li and Zou’s studies, are particularly vulnerable to measurement error (Barro, 2000, p. 30).

Banerjee and Duflo (2000). As noted above, Banerjee and Duflo hypothesize that growth is an inverted U-shaped function of changes in income inequality, and the authors do find such a relationship in the short- to medium-run (2000). The authors’ main results are based on a random effects model, evaluating the 1965 to 1995 period with five-year sub-periods and five-year lags between changes in inequality and growth (*ibid.*, p. 14). These results use the Deininger and Squire “high-quality” Gini coefficient observations. The authors also find the inverted U-shaped relationship evaluating ten-year sub-periods with ten-year lags, as with Barro’s specification, and using Barro’s expanded sample of observations (Deininger and Squire “high-quality” plus other observations in the Deininger and Squire dataset that appear of high quality). These more medium-run evaluating ten-year sub-periods results are not shown in the paper, but are said to be estimated with “less precision” (*ibid.*, p. 15).⁷ These findings are robust with respect to a variety of sensitivity tests, particularly regarding alternative estimation methods and control variables (such as the fertility rate) as well as aspects of measurement error in the Deininger and Squire dataset.⁸

Moreover, the authors re-evaluate the results of Forbes (2000) and Li and Zou (1998). They argue that the main conclusions of Forbes and Li and Zou are “not warranted: There is no evidence in the data that increases in inequality are good for growth,” and that the results of

⁶Forbes also finds a *negative* though insignificant relationship between within-country changes in income inequality and growth upon including those observations in the Deininger and Squire dataset not classified as “high-quality,” while maintaining the same country sample.

⁷In addition, the authors do not find a statistically significant relationship, linear or non-linear, between growth and inequality *levels* evaluating five-year sub-periods (Banerjee and Duflo, 2000, p. 14). The authors summarize their other main conclusions as follows: “We also find a strong negative relationship between changes in inequality and past inequality. Finally, there also seems to be a negative relationship between growth rates and inequality lagged one period, among countries where the level of inequality was not very high to start with” (*ibid.*, p. 2).

⁸Regarding measurement error, the authors find the inverted U-shaped relationship between changes in income inequality and growth controlling for fixed effects and thus for differences in the capacities of statistical agencies across countries. They also note that there have been sizeable changes in income inequality measures in countries that do have highly developed statistical agencies, and thus that such changes are likely to reflect real underlying changes in income inequality rather than measurement error. The authors also argue that classical measurement error is unlikely to account for the dramatic differences in results among their study, the studies of Forbes and Li and Zou, and older studies finding a negative relationship between income inequality and growth, given that the predicted outcome of classical measurement error is simply mean reversion (Banerjee and Duflo, 2000, pp. 19-20, 23).

Forbes and Li and Zou derive from model mis-specification in the light of the income inequality-growth non-linearity (and not from measurement error) (Banerjee and Duflo, 2000, p. 25).

In their conclusions, the authors address the policy implications of their findings, and write:

Drawing policy conclusions from our evidence is, however, not easy, as we share with the rest of the literature the problem that the exogeneity of inequality (or changes in inequality) cannot be taken as given. At best our evidence may be seen as a warning against institutional frameworks and political traditions (such as populism) that generate large swings in the income distribution (Banerjee and Duflo, 2000, p. 27).

The authors go on to state that resolving whether inequality affects growth is best done through micro data studies, of which there are at present few (*ibid.*, pp. 27-28). It would be useful, in addition, to re-evaluate the studies finding negative effects of land inequality on growth using similar methods as Banerjee and Duflo, focusing on changes in land inequality and with similar attentiveness to measurement error and model specification.

This paper considers economic growth as an aspect of employment and income opportunities. The manner in which economic growth translates in employment and income opportunities depends, though, on inequality itself, on how the gains from growth are distributed. Of central importance in this regard is the manner in which economic growth and inequality relate to each other in reducing poverty. Van der Hoeven addresses these issues by constructing a composite poverty measure that simultaneously accounts for growth and income distribution (based on the assumption of a log normal distribution of income), which enables estimates of the poverty-reducing benefits of more equal income distribution (2000). For instance, based on a poverty line equal to 50 percent of per capita income, a high-inequality country with a Gini coefficient of 0.6 has 50 percent of its population below the poverty line, whereas a more egalitarian country with a Gini coefficient of 0.3 has 25 percent of its population below the poverty line (*ibid.*, p. 17). Evaluating the composite poverty measure in a dynamic sense, van der Hoeven describes representative aspects of his findings as follows:

With a per capita growth rate of 2.0, a quite acceptable figure in the 1990s, a country with high inequality (Gini of 0.60) reduces its part of the population living below poverty from 64 per cent to 60 per cent. However a country with low inequality (a Gini ratio of 0.3) reduces the number of poor from 40 per cent to 33 per cent of the population. Thus when inequality is low...growth will reduce poverty faster than when inequality is high. These are powerful instruments to emphasize in all policy measures...*even if this* [reducing inequality] *will reduce growth somewhat*. For example, in the case of an initial poverty line of 75 percent of per capita income, reducing inequality from a Gini ratio of 0.60 to 0.40 with a 1.0 per cent per capita growth rate over 5 years reduces poverty more as compared to a per capita growth rate of 4 percent and keeping inequality unchanged (*ibid.*, p. 17, emphasis added).

In related study, Dagdeviren, van der Hoeven and Weeks simulate the effects of three alternative growth-redistribution scenarios on poverty reduction for a large sample of middle- and low-income countries (2001). These scenarios are, roughly speaking, a redistribution of current income, growth with redistribution, and growth without redistribution. For most middle-income countries, the authors estimate the strongest poverty reducing effects for the redistribution of current income scenario, followed by the redistribution with growth and growth without redistribution scenarios, respectively. In low-income countries, poverty reduction requires growth, and for most of these countries growth with redistribution is found to be more effective in reducing poverty than growth without redistribution (*ibid.*, p. 10-19).

The findings of these two studies are of fundamental importance in assessing the policy implications of the effects of inequality and redistribution on growth, especially insofar as growth is pursued as a means of poverty reduction. For even if it should turn out that the results of Banerjee and Duflo are definitive and that redistribution in any direction generally leads to slower growth (at least in the short and medium run), the effects of egalitarian redistribution can more rapidly reduce poverty even in the face of subsequent slower growth.

3. Gender inequality and growth

A recent World Bank report titled *Engendering Development* contains a very useful survey of recent empirical studies on the relationship between gender inequality and economic development (2001). A number of different methods are used in the studies summarized, including country studies using micro data and cross-country studies using macro data. The findings of the various studies surveyed point, by and large, to the same conclusion: that greater gender equality and improved educational opportunities for women are associated with — and are argued to lead to — desired developmental outcomes, particularly improved health and more rapid economic growth. One of the strongest conclusions of the studies surveyed regards the health of children. In short, improving women's education, lessening gender gaps in education, distributing income within households towards mothers, and increasing women's autonomy ("defined as their ability to control their lives" (*ibid.*, p. 82)) are all found to be associated with the improved health of children, controlling for other determinant's of children's health. Other studies surveyed conclude that improving women's education leads to lower malnutrition rates and that lower gender literacy gaps lead to lower incidence of AIDs among low-risk adults.

Improved health means improved human capital, and human capital is a positive determinant of economic growth (Bénabou, 1996, p. 51), suggesting a link between gender equality and economic growth through improved health. Other studies surveyed in the World Bank report look more directly at the relationship between gender equality and economic growth. There are a number micro-level studies providing consistent evidence of greater gender equality contributing to economic growth. The basic conclusions of these micro-level studies are as follows: that greater gender equality in the allocation of productive resources and in education leads to higher productivity, with greater equality in education argued to lead to the more ready adoption of new techniques of production; that constraints on the employment of women might lead to higher labour costs (through the contraction of labour supply) and to subsequent growth-hindering allocative inefficiencies; and that improved education for mothers leads to improved education for their children, an intergenerational transfer of human capital.

Key cross-country macro-econometric growth studies are considered here in some detail. Regarding the effects of gender inequality in education on growth, particularly important are studies by Klasen (1999) and Dollar and Gatti (1999); regarding the effects of gender inequality in earnings on growth, particularly important is a study by Seguino (2000). These studies come to contrasting conclusions regarding effects on economic growth, providing evidence of greater gender inequality in education having a negative effect on growth and greater gender inequality in earnings having a positive effect on growth. The main methods and conclusions of these studies are shown in table 2.

Gender inequality in education. *Klasen (1999)*. Klasen addresses the effects of gender inequality in education and employment on growth (Klasen, 1999). Klasen proposes a number of causal mechanisms by which greater equality in education can lead to more rapid growth. Klasen refers to the "selection-distortion factor," which he defines as follows:

If one believes that boys and girls have a similar distribution of innate abilities, gender inequality in education must mean that less able boys than girls get the chance to be educated, and, more

importantly, that the average innate ability of those who get educated is lower than it would be if boys and girls received equal educational opportunities (*ibid.*, p. 6).

This “selection-distortion factor” provides a sense of how a redistribution of educational attainment toward females (holding the total level of educational attainment constant) can raise the quality of human capital and thus contribute to growth. Klasen also refers to the “direct externality factor,” through which the education of women contributes to the education of their children and through which more equally educated males and females within a family contribute to the education of each other. By improving human capital, both of these factors are also argued to increase the rate of return on investments and thereby to increase investment rates and thus growth. As regards the demographic effects of greater gender equality in education, Klasen refers to the “indirect externality factor.” He proposes several channels through which lower fertility and population growth can boost growth, for instance, by lowering dependency ratios and increasing the share of working age relative to total population. Klasen argues that these demographic changes are more likely affect growth indirectly, through changes in patterns of savings and investment.⁹

Similar with the “selection-distortion factor” in education, Klasen refers to the “selection-distortion factor” in employment representation, which is argued to lessen the average skill level of the workforce by impeding the entry of women into employment. This factor is also hypothesized to work by reducing the overall supply of labour and affecting growth through the effect of this labour supply constraint on wages. Klasen writes:

[A]rtificial barriers to female employment in the formal sector may contribute to higher labor costs and lower international competitiveness, as women are effectively prevented from offering their labor services at more competitive wages. In this context, it may be important to point out that a considerable share of the export success of South East Asian economies was based on female-intensive light manufacturing (*ibid.*, p. 8).

This paper will return to the relationship between women’s employment and export competitiveness when considering the effects on growth of gender inequality in earnings.

Klasen’s main results derive from a cross-country model of growth from 1960 to 1992, for a sample of just over 100 countries, with gender equality in education measured as the female-to-male ratio of years of educational attainment in 1960 and also the changes in the ratio over the period. By both measures, Klasen finds evidence that greater gender equality is associated with more rapid growth. Klasen evaluates the effects of gender equality in education based on two different assumptions. First, Klasen holds constant the educational attainment of males, thus allowing total (male and female) educational attainment to vary; second, he holds constant total (male and female) educational attainment, meaning that greater gender equality is associated with lower educational attainment for males. The positive effect of greater equality on growth is, as expected, stronger based on the first assumption, but it also holds strongly

⁹An alternative account of the linkage between lower fertility and more rapid economic growth is developed in a theoretical model by Galor and Weil, who describe a three-phase “positive feedback loop” in which the gender wage gap plays a pivotal role (1996). The three phases are: higher relative wages for women leading to lower fertility and population growth as a result of the increased cost of children relative to household income; lower population growth leading to increased capital per worker; and increased capital per worker leading back to higher relative wages for women as a result of the greater complementarity of capital to women’s than men’s relative labor endowments. In the context of observed rising relative wages for women through the process of economic development, the authors describe the reasoning underlying this last phase as follows: “One explanation for this rise in women’s wages is that as economies develop, they are more prone to reward the attributes in which women have a comparative advantage. For the purposes of our model, we focus on a simplified description of the differences in factor endowments between the sexes: While women and men have equal quantities of brains, men have more brawn. And, the more developed is an economy, the higher the rewards of brains relative to brawn” (Galor and Weil, 1996, p. 375).

based on the second assumption — that is, based solely on a redistribution of a given level of total educational attainment toward females.

The effects of gender equality in education on growth are estimated to be sizeable, particularly compared with the very low rates of actual growth in several regions. South Asia and Sub-Saharan Africa along with the Middle East/North Africa were the regions where both the initial level of gender inequality in education was greatest and where inequality declined the least over the period. Klasen writes, “Had South Asia and Sub-Saharan Africa found themselves with more balanced educational achievements in 1960, and had they done more to promote gender-balanced growth in education, their economic growth could have been up to 0.9 per cent per year faster than turned out to be the case” (*ibid.*, p. 23). This 0.9 compares with actual average annual growth from 1960 to 1992 of 1.7 percent per year for South Asia and only 0.7 percent per year for Sub-Saharan Africa (*ibid.*, p. 31). The strong association between greater equality in education on more rapid growth holds for samples of all countries as well as only poorer countries, holds even more strongly looking only at Sub-Saharan African countries, and holds after using various methods, including using instrumental variables in two-stage-least-squares regressions, to address simultaneous causality (that is, for greater growth leading to greater equality in educational attainment).

Klasen also re-estimates the growth model in panel data form, with ten-year sub-periods from 1960 to 1990 and looking solely at initial (1960) gender equality in education. This model incorporates regional and time dummy variables, but neither fixed nor random effects. Based on this specification, Klasen continues to find a statistically significant positive relationship between gender equality in education and growth, with similar coefficient estimates (Klasen, 1999, pp. 13, 20).

Klasen also considers gender inequality in employment representation as a determinant of growth, with representation measured by the growth of the female share of both the labour force and the working age population in the formal sector. Klasen finds a positive association between income growth and these measures, particularly the female share of the formal sector, suggesting that greater equality in employment representation might contribute to growth. However the author urges caution in interpreting this finding, given the difficulty in accounting for reverse causality.

Dollar and Gatti (1999). Dollar and Roberta Gatti also examine the effect of gender differences in education on growth (Dollar and Gatti, 1999). Their growth model is constructed from panel data made up of sub-periods of five-year averages from 1975 to 1990 including regional dummy variables in ordinary-least-squares regressions.¹⁰ Rather than using data for years of educational attainment, as does Klasen, the authors use data for the share of the adult population with some secondary education. A fundamental difference with Klasen’s study is that the authors do not evaluate a measure of gender equality as such (for instance, the ratio of female to male educational attainment), but rather include separate measures for female and male secondary education. This specification, Klasen points out, is problematic, given that male and female educational attainment are highly correlated across countries, rendering it difficult for regression analysis to untangle the comparative effects of these variables (Klasen, 1999, p. 4).

For the full sample of countries, the authors estimate that female education has a positive effect on growth but male education a negative effect, though neither result is statistically significant. Regarding the signs of coefficient estimates, these results are the opposite of that found in prior work on growth by Barro and Lee (1994). The authors attribute this difference to their inclusion of a dummy variable for Latin American countries, for these countries have on average relatively high female secondary educational attainment but lower growth than predicted by the model (Dollar and Gatti 1999: 19).

Dollar and Gatti split their sample of countries in two, looking separately at countries with higher and lower secondary educational attainment for females. This roughly corresponds with looking separately at richer and poorer countries, respectively. The authors find a statistically significant positive effect of female secondary educational attainment on growth for

¹⁰The authors do not provide additional information on model specification.

richer countries but no such effect for poorer countries. As the authors summarize, “an interesting and robust result is that gender inequality in secondary education is bad for growth — but only for countries at lower middle income status and above” (ibid., p. 3). The authors find a similar result using instrumental variables in two-stage-least-squares regressions to address simultaneous causality.

It is worth emphasizing the decided difference between Klasen’s and Dollar and Gatti’s results regarding the effects of gender equality in education on growth in poorer countries. That is, Klasen finds evidence for these countries of a strong positive effect of gender equality in education and Dollar and Gatti do not. Klasen re-estimates his equations using Dollar and Gatti’s data. Klasen finds the same basic result as when using his original data on years of educational attainment — that gender inequality in education is associated with lower growth for richer and poorer countries alike. In addition to data differences, there are also differences between the two studies in the period considered, with Klasen evaluating a thirty-two year period cross-sectionally and in panel form as three decade-long sub-periods and Dollar and Gatti evaluating a fifteen year period in panel form as five-year sub-periods. Thus the difference between the two studies may thus result to some extent from the length of time it takes for the growth benefits of gender equality in education to become manifest.

Perhaps the most important difference between the studies is more purely technical, as regards the high degree of cross-country correlation between educational attainment for males and females. For instance, the correlation coefficient between years of male and female educational attainment for those 15 and above as of 1995 is 0.96. Using a common test of collinearity, the variance inflation factor (VIF) resulting from regressing either variable on the other exceeds acceptable thresholds, indicating unacceptably high collinearity between the two variables (with a VIF of over 13, compared with the common threshold of acceptability of 10). This very strong linearity between these two variables makes their simultaneous inclusion as independent variables highly problematic. On these grounds, Klasen’s results have to be regarded as more definitive than Dollar and Gatti’s. It would nevertheless be useful to develop empirical evidence, including micro evidence, on the several hypothesized mediating linkages between gender inequality and growth put forth by Klasen. Such evidence would provide a clearer sense of whether the observed relationship between growth and gender equality in education is indeed causal.

Why does gender inequality in education persist? In advocating the elimination of gender inequality in education, it is important from a policy perspective to understand why such inequality persists. Much useful work addressing the underlying causes of regional and cultural variation in gender inequality in education is provided in Hill and King (1995). As a point of departure, the authors look at male and female primary and secondary enrolment rates for the span of years from 1960 to 1988 for developing countries in five regions, Sub-Saharan Africa, South Asia, the Middle East and North Africa, East Asia and the Pacific, and Latin America and the Caribbean (Hill and King, 1995, p. 5). In all five regions, there were steady overall increases in primary and secondary education for both males and females. But the gender education gap persisted in Sub-Saharan Africa and South Asia while having converged to equality in East Asia and the Pacific and Latin America and the Caribbean. These regional patterns are very much the same as noted by Klasen in looking at data on years of education attainment.

The authors show that gender equality in education is associated with higher per capita national income and life expectancy and lower infant mortality and fertility rates and argue that gender equality in education is an important cause of these outcomes, which they refer to as the “effects of the gender gap” (Hill and King, 1995, pp. 13-14). If gender equality in education results in such beneficial developmental outcomes, why then do gender gaps persist and what accounts for the regional variation in gender gaps? The authors address these questions as follows:

[W]e present a conceptual approach for organizing the factors that can explain the current state of women’s education and for understanding the dynamics underlying educational outcomes. We propose, in short, that gender differentials in education endure because those persons who bear the private costs of investing in schooling for girls and women fail to receive the full benefits of

their investment. This is especially true because much of the payoff in education women is broadly social (Hill and King, 1995, p. 23).

It is beyond the scope of this paper to address in any detail the full and varied range of factors determining the gender gap in education, which is the subject of a large and growing literature. But a short and general list of some these factors provides a sense of the complexities that need addressing if policies advocating greater gender equality in education are to be successful. These factors are presented by the authors in the context of costs versus benefits, including the possible disjuncture between private costs (borne by families) and broader social benefits.

Are families more reliant on the labour, in the household and the marketplace, of daughters than sons? This is the case in most countries, the authors argue (*ibid.*, p. 24).

- To what extent does formal education come at the expense of training in the household for other valuable skills (for instance, in agriculture, childcare, and the production of crafts) and how does this affect girls differently than boys (*ibid.*, p. 26)?
- Are education-related expenses, such as for clothing and room and board, higher for girls than boys? The authors provide the example of parents who are less inclined to let daughters than sons travel long distances to school and so must pay for room and board for daughters attending school (*ibid.*, p. 24).
- Are the expected returns of education to parents higher for sons than daughters? A number of factors come into play here. For instance, daughters' expected earnings might be less as a result of occupational or wage discrimination in labour markets or as a result of less continuous labour-force attachment. In cases where daughters move into their husbands' families, the average age of marriage also matters, the authors argue (*ibid.*, p. 27).
- The authors also refer to "psychic" costs, non-pecuniary costs that operate differently in different cultures. The authors describe these costs as follows: "In certain settings, religion as well as sociocultural factors...strongly influence parents' choices by imposing a heavy cost on nonconformist behavior" (*ibid.*, p. 26). Such psychic costs may arise, for instance, from having a daughter in school where females are commonly secluded. In addition, the authors argue, education for girls beyond attaining literacy can be considered of questionable value, "because of prevailing doubts about whether better-educated women make good wives" (*ibid.*, p. 26).

Gender inequality in earnings. Differences in education are a vitally important aspect of gender inequality, for which there is solid evidence of less inequality being associated with more rapid growth. But educational attainment is of course just one of several aspects of gender inequality, and lesser inequality in one aspect within a country or region is not necessarily associated with lesser inequality in another. Evidence on this point is provided by Dollar and Gatti, who note the generally weak correlations across countries between measures addressing several different aspects of gender inequality (educational attainment, health, legal status, economic status, political empowerment) (Dollar and Gatti, 1999, p. 4). Weak correlations suggest that different aspects of gender inequality have different causes. There is also evidence that they have different effects, on economic growth in particular.

East Asia provides a striking example of this, for the region has comparatively low gender inequality in educational attainment and comparatively high gender inequality in earnings. These wide gender earnings gaps have been argued to be an important determinant of the region's rapid growth, particularly in the context of export-oriented industrialization. As Blecker and Seguino write:

A large literature argues that women's low wages have been a stimulus to growth in many of the most successful cases of export-led development, such as South Korea, Hong Kong, and Taiwan. Research suggests that the low female wages in these and other countries' export sectors are not explained entirely by women's relatively lower productivity or human capital. Rather, they are

largely attributable to gender discrimination embedded in traditional gender norms and social practices combined with women's segregation into export sector employment and the repression of labor organization by state-corporate alliances. These views imply a serious problem for efforts to enhance gender equity in SIEs [semi-industrialized economies]: if women are able to raise their wages relative to men's, the result could be a decline in export competitiveness and a slowdown in the country's growth rate. In this case, gender equity may not be compatible with growth in an export-oriented SIE (Blecker and Seguino, forthcoming).

The association between the increased employment of women relative to men in manufacturing and increased export orientation holds for a wide range of developing countries. Wood, for instance, shows the strong positive cross-country correlation between changes (from 1960 to 1985) in measures of women's relative manufacturing employment and the ratio of manufacturing exports to value added (looking at exports from developing to developed countries for thirty-five developing countries) (Wood, 1991, p. 175). In short, export-oriented industrialization is generally associated with a rising share of women's manufacturing employment. These patterns for the manufacturing sector as a whole are driven in large measure by just a handful of manufacturing industries — particularly the textiles, apparel and electronics industries. These are key industries in export-oriented industrialization and they tend to have high price elasticities of export demand and to be labour intensive as well as female intensive. Export competitiveness in these industries is therefore particularly sensitive to higher labour costs.

Seguino (2000). A key study exploring the relationships between gender inequality in wages and growth is that by Seguino (2000). Consistent with the line of argument noted above, Seguino hypothesizes a causal chain from gender inequality in wages to export expansion, leading to technical change (in part through exports facilitating the purchase of foreign technology) and thus growth (*ibid.*, pp. 1212-1214). Following from these hypotheses, Seguino restricts the sample to just twenty countries that are both semi-industrialized and export-oriented (as indicated by exports and manufactures as a share of national income and “the ratio of machinery and transport goods to non-oil primary commodities in exports”) (*ibid.*, p. 1215). Seguino presents results for two growth models for the 1975 to 1995 period, one based on straight cross-sectional averages for the entire period, the other based on panel data of five-year sub-period averages in a fixed effects model with time dummy variables and thus isolating variation over time within countries. Given the fairly small number of observations, the author makes use of a lean growth model, using measures of capital stock and human capital as the explanatory variables in benchmark models. Three measures of gender inequality in wages are constructed: first, log differences of male and female earnings (usually hourly); second, these differences adjusted by differences in years of secondary educational attainment for males and females; third, the prior measure interacted with average years of educational attainment for the country, to address the absorptive capacity of the country as regards new techniques of production. These measures are introduced into the models in unlagged form, contemporaneous with the whole period in cross-sectional regressions and with sub-periods in panel data regressions (*ibid.*, pp. 1216-1217).

Based on these two different models and three different measures of gender inequality in wages, the basic findings are largely the same: wider gender wage gaps are associated with more rapid growth. The relationship is a fairly strong one, more so for panel data regressions. For the cross-sectional model using the first measure of gender inequality, for instance, Seguino's estimates suggest that a 0.10 increase in inequality would lead to a 0.15 percentage point increase in annual income growth (*ibid.*, p. 1218). This implies that 1.2 percentage points of the 2.7 percentage point difference between the average annual growth rates of South Korea (at 8.0 percent) and Chile (at 5.3 percent) is attributable to the wider gender wage gap in South Korea. Cross-sectional results are of borderline statistical significance, at just the 10 percent level for all three measures of gender inequality in earnings. In panel data regressions, Seguino's estimates suggest that a 0.10 increase in the first measure of gender inequality in earnings would lead to a 0.60 percentage point increase in annual income growth (*ibid.*, p.

1220). Coefficient estimates on all three measures of gender inequality in earnings are statistically significant at the 1 percent level.

In addition to growth, Seguino also models investment (as a share of national income) and finds that wider gender wage gaps are also associated with higher investment. This provides evidence that one of the channels linking gender wage gaps to growth is through investment (*ibid.*, p. 1222).

In sum, Seguino's study suggests that gender inequality in wages contributes to economic growth, at least for the countries in question, opposite in spirit to the results of the studies on gender inequality in education.¹¹ This suggests that it matters considerably which aspect of gender inequality one looks at regarding economic growth. This also calls into question the value of composite measures of gender inequality, which conflate different aspects of gender inequality having different causes and effects and which are often only weakly correlated with each other.

How definitive are Seguino's main results and conclusions? It is worth noting that there are few empirical studies at present addressing the relationship between gender earnings gaps and growth. The conclusion of a positive effect of gender wage gaps on growth could be regarded as more definitive if additional empirical studies using varied methods find similar results. Regarding the hypothesized causal linkages between gender wage gaps and growth, mediated by export expansion and technical change, the argument seems plausible; but as the author notes, the effects of trade on technical change and growth are issues of contention, with mixed empirical evidence (*ibid.*, p. 1212)). It would be worth exploring these hypothesized linkages in greater detail, perhaps through the use of industry-level data. For instance, it would be illustrative to identify cases in which changes in the gender wage gap within industries led to greater export competitiveness for these industries and then to trace if and how such greater trade competitiveness facilitated technical change (such as through the purchase of foreign technology) on a sufficient scale to significantly effect growth in the economy as a whole. This is particularly true given that the author's selection of the small sample of countries is predicated on these linkages. One could also model export competitiveness for different industries, using measures of the gender wage gap as an explanatory variable.

Other possible linkages are also worth exploring. For instance, women tend to be strongly concentrated not only in the manufacture of textiles and apparel but also foodstuffs. These are all industries that make up a large share of consumption goods. Thus low wages for women in these industries might lead to lower prices of consumption goods and thus facilitate the payment of lower wages for both men and women workers in the economy as a whole (for cases in which women's lower wages is not solely a reflection of lower productivity). These lower average wages could then translate into greater export competitiveness resulting from linkages of a more purely domestic nature. One could also reasonably imagine how wider gender wage gaps could affect growth in countries less reliant on trade or even wholly closed. For a given level of male wages, wider gender wage gaps mean lower average wages and higher profits. In scenarios of profit-led growth, a wider gender wage gap might therefore lead to more rapid growth and in scenarios of wage-led growth the opposite. The possibility of such dynamics also suggests looking at a wider sample of countries than does Seguino.

Last, it is important to untangle these hypothesized causal linkages to address whether Seguino's estimates on the gender earnings gap measures are proxying for other determinants of growth in East Asia that are not captured in her models. For it may be the favorable growth of countries in the region that is driving the overall relationships observed in the author's models, particularly in light of the small sample of countries considered. This concern holds for the fixed effects models as well, insofar as results of these models may derive from country- or

¹¹It might be worth noting, in this regard, that Klasen's association of export success in South East Asian economies with "female-intensive light manufacturing" is not argued by him to depend on wage discrimination, and he distinguishes his study from Seguino's in this regard. He writes: "This contrasts with the arguments advanced by Seguino who argues that gender discrimination in the labour market will favour growth as it will lead to lower female wages in export-intensive sectors. The argument advanced [by Klasen] differs from this by focusing on access to employment rather than wages. If females do not have access to employment, then labour supply is artificially restricted and men will earn higher wages, making the country less competitive" (Klasen, 1999, p. 28).

region-specific dynamic effects that are not otherwise captured by the measures of capital stock and human capital. Such dynamic effects may result, for instance, from the more efficient organization of a given stock of capital.¹²

4. Concluding remarks

Several competing hypotheses regarding the effects of wealth inequality on economic growth were considered, relating to the median voter theorem, undeveloped credit and insurance markets, social instability, and savings rate effects on investment. These hypotheses point to the possibility of opposite short run and long run effects of wealth inequality on growth. For instance, Banerjee and Duflo hypothesize that the immediate impact of any sizeable redistribution of wealth — whether leading to more or less inequality — is likely to contribute to social instability and thus to slower growth; in the long run, however, such redistribution might contribute to growth insofar as it provides a means of financing growth-promoting investments, such as in education and infrastructure (2000).

There have been a good number of macro-econometric studies of the wealth inequality-growth relationship, looking variously at long and short run effects on growth and using measures of income and land inequality as proxies for wealth inequality. The main methods and conclusions of several important recent studies are summarized in table 1. In the long run, there does not appear to be a robust statistically significant relationship between income inequality and growth. Though fewer studies have addressed the effects of land inequality on growth, these studies find a robust statistically significant negative relationship between land inequality and growth in the long run, consistent with the interpretation that more unequal distribution of land impedes growth. Regarding the short run, it appears a robust finding that redistribution of income in either direction is associated with slower economic growth (Banerjee and Duflo, 2000). For future study, it seems worthwhile to subject the land inequality measures to similar scrutiny as the income inequality measures, for instance by evaluating short and medium run variation within countries.

There have been fewer studies of the effects of gender inequality on growth, with main methods and conclusions of recent macro-econometric studies summarized in table 2. Regarding gender inequality in education, the more definitive of the two studies surveyed finds a negative relationship between inequality and growth in the long run, consistent with the view that greater gender inequality in education has a negative effect on growth (Klasen, 1999). A study of the effects of gender inequality in earnings finds the opposite, a positive relationship between inequality and growth in the short and medium run (Seguino, 2000).

As with the wealth inequality-growth relationship, there is a shortage of empirical evidence on the hypothesized mediating linkages between gender inequality and economic growth. Regarding gender inequality in education, the hypothesized linkages pertain to the “selection distortion factor” and to education occurring spontaneously within households, both operating on growth through human capital development, as well as to demographic effects operating on growth through lower fertility rates. Regarding gender inequality in earnings, the hypothesized linkages are through export competitiveness contributing to technical change. As for research methods, complementing macro-econometric analysis with more detailed

¹²Seguino contrasts her results with those such as noted above regarding the negative effect of income inequality on growth, with the relationship mediated by the social conflict resulting from inequality. Seguino notes that these studies generally look at household data, by which East Asian countries have low-income inequality in contrast with the high inequality between men and women’s earnings (Seguino, 2000, p. 1213). Of the contrary results between the studies of these two types of inequality, Seguino writes as follows: “The results presented here suggest that just who experiences the inequality matters. Inequality born by women appears to have a positive effect because this condition stimulates exports and raises profit expectations. These together stimulate investment and productivity growth, without apparently generating the negative political repercussions that would undermine gains in measures GDP growth. Why then so little growth-retarding conflict in response to gender-based inequality? The key seems to lie in the socialization of women who are less inclined than men, at least in the sample of countries used in this study, to protest income inequality sufficiently to slow investment and growth (*ibid.*, p. 1222).” Seguino argues that one implication of this line of reasoning is that the positive effects of gender wage inequality on growth would likely be greater in more patriarchal countries.

approaches would likely deepen the understanding of the causal connections between inequality and economic growth.

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Table 1**The effects of wealth inequality on growth: main methods and conclusions of key recent macro-econometric studies**

Study	Methods	Conclusions
Deininger and Squire (1998)	Uses Deininger and Squire (D&S) "high quality" income inequality data as well as land inequality data in cross-sectional regressions for 1960-92. Evaluates the effects of initial levels of inequality on subsequent growth.	Finds that the statistically significant negative relationship between income inequality and growth found in earlier studies is not robust with respect to inclusion of regional dummy variables. Finds a robust statistically negative relationship between land inequality and growth, suggesting that land inequality negatively affects growth in the long run.
Barro (2000)	Uses D&S "high quality" income inequality data plus additional observations from poorer countries in random effects panel data regressions evaluating 10-year sub-periods with 10-year lags between growth and levels of income inequality for 1965-95. Regression results mainly driven by cross-country variation.	Finds that the statistically significant negative relationship between income inequality and growth is not robust with respect to inclusion of a fertility rate variable. Finds a statistically significant difference in the medium-run income inequality-growth relationship between samples of richer and poorer countries, with a positive relationship for richer countries and a negative relationship for poorer countries.
Forbes (2000)	Uses D&S "high quality" income inequality data in fixed effects and related panel data regressions with time dummy variables evaluating 5- and 10-year sub-periods with correspondingly long lags between growth and income inequality for 1965-95. Models evaluate within-country changes.	Finds a statistically significant positive relationship between within-country changes in income inequality and growth, suggesting that short and medium run increases in income inequality positively affect growth. A similar result is found in Li and Zou (1998).
Banerjee and Duflo (2000)	Uses both D&S "high quality" income inequality data and expanded sample as per Barro in random effects panel data regressions evaluating 5- and 10-year sub-periods with correspondingly long lags between growth and income inequality for 1965-95. Primarily evaluates changes in rather than levels of income inequality.	Finds that any changes in income inequality in the short run -- whether leading to greater or lesser inequality -- are negatively related to growth in a statistically significant and robust manner, with similar results for the medium run. Argues that the findings of Forbes and Li and Zou are "not warranted" and result from not adequately accounting for the non-linearity between changes in income inequality and growth.

Table 2

The effects of gender inequality on growth: main methods and conclusions of key recent macro-econometric studies

Gender inequality in education		
Study	Methods	Conclusions
Klasen (1999)	Measures gender inequality in education as the female-to-male ratio of years of educational attainment, holding either total or male years of educational attainment constant. Evaluates initial inequality and changes in inequality in cross-sectional regressions for 1960-92 period and also initial inequality in panel data regressions with 10-year sub-periods for 1960-90, the latter including regional and time dummy variables.	Finds a large and statistically significant negative relationship between gender inequality in education and growth, with coefficient estimates similar for cross-sectional and panel regressions, suggesting that gender inequality in education negatively affects growth in the long run. Results hold using Dollar and Gatti's data on shares of adults with some secondary education evaluated as female-to-male ratios.
Dollar and Gatti (1999)	Measures gender inequality in education with separate measures for shares of adult males and females with some secondary education in panel data regressions evaluating 5-year sub-periods from 1975-90, including regional dummy variables.	Finds a significantly positive relationship between female education and growth in a subsample of richer countries, analogous to Klasen's results, but not in the full sample of countries (where the relationship is positive but statistically insignificant) nor in the subsample of poorer countries (where the relationship is negative but statistically insignificant). Model specification, with separate education measures for males and females, suffers from problematically high collinearity, and thus results are less definitive than those in Klasen on these grounds.
Gender inequality in earnings		
Study	Methods	Conclusions
Seguino (2000)	Measures gender inequality in earnings as the log difference between male and female hourly earnings, with variations of the measure adjusting for gender differences in years of secondary educational attainment as well as overall years of educational attainment in the country at large. Evaluates contemporaneous, period average gender inequality in earnings in cross-sectional regressions for 1975-95 and in panel data regressions with 5-year sub-periods for 1975-95, the latter including fixed effects and time dummy variables and so evaluating within-country changes. Sample includes 20 semi-industrialized, export-oriented countries.	Finds a large and statistically significant positive relationship between gender inequality in earnings and growth, with coefficient estimates larger in panel than cross-sectional regressions, suggesting that gender inequality in earnings positively affects growth in both the short and long run. It may be that gender inequality in earnings is proxying for other positive determinants of growth in East Asia.