

# Finance and Opportunity:

## Financial Systems and Intergenerational Persistence of Relative Incomes

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### Abstract

We review research on the intergenerational persistence of relative incomes and identify a key gap in the literature. Although theory advertises the crucial role of financial market imperfections in explaining intergenerational income dynamics, there is stunningly little research on how financial policy reforms and changes in financial system operations shape the evolution of poverty and the distribution of income. We discuss the value of additional research on how reforms to financial policies influence the economic opportunities of the poor and hence the intergenerational persistence of relative incomes.

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## 1. Introduction

What determines the intergenerational persistence of relative incomes? How do policies affect the degree to which a person's economic opportunities are determined by individual skill and initiative, or whether the person's economic horizons are largely shaped by parental wealth, human capital, and social networks? Although these are age-old questions, opinions about the answers are as dissimilar as the political philosophies and policy recommendations that they generate. To improve research on these fundamental questions, we highlight and analyze a critical gap in the literature, the role of the financial system in shaping economic opportunities and affecting the intergenerational transmission of poverty and relative incomes.

There is startlingly little research on how financial policies and changes in financial system operations shape the economic opportunities faced by individuals and the dynamics of relative incomes across generations. Reviews of development economics, textbooks on economic growth, and the entire Handbook of Income Distribution provide little to no discussion of how changes in financial sector policies and regulations affect poverty and income distribution.<sup>1</sup>

This gap in the literature is surprising because financial market imperfections are a keystone of virtually all theories of intergenerational persistence in relative incomes. For example, in theories stressing human and physical capital accumulation, financial market imperfections determine the extent to which the poor can borrow to invest in schooling or capital investments. In theories stressing entrepreneurship, financial market imperfections determine the extent to which comparatively talented, but poor, individuals can raise external funds to initiate projects. To generate long-run, intergenerational persistence in relative incomes, practically all theories require financial market imperfections.

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<sup>1</sup> For example, see Stern (1989) on development economics and Jones (1998) and Weil (2004) on economic growth.

Instead of analyzing changes in financial policies and performance, researchers generally take financial market imperfections as given and unalterable and examine how other factors influence the distribution of income. In some theories, credit constraints or other frictions are simply taken as exogenous. In others, static information and transactions costs endogenously yield adverse selection and moral hazard frictions that impede the operation of financial markets. In either case, researchers treat financial market frictions as unchanging and proceed to dissect how changes in schooling, saving, or fertility decisions shape the intergenerational transmission of relative incomes. Yet, these analyses, and resultant policy recommendations, are based on the erroneous treatment of financial market frictions as unchanging features of the economy. Economic conditions, technological change, and financial sector policies and innovation can all affect the level and evolution of financial market frictions. The degree of adverse selection, moral hazard, and resultant credit constraints are not immutable. Furthermore, these investigations miss a potential first-order line of inquiry: The impact of changes in financial conditions on the economic opportunities faced by individuals from different socioeconomic backgrounds.

We argue that financial policy reforms and changes in financial system operations may exert a first-order impact on intergenerational income dynamics and the transmission of poverty across generations. Depending on laws, regulations, and policies, financial contracts, markets, and institutions may arise and ameliorate, or intensify, the adverse effects of financial market frictions on economic opportunities. We do not claim that financial development is the cure for poverty. We simply argue that given the central role of financial market frictions in theories of persistent poverty and relative incomes, economists have not adequately addressed the question of whether, and if so which, financial sector characteristics affect intergenerational income dynamics.

It is difficult to over estimate the potential welfare implications of enhancing economic opportunities in general and those of the poor in particular. Almost 3 billion people – about half of the earth’s inhabitants -- live on less than \$2 per day. Many live in the same impoverished conditions as their parent and grandparents. Thus, policies that augment the economic prospects of the poor could have enormous ramifications for current and future generations. Furthermore, expanding the economic liberties of the poor can boost aggregate economic growth. For example, when parental poverty and financial sector policies combine to hinder the poor from obtaining training and capital, this can lower the efficiency of aggregate resource allocation and hence slow the rate of economic growth. Under these conditions, therefore, financial market reforms can increase the size of the economic pie, while disproportionately helping the poor.

It is also difficult to overestimate the methodological challenges. Understanding the distribution of income and the intergenerational persistence of relative incomes requires sound measures and rigorous theories of the determinants of income distribution and its persistence. Although researchers have developed measures of the distribution of income across a wide array of countries,<sup>2</sup> these data do not provide information on the extent to which relative incomes persist from parents to children. There is a dearth of measures of the intergenerational persistence of relative incomes. For the United States and Europe, the cross-generational correlation of total income is between 0.7 and 0.8 (Mulligan, 1997; Bjorklund and Jantti, 1998). But, we need estimates of how this correlation has changed over time and how the cross-generational correlation of total income compares internationally. At the most basic level, we lack measures of the object of concern: the intergenerational persistence of relative incomes.

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<sup>2</sup> In many countries, the distribution of income is exceptionally skewed, but it is not necessarily stagnant. The poorest 20 percent of the population receive 3 percent or less of national income in Brazil, Chile, Ethiopia, Namibia, and South Africa. However, Finland, France, and Norway experienced declines in their Gini coefficients of about one percent per annum over the last 40 years. Over the same period, Argentina and the United States experienced equally rapid increases in their Gini coefficients.

Besides data shortcomings, there are serious analytical problems associated with interpreting any particular measure of persistence, or any change in the degree of persistence. Is a cross-generational correlation of total income of 0.8 big, or small; is it a sign of efficiency, or of public policy failures? If the cross-generational correlation of total income falls from 0.8 to 0.4 in a country, does this represent a positive or negative development from a social welfare perspective? A particular degree of skewness and persistence in the distribution of income might simply reflect returns to ability and effort that endure over long horizons. Alternatively, the same degree of skewness and persistence in the distribution of income could reflect the limited economic opportunities of the poor and the inefficient perpetuation of rigid economic classes. Thus, besides constructing better measures of the intergenerational persistence of relative incomes, we need to identify the causes of any observed persistence in each country and at each point in time to draw confident inferences and policy implications. This further motivates our emphasis on financial reforms designed to expand individual opportunities, rather than on reforms designed to reduce the skewness of the distribution of income per se.

Our emphasis on the role of the financial sector policies in shaping economic opportunity cuts across philosophical and political boundaries. For comparison purposes, consider income and wealth redistribution policies, which are frequently employed to reduce income inequality. Many theories motivate redistributive policies as a mechanism for de-linking an individual's opportunities from her parent's accumulation of wealth. Redistributive policies, however, create disincentives to work and save, though the actual economic magnitudes of these disincentive effects are hotly debated as emphasized by Aghion et al (1997). Furthermore, redistributive policies are directly linked with equalizing outcomes, not simply equalizing opportunities. While many people from different political perspectives readily embrace equality of opportunity, many

fewer support equalizing outcomes (Hayek, 1960). These tensions, however, vanish when focusing on financial sector reforms. Financial developments that expand individual economic opportunity create positive, not negative incentive effects, and avoid the adverse repercussions associated with attempts to equalize outcomes.

Thus, financial development, growth, and the dynamics of intergenerational income dynamics are inextricably intertwined, so that examining only one, or two, of these evolving features of the economy might severely reduce the generality and precision of the analysis. A variety of theories and empirical work suggest that financial development influences the economy-wide efficiency of resource allocation and the comparative economic opportunities of individuals from relatively rich or poor households. Put differently, theory suggests that finance influences the rate of economic growth, the evolution of the distribution of income, and the dynamic interactions between growth and income distribution during the process of economic development. Furthermore, as we review below, the distribution of income may influence economic growth by altering incentives associated with accumulation human and physical capital and by affecting public policies. For instance, the elite in a country with a highly skewed distribution of income might seek to enact policies, including financial policies, that protect their positions of privilege even if these policies slow economic growth. Furthermore, technological innovation and human capital accumulation that spur economic growth may also alter the distribution of income in ways that endogenously change the effectiveness with which financial systems ameliorate information frictions and the types of financial sector policies enacted by the an economy. Thus, a central theme in this paper is that finance, growth and inequality evolve jointly and that ignoring one component, or adopting a static framework, might involve substantial analytical costs.

Our review and critique of the literature focuses on the role of the financial system in shaping the intergenerational persistence of relative incomes, rather than on providing a comprehensive review of research on income distribution and poverty. The Handbook of Income Distribution is almost 1,000 pages and we do not seek to update this sweeping collection of surveys. Rather, we describe broad theoretical approaches to understanding intergenerational income dynamics, and argue that future theoretical research should examine how the emergence of financial contracts, markets, and institutions under specific laws, regulations, and policies affect the intergenerational dynamics of poverty and relative incomes. When, we turn to the empirical literature, we focus on the relationship between the functioning of the financial system and the dynamics of poverty and income distribution. While the empirical literature suggests that financial development reduces the persistence of relative incomes across generation, there are many questions and gaps that should be addressed by future research.

## 2. Theories of Persistent Inequality and Poverty

In this section, we discuss theories of the intergenerational persistence of poverty and relative incomes. In particular, we describe how different assumptions regarding preferences, technologies, and financial market frictions shape the dynastic transmission of wealth and human capital, which in turn determine the short-run and long-run persistence of cross-dynasty relative incomes. Since theories of intergenerational income dynamics are frequently interwoven with theories of economic growth, our presentation reflects these linkages, though our focus is on cross-dynasty relative income persistence.

### 2.1. Asset accumulation and persistence

#### 2.1.1. Savings behavior and persistence

We begin with a simple equation that divides total income of dynasty  $i$  in generation  $t$ ,  $y(i,t)$ , into wage income and income from physical capital:

$$y(i,t) = h(i,t)w(t) + a(i,t)r(t), \quad (1)$$

where  $h(i,t)$  is human capital,  $w(t)$  is the wage rate,  $a(i,t)$  represents inherited assets as a function of parental income, and  $r(t)$  is the return on assets. In this initial specification, we assume that the return on assets is the same across dynasties. In our review, we systematically describe theories concerning the behavior of each of the components of equation (1) and how this behavior affects the evolution of the distribution of income.

Under standard assumptions, the equation suggests that the children of rich parents tend to be richer than those of poor parents, even when holding labor income equal across dynasties. More specifically, the intergenerational correlation of income will be positive if inheritance (saving) is a

positive function of parental income  $[\partial a(i,t)/\partial(y(i,t-1))] > 0$ , i.e.,  $a' > 0$ . Rich parents bequeath more money than poor parents, which perpetuates relative income differences.

The positive correlation between parental and child income, however, does not necessarily imply that cross-dynasty relative income differences persistent in the long-run. We continue to hold labor income constant. If the inheritance (saving) function is a concave function of parental income,  $a' > 0$   $a'' < 0$ , then average savings rates  $a/y$  decline as income  $y$  rises. Consequently, relative income differences between dynasties decline across generations since we are holding labor income constant across dynasties. In short, wealth inequality declines and converges to a unique ergodic distribution (Stiglitz, 1969).

Within this simple framework, relative income differences across dynasties will persistent in the long-run when rich parents bequeath (save) a higher percentage of their incomes to their children than poor parents. More specifically, if we continue to hold labor income constant and if the inheritance (savings) function is a convex function of parental income,  $a' > 0$  and  $a'' > 0$ , then average saving rates  $a/y$  rise with income, putting upward pressure on wealth inequality (Bourguignon, 1981).<sup>3</sup> In this case, dynastic wealth will not converge in the steady-state, wealth differences will persistent in the long-run, and the long-run distribution of wealth will depend on the initial distribution of wealth.<sup>4</sup>

Thus, with no financial market frictions and no cross-dynasty differences in labor income, convex bequest preferences produce long-run persistence in relative income differences across dynasties. It is difficult, however, to assess directly the relationship between saving behavior and

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<sup>3</sup> The simplifying assumption that labor income is constant across dynasties is not innocuous. The Bourguignon (1981) results on long-run persistence with convex saving behavior will not necessarily hold if increases in capital increase demand form human capital (Galor and Moav, 2004).

<sup>4</sup> Furthermore, the level of assets  $a(i,t)$  can influence the returns that are available to dynasty  $i$  in generation  $t$ . Under some conditions, this can create another convexity that fosters intergenerational persistence in relative incomes. For example, minimum investment requirements or fixed costs associated with high-return investments, including high-return entrepreneurial activities, imply higher returns to wealthier individuals  $\partial r(a(i,t),t)/\partial a(i,t) > 0$ .

intergenerational persistence of relative incomes. Consequently, researchers have empirically examined other testable implications of convex savings behavior.

A number of empirical observations, however, suggest that convex savings behavior is not driving persistent income inequality. One implication of convex saving behavior is that greater income inequality will be positively associated with aggregate economic growth. Consider two economies that are equivalent except economy A has a perfectly equal distribution of income across dynasties, while economy B has a skewed distribution of income. With convex savings, the economy B will have a higher aggregate savings rate and therefore will enjoy a higher average per dynasty income level in the next period. The evidence pushes against this conclusion, however. A growing body of empirical work finds that income inequality hurts growth Alesina and Rodrik (1994), Persson and Tabellini (1994), Clarke (1995), Perotti (1996), and Easterly (2002).

Although the finding of a causal, negative relationship between inequality and growth is by no means definitive (Forbes, 2000; Lundberg and Squire, 2003), the evidence does not suggest that inequality is associated with faster economic growth as suggested by the assumption of convex savings within the very simple framework considered thus far. Our point is not that the savings function is concave. The point is that a convex savings function alone does not jointly explain two empirical findings: persistent inequality and the absence of positive relationship between inequality and growth. This has helped push researchers to look beyond convex savings behavior to explain the intergenerational persistence of poverty and relative incomes.<sup>5</sup>

### **2.1.2. Finance, asset accumulation, and persistence**

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<sup>5</sup> Endogenous fertility decisions can further motivate the assumption of a convex savings function in per capita terms. Specifically, if poor dynasties have more kids than rich ones, cross-dynasty per capita wealth inequalities can persist across generations even if all dynasties have the same savings rate in aggregate terms (Atkinson, 1980; Chu, 1991; Piketty, 2000). Galor and Weil (2000), however, argue that empirically fertility falls with human capital, not with wealth. This advertises the value of studying human capital accumulation, not simply relying on convex savings decision, to better understand long-run persistence of relative incomes.

Rather than focusing on different savings rates across dynasties, Jovanovic and Greenwood (1990) stress cross-dynasty differences in assets returns. In particular, they assume that it is costly to assess the quality of projects. There is a fixed cost to joining financial intermediaries that produce information about projects and hence boost returns to members of the financial intermediary. When a dynasty joins an intermediary, the expected returns on its savings,  $r(i,t)$  will increase. Joining the financial intermediary also improves the efficiency of social resource allocation, spurring aggregate growth. Growth means that more individuals can afford to join financial intermediaries, which gives more individuals access to higher rates of return.

In the Greenwood and Jovanovic (1990) model, the relation between growth and income distribution follows a distinct path that depends on financial development, but the model does not produce long-run persistence in relative income differences. At low levels of economic development few people join intermediaries because of the high fixed costs relative to income, so growth is slow and the distribution of income is equal. Over time, some people join the financial intermediary and enjoy greater returns. Both growth and income inequality increase. Eventually, many people can afford to join the intermediary, which maximizes growth and reduces inequality. This model does not produce long-persistence in relative incomes across dynasties since in the long-run everyone joins the intermediary and enjoys high returns.

Greater financial development speeds the convergence of the economy to a state with no cross-dynasty income differences. The inverse of the cost of joining the financial intermediary represents the level of financial development. As financial development improves, more people can more readily join the intermediary and have access to higher returns. This expedites the transition from (i) a low level of economic development with little income inequality and slow growth to (ii) a high level economic development with little income inequality and fast growth. In

the Greenwood and Jovanovic (1990) model, the transition period during which there are substantial cross-dynasty income indifferences shrinks as the level of financial development increases.

### **2.1.3. Value of incorporating human capital into theories of persistence**

Although theories of cross-dynasty differences in saving rates and asset returns provide predictions about the intergenerational persistence of relative incomes, many factors advertise the comparative role of human capital accumulation, rather than asset accumulation, in understanding the persistence of relative income levels. For example in the United States, the correlation of wages across generations is 0.5, while it is 0.7 for total earnings. Thus, wages account for 70% of persistence in total earnings across generations. Unsurprisingly, therefore, researchers have carefully researched the role of human capital accumulation in explaining long-run persistence in relative incomes.

Another factor that motivates research on the role of human capital in accounting for both the long-run distribution of income and long-run economic growth is that human capital has fundamentally distinct characteristics from physical capital even when both are subject to diminishing returns. In particular, human capital is embodied in individuals and is potentially subject to diminishing returns at the individual level. Physical capital is not embodied in individuals, so any diminishing returns occur at the economy level. These differences imply that human and physical capital cannot be treated symmetrically. This difference is most clearly articulated by Galor and Moav (2004, 1002):

In contrast to physical capital, human capital is inherently embodied in humans and the existence of physiological constraints subjects its accumulation at the individual level to diminishing returns. The aggregate stock of human capital would be therefore larger if its accumulation would be widely spread among individuals in society, whereas the aggregate productivity of the stock of physical capital is largely independent of the distribution of its ownership in society. This asymmetry

between the accumulation of human and physical capital suggests therefore that as long as credit constraints are largely binding, equality is conducive for human capital accumulation, whereas provided that the marginal propensity to save increases with income, inequality is conducive for physical capital accumulation.

Thus, to understand the evolution of the distribution of income -- as well as linkages between income distribution and long-run growth, researchers have focused on the characteristics of human capital accumulation.

## **2.2. Finance, human capital accumulation, and persistence**

Theories of human capital dynamics can also produce both short-run and long-run persistence in cross-dynasty relative incomes. In these models, differing assumptions about the production of human capital and the degree of financial market frictions influence the degree of intergenerational income dynamics. Furthermore, many of these analyses of cross-dynasty differences in human capital have been integrated into theories of aggregate growth. This line of inquiry is part of a broader movement in macroeconomic, which argues that the dynamics of income distribution and long-run growth are inextricably intertwined. By reviewing this literature, we naturally highlight the central role of financial market imperfections in shaping the dynamics of the distribution of income, economic growth, and their interactions.

### **2.2.1. Initial models**

Let  $h(i,t) = h(e(i,t), s(i,t))$ , where  $e(i,t)$  is the dynastic endowment of ability and  $s(i,t)$  is investment in human capital accumulation (schooling). Further assume that ability endowments and schooling are complementary inputs in human capital production, so that  $\partial^2 h / \partial e \partial s > 0$ . Thus, it is socially efficient for kids with high ability endowments to receive the most schooling.

With perfect credit markets, high ability people get schooling irrespective of parental wealth. That is,  $h(i,t)$  is only a function of  $e$  and the economy attains the socially efficient allocation of  $s$ . An individual's economic opportunities are determined by her endowment of ability.

In this framework, explicit assumptions about the evolution of dynastic abilities influence the degree of short-run and long-run persistence of relative incomes. Ability endowments are frequently specified as follows:  $e(i,t) = \rho e(i,t-1) + \varepsilon(i,t)$ , where  $\rho$  is the intergenerational correlation of abilities, and  $\varepsilon(i,t)$  represents the random component of individual ability. The bulk of the literature assumes that ability is only partially inherited, so that  $0 \leq \rho < 1$ . As argued by Becker and Tomes (1986), this implies that ability regresses to the mean. While the children of high ability parents tend to have greater abilities than children from low ability parents, the relative difference in ability tends to shrink from generation to generation, subject to the random shock  $\varepsilon(i,t)$ .

Maintaining the assumption that ability is mean reverting, influential papers by Loury (1981) and Becker and Tomes (1986) show that the degree of cross-dynasty relative income persistence depends on the degree of financial market imperfections. Human capital differences across dynasties tend to vanish quickly with perfect capital markets since ability regresses to the mean and individuals can borrow to finance the efficient level of schooling regardless of dynastic wealth.

Imperfect credit markets increase the (short-run) persistence of cross-dynasty differences in human capital, with corresponding implications for cross-dynastic differences in income and

wealth (Loury, 1981).<sup>6</sup> Even if ability tends to regress toward the mean, there will be a slower reduction in cross-dynasty human capital differences if access to schooling is constrained by parental wealth so that  $s(i,t)$  is a function of  $a(i,t-1)$  and  $h(i,t) = h[e(i,t), a(i,t-1)]$ . Thus, children from rich parents with comparatively low abilities will frequently receive more schooling than comparatively high ability children from poor families. This (i) increases the cross-dynasty persistence of relative incomes, (ii) reduces the economic opportunities of individual born into poor dynasties, and (iii) lowers the socially efficient allocation of schooling resources. Loury (1981, p. 851) emphasizes the central role of financial market imperfections in accounting both for persistent inequality and inefficient resource allocation by quoting from Arthur Okun (1975, P. 80-81):

The most important consequence (of an imperfect loan market) is the inadequate development of the human resources of the children of poor families—which I would judge, is one of the most serious inefficiencies of the American Economy today.

In these models with mean reverting abilities, however, wealth differences disappear in the long-run as all initial wealth distributions converge. Greater financial market imperfections increase the persistence of intergenerational relative income differences and slow the speed of convergence. However, to generate permanent differences in relative incomes, one needs to adopt different assumptions regarding the technology for human capital accumulation.

### **2.2.2. Human capital accumulation, parental human capital, and persistence**

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<sup>6</sup> Building on Becker and Tomes's (1979) model of intergenerational mobility, Loury (1981, 851-2) argues that financial market imperfections impede human capital accumulation, "Legally, poor parents will not be able to constrain their children to honor debts incurred on their behalf. Nor will the newly matured children of wealthy families be able to attach the (human) assets of their less well-off counterparts, should the latter decide for whatever reasons to not repay their loans. ... Moreover, the ability to make use of human capital is unknown even to the borrower."

It is possible to generate long-run persistence in cross-dynasty human capital differences by dropping the focus on mean-reverting ability and instead modeling human capital as a function of parental human capital. Galor and Tsiddon (1997) assume that all individuals have identical innate ability and model human capital accumulation as follows:  $h(t+1) = \phi\{h(t), s(t)\}$ . They assume positive, but diminishing returns to dynastic human capital and schooling, so that  $\phi_1 > 0$ ,  $\phi_{11} < 0$ ,  $\phi_2 > 0$ , and  $\phi_{22} < 0$ . They also assume that parental human capital and schooling complement each other,  $\phi_{12} > 0$ . Even with perfect capital markets, this model can, for particular parameter values, produce situations in which the distribution of human capital does not converge to a unique ergodic distribution. The initial level of dynastic wealth determines the pattern of dynastic human capital accumulation, and its long-run level (Galor and Tsiddon, 1997, 94).

A defining feature of Galor and Tsiddon's (1997) analysis of the intergenerational persistence of human capital differences is that it is conducted within a theory of long-run growth. This does not simply involve adding growth to a model of income inequality. The dynamical patterns of both growth and inequality interact, which both enriches and complicates the analyses.

For our purposes, integrating the study of intergenerational income dynamics into models of long-run growth has three critical implications: (1) the relationship between the distribution of income and economic growth changes during the process of economic growth, (2) policies that equalize outcomes rather than opportunities can stop economic growth, and (3) the probability of experiencing long-run persistence of relative income differences falls with economic growth and increases with the severity of financial market frictions. The Galor and Tsiddon (1997) model has both a home environment externality because human capital is positively associated with parental human capital and a global externality because average human capital in the economy boosts the rate of technological progress and output. At low levels of development, cross-dynasty human

capital inequality is advantageous for growth because it increases the incentives for rich dynasties to invest in schooling since  $\phi_{12} > 0$ . This can ignite a “take-off” in the accumulation of human capital because the increase in human capital by the initially rich enhances the global human capital externality, which boosts economic and encourages others to invest in schooling. Under these conditions, increases in inequality and growth are positively related at low levels of development. As growth continues, however, the returns to acquiring human capital become beneficial to all members of society. With perfect capital markets, poor dynasties readily respond to these incentives. This further boosts average human capital and hence growth through the global externality while *reducing* inequality. Thus, the correlation between inequality and growth changes during the process of economic development. Moreover, in this model, policies that maintain equality at low levels of development can stymie long-run economic growth by impeding the take-off of human capital accumulation.

Furthermore, the probability of experiencing long-run persistence falls if the financial system is frictionless in Galor and Tsiddon (1997). While not the focus of their investigation, perfect financial markets facilitate the accumulation of human capital, which increases the global human capital externality, and accelerates economic growth. As the global human capital externality increases, Galor and Tsiddon (1997) show that the distribution of relative incomes contracts, so that relative income differences tend not persist in the long-run. Thus, although there are parameterizations in which growth stagnates and relative income differences persist indefinitely, these situations are less likely with perfect capital markets because perfect capital markets facilitate the economy’s evolution toward a situation in which the global human capital externality drives growth and hence drives the distribution of human capital toward a unique long-run distribution.

### **2.2.3. Human capital accumulation, non-convexities, and persistence**

Alternative assumptions about human capital accumulation within a theory of economic growth also suggest that both (1) the degree of persistence of cross-dynasty relative income differences and (2) the nature of the relationship between economic growth and the evolution of the distribution of income depend on financial market imperfections. Consider Galor and Zeira (1993), who combine financial market frictions with a non-convexity in the production of human capital. They show that with imperfect credit markets and a fixed cost associated with schooling, inherited wealth distributions persist in the long-run. Unlike Loury (1981) and Becker and Tomes (1986), they do not focus on mean-reverting ability; indeed, Galor and Zeira (1993) assume that individuals have identical innate abilities. Unlike Galor and Tsiddon (1993), they do not model human capital as a smooth, concave function of parental human capital. Rather, Galor and Zeira (1993) consider a non-convex technology for creating human in conjunction with financial market frictions, so that self-financed investment in human capital is only feasible for rich dynasties. With these frictions, wealthier dynasties invest more in human capital accumulation. Inherited wealth determines each person's investment in human capital and hence the distribution of income in the next period. Consequently, the initial distribution of wealth does not converge in the long-run and cross-dynastic relative income differences persist in the long-run.

The joint modeling of income distribution and growth by Galor and Zeira (1993) further highlights the central role of the financial system in macroeconomic dynamics. The initial distribution of wealth combined with financial market imperfections determines aggregate levels of human capital accumulation and growth. If the distribution of initial wealth is highly skewed, then few people accumulate capital, which reduces aggregate efficiency, slows growth, and calcifies the distribution of income across dynasties. Thus, in the presence of financial market

frictions, the initial distribution of wealth is crucial for both long-run growth and the long-run distribution of income. As the financial system improves, however, this allows the poor to borrow to invest in human capital which both spurs aggregate growth and reduces income inequality. Thus, financial market imperfections shape the joint evolution of growth and the distribution of income across dynasties.

#### **2.2.4. Occupational choice, non-convexities, and persistence**

Other theories focus on the role of financial market frictions in affecting the ability of individuals to become entrepreneurs, with material implications for the persistence of income inequality. These theories stress that returns to physical capital investment can become dynasty-specific when there are fixed costs associated with becoming an entrepreneur. With financial market frictions, the initial distribution of wealth influences which dynasties can obtain external finance and acquire the business acumen to initiate projects. Both moral hazard and adverse selection can generate credit constraints as discussed by Aghion and Bolton (1997) and Bardhan (2000).<sup>7</sup> Thus, the initial distribution of wealth can influence total output and the future distribution of income. These assumptions generate both within and across country income distributional dynamics.

In particular, with financial market imperfections and nonconvexities in becoming an entrepreneur, poverty traps and persistent income inequality may arise (Kanbur, 2000, 799). Low wealth ( $a(i,t)$ ) prohibits entrepreneurship. Thus, low  $a(i,t)$  implies low  $r(i,t)$ , perpetuating the dynasty's relatively low income level. In addition, by impeding talented, but poor, individuals

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<sup>7</sup> Another channel through which market frictions may affect investment, especially by the poor, is by impeding the ability to hedge risk. Either through missing insurance markets, or through transactions costs that limit diversification, the inability for an entrepreneur to limit her personal risk will affect the types of investments she undertakes (See the review of this literature in Levine, 1997). Thus, poor risk diversification mechanisms can hinder efficient resource allocation. If there are fixed costs to accessing insurance and hedging services, then poor risk diversification will be a particularly large constraint on the poor.

from becoming entrepreneurs, credit constraints lower overall level of economic efficiency in the economy as emphasized above and discussed by Piketty (2000, p. 455). In particular, Banerjee and Newman (1994) show that (1) if everyone is very poor, there is only subsistence self-employment since nobody can afford to be an entrepreneur, so that there is a low level of inequality and slow growth and (2) with some initial inequality, the rich become entrepreneurs who hire workers and obtain high returns, so that growth is accompanied by widening income differences. Well-functioning financial markets, however, diminish the link between investment in a project and the wealth of the project owner.

### **2.2.5. Human capital, physical capital and inequality during growth**

As suggested above, there are fundamental differences between human and physical capital. In particular, human capital is embodied in individuals, and an individual's investment in human capital through schooling (or other forms of training) is likely to be characterized by diminishing marginal returns. Thus, if individuals have the same innate abilities, the economy-wide return to investment in human capital is maximized when this investment is spread across all individuals. In contrast, diminishing returns to physical capital occur at the economy-wide level, and the returns to physical capital accumulation are less closely associated with the concentration, or diffusion, of the ownership of this capital.

Based on these key differences between human and physical capital accumulation, Galor and Moav (2004, RES) develop a theory that jointly highlights the changing roles of physical and human capital and the impact of financial market frictions on the evolving relationship between inequality and economic growth. Specifically, they assume that the marginal propensity to save increases with income, the rate of return to physical capital accumulation is greater than the return to human capital accumulation during the early stages of economic development, and the returns

to human capital accumulation increase during the growth process relative to those of physical capital accumulation. Thus, during the early stages of economic development when capital accumulation is crucial for economic growth, inequality promotes growth by channeling resources toward individuals with higher marginal propensities to save. Since capital is not embodied in individuals, economic growth is maximized when aggregate savings is greatest, regardless of who saves. During this stage of economic development when returns to human capital accumulation are comparatively low, there is a positive relationship between income inequality and growth.

In later stages of economic development as human capital becomes more valuable, the poor would like to borrow to invest in human capital accumulation, but credit market imperfections inhibit their economic opportunities. At this stage, income equality is beneficial to growth because for the same level of average income per capita, more people can afford education, which boosts aggregate growth more than additional physical accumulation. Thus, the degree of income inequality affects growth, but this effect is positive at low levels of income per capita when capital is most important and the effect is negative at higher levels of average income per capita when human capital accumulation is essential.

For our purposes, this line of inquiry advertises two salient points. First, the relationship between economic growth and the intergenerational persistence of relative income differences may change during the process of economic development. Second, financial market frictions affect the degree of intergenerational persistence, the rate of economic growth, and the dynamic interactions between growth and the distribution of income. Unfortunately, researchers have not yet adequately examined the potentially pivotal role of financial development in shaping the dynamic interactions between the processes of growth and income distribution.

### 2.3. Public goods, externalities, and finance in theories of persistent inequality

Interactions between public goods, policies, politics, and financial market frictions may also affect both growth and the evolution of income inequality. In particular, an influential strand of research argues that output ( $Y$ ) is a function of capital ( $K$ ), labor ( $L$ ), and a public good ( $P$ ). Formally,  $Y=(K,L,P)$ , where the public good, such as public education, is financed with a proportional tax on capital that impedes capital accumulation. From a purely growth perspective, it is possible to derive the optimal tax that maximizes growth by balancing the growth-enhancing effects of providing a public good that is financed with a growth-reducing tax.

People with different income and wealth levels disagree about financing the growth-enhancing public good with a growth-retarding capital tax. The tax burden falls primarily on the wealthy. The benefits of the public good, however, are shared equally. Thus, low income individuals will prefer greater redistribution through a higher tax rate and greater expenditures on the public good, especially if poor dynasties cannot borrow to finance their children's education. The rich will prefer lower tax rates and faster capital accumulation, especially since the rich can self-finance human capital accumulation for their children. These theories predict that greater income inequality, therefore, will increase the proportion of the population favoring greater redistribution and higher taxes, while economies with a more equal distribution of income will favor lower taxes and less redistribution. This research also suggests that as income inequality widens redistributive policies will slow growth. Prominent examples of this line of research include Alesina and Rodrik (1994) and Persson and Tabellini (1994).<sup>8</sup>

Empirical work, however, conflicts with two key predictions emerging from this simple set-up (Perotti, 1996; Lindert, 1996). The data do not suggest that more unequal economies redistribute more than economies with less income inequality. Second, the data do not suggest

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<sup>8</sup> See the discussion in Kanbur (2000) as well as the insightful papers by Bertola (1993) and Perotti (1993).

that redistribution lowers growth. Thus, to fit the data better, researchers have developed more complex models of the interactions among public goods, policies, and politics.

By allowing for situations in which redistribution enhances the efficiency of resource allocation and the rate of economic growth, Benabou (2000) develops a theory that more accurately links with the empirical observations than the initial political economy models. In Benabou (2000), when inequality is very small, there is very strong support for redistribution because it does not cost anyone much and it boosts aggregate growth. As inequality rises, more people are hurt by redistribution, which empowers the political constituency against redistribution. A lower redistribution rate further increases inequality since the poor cannot borrow to finance schooling, while the rich can self-finance human capital accumulation. At high levels of inequality, the large proportion of the population below the mean level of wealth vote for redistribution. The growth effects of these different environment is ambiguous and depends on the strength of tax distortions on capital accumulation, the impact of public education on productivity, and the degree to which poor families can access financial systems and borrow to finance their children's education.

Going further, the dynamic interactions between inequality, public good provision, and politics can be incorporated into theories of long-run economic growth. Galor and Moav (2006) argue that the natural process of economic growth influences different groups' views about the use of tax revenues to finance growth-enhancing public education that raises wages and reduces inequality. Critically, the tensions between different groups arise endogenously as a natural part of the growth process. In a model with financial market imperfections that prohibit poor workers from financing their own education to optimal levels, Galor and Moav (2006) show that the long-

run accumulation of physical capital increases the returns to human capital accumulation and induces the capitalists to support the provision of public education for the poor.

Thus, capitalists benefit from the aggregate accumulation of human capital in society, while landowner lose, assuming that human capital complementarities are lower for landowners (Galor, Moav, and Vollrath, 2006). Since individuals face diminishing returns to human capital accumulation, the aggregate stock of human capital is larger if its accumulation is widely spread. Thus, without public education investment in human capital is socially suboptimal due to borrowing constraints. The acquisition of human capital skills increases wages relative to the return on capital. Thus, inequality will persist, and the economy will stagnate in this model, unless the industrialists and labor can exert sufficient political power to finance public education.

A distinct line of research stresses that with financial market imperfections and human capital externalities, high-human capital individuals may self-segregate with powerful consequences for the intergenerational persistence of relative incomes (Benabou, 1993, 1996a, Fernandez and Rogerson, 1996, Durlauf, 1996). If the marginal private benefits of having more educated neighbors are higher for more educated people, then market forces push toward segregation. High-educated people are ready to pay a marginally higher rent (or taxes or other inconveniences) to live next to high-educated people. Local externalities, therefore, can make market equilibria Pareto inefficient by impeding the human capital accumulation of comparatively poor dynasties, which perpetuates cross-dynasty income differences. Financial market imperfections also play a crucial, though frequently ignored, role in these local-externality explanations of persistent inequality. The rich become segregated only if the poor cannot borrow sufficiently to build a home in high-education neighborhoods.

## 2.4. Discussion

Theoretical models have stressed two public policy strategies for reducing the persistence of intergenerational relative income differences. First, as highlighted by Aghion, Caroli, and Garcia-Penalosa (1999), ongoing income and wealth redistributions from the rich to the poor reduce the impact of parental wealth on the economic opportunities of their progeny. Aghion and Bolton (1997) argue that redistribution must be ongoing to reduce the persistence of cross-dynasty income inequality. If the redistribution is only a one-time event, then factors that produce inequality after the redistribution may ignite forces that produce long-run persistence in cross-dynasty relative income differences. Thus, one-time redistributions will temporarily reduce inequality of opportunities, but ongoing redistributions are necessary for eliminating the long-run persistence of cross-dynasty relative income differences. Second, the literature stresses the importance of public education for reducing inequality of economic opportunities. As reviewed above, numerous theories emphasize the role of human capital accumulation in (i) producing economic growth and (ii) accounting for the dynamics of cross-dynasty relative income differences.

In our review, we both show that financial market imperfections are crucial components of theories of persistent income inequality and that surprisingly little research examines whether financial sector policies affect the evolution of the distribution of income. We do not argue that financial sector policies are more or less important than public education in shaping the dynamics of relative income inequality. Similarly, we do not argue that the social costs of the adverse incentive effects from income redistribution outweigh the social benefits from reducing differences in economic opportunities associated with parental wealth differences. We simply hold that given the central role of financial market frictions in theoretical explanations of

persistent income inequality, researchers should devote more energy to analyzing financial sector regulations and policies.

Our focus on the financial sector also connects to the historical development of views on the linkages between economic growth and the evolution of the distribution of income. Initially, many models stressed that relative income differences were essential for economic growth because (i) income differences create incentives for individuals to work hard and (ii) a wider dispersion of relative incomes boosts aggregate physical and human capital accumulation under some conditions. A growing body of empirical evidence pushes away from this conclusion, however. In fact, many papers find that inequality slows economic growth by stymieing factor accumulation.

Thus, an exciting new line of inquiry examines the joint evolution of growth and relative income differences. These theories emphasize that the relationship between inequality and growth depend on the stage of economic development. These theories also advertise the central role of financial market frictions in jointly explaining growth, the intergenerational persistence of relative incomes, and the interactions between growth and relative income differences. Again, from our perspective, this new line of research further advertises the potential returns from examining whether financial sector policies matter for the persistence of relative income differences.

### **3. Empirical Evidence on Finance, Inequality, and Poverty**

We now turn to the empirical evidence on the linkages between the operation of the financial system and distribution of income and poverty. As we have seen in the first part of the paper, financial market frictions are the critical ingredients in many models of the dynamics of poverty and income distribution. It is those imperfections –such as information and transaction

costs - that prevent broad access to finance since they tend to be especially binding on the talented poor and the micro and small enterprises that lack collateral and credit histories. Hence without access, poor individuals and small enterprises need to rely on their personal wealth or internal resources to invest in their education, become entrepreneurs or take advantage of promising growth opportunities.

When we review the empirical literature on finance and development, three issues immediately stand out: (i) there is very little research on how financial development shapes the evolution of poverty and the distribution of income; (ii) the bulk of the empirical literature on finance and growth focuses on measures that capture the depth of financial systems as opposed to their breadth, while development theories emphasize the importance of broad access; (iii) this is partly due to unavailability of systematic information on measures of access to finance, which the literature is starting to focus on relatively recently. Hence, while the bulk of the evidence reviewed in the rest of this section is encouraging and consistent with the crucial role of finance in development as depicted by theory, there is still significant amount of work that remains to be done to establish these links empirically.

The next two sections discuss the empirical evidence from cross-country studies and microeconomic studies based on household and firm level studies, respectively. The last section concludes with a summary of future research agenda.

### **3.1. Macroeconomic evidence**

In examining the relationship between finance, income inequality, and poverty, it is helpful to recall that (1) a large literature finds that financial development – as measured by measures of depth, such as credit extended to the private sector divided by GDP per capita - accelerates

aggregate economic growth and (2) there is an identity linking aggregate growth, income of the poor, and inequality. Specifically, if  $Y_p$  equals the per capita income of the lowest quintile,  $Y$  equals average income per capita, and  $L$  is the Lorenz curve which relates the share of income received to the share of the population, then  $Y_p = Y * L(0.2) / 0.2$ . Differentiating with respect to time and letting  $g(x)$  represent the growth rate of variable  $x$  yields  $g(Y_p) = g(Y) + g(L(0.2))$ . The growth of per capita income of the poorest quintile equals the growth of average per capita income plus the growth of the Lorenz curve, which captures changes in income distribution. Thus, if financial development does not intensify income inequality (too much), financial development will reduce poverty by boosting overall economic growth. If, however, financial development intensifies income inequality, then this income distribution effect could negate – or even reverse – the poverty-reducing influence of financial development that operates through overall growth. Or, finance might disproportionately help the poor, in which case financial development would affect poverty through two channels: overall growth and a flattening of the distribution of income.

### **3.1.1 The distribution of income**

To assess the relationship between the operation of the financial sector and the distribution of income in an economy, researchers examine the evolution of national Gini coefficients. Research on Gini coefficients finds that financial development is associated with lower levels of income inequality.

Beck, Demirguc-Kunt and Levine (2007) find that there is a negative relationship between financial development and the growth rate of the Gini coefficient, which holds when controlling for real per capita GDP growth, lagged values of the Gini coefficient, a wide array of other country-specific factors, and when using panel instrumental variable procedures to control for endogeneity and other potential biases. They also find that financial development exerts a

disproportionately positive impact on the relatively poor. Financial development boosts the growth rate of the income share of the poorest quintile, thus helping the poor above and beyond the impact on aggregate growth. Specifically, researchers find that about 40 percent of the impact of financial development on the income growth of the poorest quintile is the result of reductions in income inequality, while the remainder of the impact is due to the effect of financial development on aggregate economic growth. These results are robust to conditioning on many country traits and when employing a panel instrumental variable estimator to control for potential endogeneity bias.<sup>9</sup>

This analysis is linked most closely to the model of Galor and Moav, where education is passed from generation to generation, so that the level of finance may influence the rate of human capital accumulation and hence changes in inequality and poverty over time. These results also complement the work of Clarke, Xu, and Zou (2006) and Li, Squire, Zou (1998) who study the relationship between financial development and the level of the Gini coefficient and find a negative effect.

### **3.1.2. Poverty**

While the empirical findings reviewed above suggest financial development is particularly beneficial to the income growth of the poor, it should be remembered that the poor in this analysis means something different for each country, in each period. Hence, this is an analysis of income distribution, rather than poverty.

Examining international poverty rates computed by the World Bank, researchers (Honohan, 2004; Beck et al., 2007) find that financial development is negatively correlated with

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<sup>9</sup> Dollar and Kraay (2002) use a highly unbalanced system panel estimator to examine the relationship between the income of the poor, median income, and policy indicators. They find that average income and income of the poor move equiproportionately. Changes in income and changes in inequality are unrelated. When they examine one measure of financial development, commercial bank / total banking assets, it does not enter significantly. But, this is not a very conventional or appealing measure of financial development.

poverty and the growth rate of poverty. In particular, Beck et al (2007) regress growth of poverty, which is measured as the fraction of the population living on less than \$1/day (or \$2/day) on the level of financial development, initial poverty, initial income, economic growth, and many other country traits. They find a robust negative relationship and show that for the median country in their sample, about half of the impact of financial development on the headcount measure of poverty is due to financial development accelerating economic growth, and the other half is due to financial development reducing income inequality. However, the sample is small and it is not possible to use panel estimators to control for potential endogeneity, making these results subject to greater qualifications.

In neither cross-country analyses of poverty or income distribution does research focus on access to finance, relying on measures of financial depth instead. However, financial depth is an imperfect measure of breadth of financial development or broad access, and it is employed by researchers primarily because it is available for many countries over long periods. Even deep financial systems may provide very limited access if there is no competition, mainly serving the incumbents at high cost. Thus far, the literature has not examined the impact of different financial sector policy reforms either on income distribution and poverty either.<sup>10</sup> Furthermore, there is no work that tests whether the poverty and income distribution effects of policy reforms depends on

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<sup>10</sup> There is very little macro or micro work in this area. One exception is Burgess and Pande (2004) who investigate the linkages between banking sector operations and poverty. They look at the introduction and removal of a nationwide bank branch licensing rule which sought to increase and equalize bank branch presence across Indian states to estimate the effect of rural bank openings on poverty. Between 1977 and 1990, an Indian bank had to open four branches in locations with no bank branches to qualify for a license to open a branch in a census location which already had one or more bank branches. They find that rural branch expansion in India significantly reduced rural poverty. The default rates, however, were around 40%. Moreover, the program was not self-sustaining because the banks stopped creating extra branches as soon as the policy was stopped. It is also not possible to answer the question whether this money may have generated greater poverty reduction if spent elsewhere as opposed to being invested in loss-making branches. Furthermore, since few developing countries have a sufficiently attractive urban banking market, it is not clear whether this policy can even be applied in other countries.

other policies that are designed to combat poverty and income inequality, such as public education and redistributive policies.

### **3.2. Microeconomic evidence**

In this section we review the empirical evidence on the impact of financing constraints on households and enterprises and discuss the role of microfinance in relaxing the financing constraints for the poor. Finally, we also discuss the use of calibrated general equilibrium models in assessing the relationship between financial development, income inequality and poverty.

#### **3.2.1. Financing constraints faced by households**

Microeconomic evidence indicates that financial market imperfections help sustain income inequality and poverty traps by hindering the ability of the poor to accumulate human capital. Using household data from Peru, Jacoby (1994) finds that lack of access to credit perpetuates poverty because poor households reduce their children's education. Similarly Jacoby and Skoufias (1997) show that households from Indian villages without access to credit markets tend to reduce their children's schooling when they receive transitory shocks more than households with greater access to financial markets. There are also studies that examine the effect of borrowing constraints on human capital accumulation in the context of US college education. Flug, Spilimbergo, Wachtenheim (1998) use cross-country panel regressions over 1970-1992 to show that lack of access to financial markets reduce average secondary school enrollment rates. Lazear (1980) and Lang and Ruud (1986) show that finance affects the persistence of income inequality by disproportionately impeding the ability of the poor to accumulate income-enhancing human capital.

Financial market imperfections also encourage child labor, with adverse implications on human capital accumulation in poor families. Beegle, Dehejia and Gatti (2007) use a household panel survey in Tanzania to show that transitory income shocks (crop shocks) lead to greater increases in child labor in households with fewer assets (which are used both as buffer stocks and collateral for borrowing). Guarcello, Mealli and Rosati (2002) use data from Guatemala and show that child labor increases in response to broadly defined income shocks and self reported credit rationing. If the household has assets, including pension assets (which they can either use as a buffer or as collateral to borrow), child labor does not increase with the negative income shock (Edmunds, 2004). Hence, access to credit is important. Using cross-country analyses, Dehejia and Gatti (2005) find that financial development in the period 1960-95 is associated with a reduction in child labor.<sup>11</sup>

One shortcoming with most of these studies reviewed in this section is again the difficulty associated with deriving a satisfactory proxy for access to finance/credit constraints. While the macro literature relies on aggregate measures of financial depth, the authors of micro studies use variables like ownership of fixed assets, which are essentially financial wealth measures assumed to pick up credit constraints. More recent experimental studies investigate the impact of access to credit more directly, however. Karlan and Zinman (2006a,b) work with a major South African lender to better understand the prevalence of credit constraints in the consumer credit market. They use randomized field experiments – and a direct indicator of access - to show that access to consumer credit reduce unemployment, hunger, and poverty.

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<sup>11</sup> There is also a theoretical literature that models the role of household access to credit in determining the extent of child labor: Parsons and Goldin, 1989; Ranjan 1999, 2001; Baland and Robinson 2000; and Jafarey and Lahiri 2002).

### **3.2.2. Financing constraints faced by enterprises**

In this subsection, we review research findings that financial constraints hinder efficient investment. To the extent enterprises cannot access finance to undertake promising investments, this is likely to exacerbate inequalities and lead to poverty traps. In many developing countries small and medium enterprises face difficulties accessing finance, due to absence of credit information and connections.

Earlier work in this area, using cross-country firm level data sets showed that a greater proportion of firms financed their growth externally in countries with more developed financial systems and more efficient legal enforcement (Demirguc-Kunt and Maksimovic, 1998). Using industry level data for 44 countries and 36 industries and difference-in-difference approach Beck, Demirguc-Kunt, Laeven and Levine (2006) show that financial development boosts the growth of small firms disproportionately more. However again, in these studies financial development was measured by financial depth. More recently, attention shifted to direct measures of access to finance. Using data from enterprise surveys for 54 countries, and direct measures of credit constraints reported by firms, Beck, Demirguc-Kunt and Maksimovic (2005) show that the growth of smaller firms is significantly more constrained by financing obstacles, particularly in countries with less developed financial systems.

Using data on microenterprises, research also finds that financial constraints importantly shape economic development. De Mel et al. (2006) and McKenzie and Woodruff (2006) conduct randomized experiments in Sri Lanka and Mexico to measure the return to capital for the average microenterprise in their sample regardless of whether or not the enterprise applies for credit. By providing cash and equipment grants to microenterprises and measuring the increase in profits arising from this exogenous positive shock to capital stock, they are able to show that returns to

capital are substantially higher than market interest rates. However, showing high return to investment is not synonymous with demand for credit and it is not obvious these enterprises would be willing to borrow or able to obtain financing.

### **3.3. Relaxing the financing constraints faced by the poor: The role of Microfinance**

An extensive literature explains why the poor frequently lack access to financial services besides the basic notion of fixed costs to accessing financial markets and institutions (Besley, 1995, Rajan, 2006, Stiglitz, 1990). Social and physical distance from the formal financial system may matter. The poor may not have anybody in their social network familiar with financial services. Poor education may make it difficult for the poor to fill out loan applications. The small value of the transactions may make the provision of financial services unprofitable to financial service providers. Physical distance may also matter, as financial institutions are likely to be in richer neighborhoods. In terms of accessing credit, the poor have no collateral, and cannot borrow against their future income because they tend not to have steady jobs or income streams. Dealing with small transactions is also costly for the financial institutions.

Microfinance – specialized institutions that serve the poor- seek to overcome the obstacles keeping the poor from accessing finance (Morduch, 1999; Armendariz de Aghion and Morduch, 2005). With microfinance programs, the loan officers come from similar social status as the borrowers and go to the poor instead of waiting for the poor to come to them. Microcredit also involves education as much as it provides credit. Group lending schemes not only improve repayment incentives and monitoring through peer pressure, but they are also a way of building support networks and educating borrowers. The joint liability contract can, in principle, mitigate moral hazard and adverse selection by harnessing local information and enforcement possibilities.

Ahlin and Townsend, 2006 and Cassar et al. 2006 provide theoretical perspectives and empirical tests of group mechanisms.<sup>12</sup>

There is considerable skepticism, however, about the ability of microfinance credit programs to reduce poverty, lower income inequality, or stimulate economic growth. One difficulty associated with evaluating the aggregate ramifications of microfinance is that microfinance around the world has been very non-uniform, with significant penetration rates only in a few countries like Bangladesh, Indonesia and Thailand (Honohan, 2004). Research is exploring determinants of these disparities, and policy choices governments can make to improve microfinance performance and penetration (Cull, Demirguc-Kunt and Morduch, 2007). While microfinance increases access to financial services to those participating in the program, these types of group lending programs are very costly to operate and typically require extensive subsidies. (Robinson, 2003; Armendariz de Aghion and Morduch, 2005 discuss subsidy and sustainability in their chapter 9).<sup>13</sup> Skeptics question whether subsidizing microfinance programs is the best use of scarce development assistance. Some stress the advantages of developing better functioning mainstream finance, i.e., banking systems and securities markets (Honohan, 2004).

While microfinance research has focused on access to finance all along, and is therefore closely related to development theory, one problem with focusing on microfinance is that in developing countries, it is not only the poor, but also the middle class who lack access to financial

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<sup>12</sup> Although group liability is often portrayed as the key innovation that led to the growth of the microfinance, it may also discourage good clients from borrowing. For example Gine and Karlan (2006) conduct a field experiment in the Philippines and find that conversion to individual liability does not affect repayment rates and helps attract new clients to the program.

<sup>13</sup> And keeping interest rates low is important for the mission of microfinance programs. Using data from credit cooperatives in the slums of Dhaka, Dehejia, Montgomery, and Morduch (2005) show that poor borrowers are especially sensitive to interest rates and find that when banks raise interest rates, the lending portfolio shifts to higher net wealth individuals.

services (see World Bank, 2007).<sup>14</sup> Hence, the attention of the development community is currently shifting to improving access for all underserved groups, as opposed to microfinance. While it is very important to internalize the lessons we learn from microfinance, focusing on broader access more generally is likely to have higher pay-offs in terms of poverty reduction. There are also good political economy reasons why the focus should not be on the poor or how we can make microfinance more viable, but instead on how financial services can be made available for all (Rajan, 2006). The poor lack the political clout to demand better services and by defining the issue more broadly to include the middle class makes it more likely that promotion of access will be made a priority.

### **3.4. Estimating the impact of credit constraints in general equilibrium models**

Banerjee and Duflo advertise the value of building general equilibrium models which can be calibrated using estimates from microeconomic studies to examine poverty and other phenomenon. They argue that macroeconomic evidence or any cross-country microeconomic evidence on the relationship between credit constraints and economic outcomes are very difficult to interpret because of identification problems. Although analysis of large, good quality, microeconomic datasets where credible identification restrictions can be obtained from exogenous sources of variation does not suffer from this weakness, there the challenge is how to bring together different pieces of evidence in an aggregate context. Hence, even a series of convincing micro empirical evidence is not good enough to provide an overall sense of how together they generate aggregate growth, the dynamics of income distribution and their relationships.

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<sup>14</sup> Another criticism of microfinance has been its over-emphasis of credit. Most microfinance institutions do not offer savings services beyond the compulsory savings linked to credit. Ashraf, Karlan and Yin (2005,2006) study the impact of offering different savings products on savings.

Many of these calibrated general equilibrium models emphasize the role of financial market imperfections in facilitating persistent income inequality and poverty traps. Paulson and Townsend (2003) build and calibrate a model with credit constraints using Thai household data to understand the relationship between wealth and the probability of becoming an entrepreneur. Wealthier households are more likely to start businesses. Furthermore, financial market imperfections impose greater constraints on entrepreneurial activity in the poor Northeast part of Thailand, compared to the more developed central region. Buera (2003) shows that the long run correlation between wealth and entrepreneurship is weaker than the short run correlation, which suggests that potential entrepreneurs can ameliorate credit constraints over the long term through savings.

Caselli and Gennaioli (2002) instead stress that credit constraints imply that the biggest firms may not be run by the best entrepreneurs, with adverse implications for economic efficiency and income inequality. Rather the authors find that big firms will be run by the wealthy. They build a model where the incidence of dynastic management depends on the severity of asset-market imperfections, on the economy's savings rate, and on the degree of inheritability of talent across generations. Hence, in the model financial market failures and savings rates affect aggregate total factor productivity. Calibrating the model using U.S. data, numerical simulations show that efficiency costs of this misallocation of talent leads to large productivity losses and can explain as much as 50 percent of cross-country differences in total factor productivity.

Jeong and Townsend (2003) and Townsend and Ueda (2003) build and calibrate their models to see if the path of wealth distribution matches the data. Townsend and Ueda study models that display growth with financial deepening and increasing inequality along the way to perpetual steady state growth. The benchmark model is a complete markets model with transaction

costs of financial intermediation. They calibrate the model and report quantitative predictions for Thailand during 1976-96. They interpret the discrepancies they find between the model and data as reflecting the existence of barriers to financial deepening and evaluate the associated welfare loss.

In Jeong and Townsend the authors compare two models (occupation-choice and financial deepening) to analyze how well they capture the observed patterns between growth and inequality, again using Thai data to calibrate the models. With incomplete markets or transactions costs, wealth can constrain investment in business and the choice of occupation and also constrain the timing of entry into the formal financial sector, which motivate the two models being compared. While both models capture important aspects of the Thai patterns, neither model does well in explaining the cross-sectional variation across sectors.

In another model, Gine and Townsend (2004) look at the aggregate growth effects and distributional consequences of financial liberalization in Thailand from 1976 to 1996. They build a general equilibrium occupational choice model with two sectors, one with no intermediation and the other with borrowing and lending. Calibrating the model using Thai data, the results indicate that talented entrepreneurs who otherwise would not have been able to get credit and start businesses are the biggest winners.

In summary, while these structural models illustrate the impact of credit constraints and are promising in improving our understanding of the micro foundations of growth and inequality, it is not always clear how much the insights from these stylized models rely on specific details of how the imperfections were modeled and whether the results are robust to these choices.

### **3.5. Summary discussion**

Existing evidence on financial development, inequality and poverty is encouraging and consistent with theory. However, there is still very little research on how financial development shapes the evolution of poverty and the distribution of income, and most of this evidence is at the very aggregate level. Most of the macroeconomic literature uses financial depth measures instead of measures to capture broad access, and microeconomic studies use financial wealth to proxy for credit constraints. Hence, while theory emphasizes the role of broad access to financial services – credit, insurance etc. - in development; most empirical work do not utilize measures to capture this access.

This gap in the literature is partly due to unavailability of systematic information on measures of access to finance. Hence future work in this area is likely to benefit from development of better indicators; indicators on who has access to which financial services, to establish how broad access is, who the underserved groups are, and the barriers to broaden this access. Beck, Demirguc-Kunt and Martinez Peria, (2007a,b) are efforts in this direction.

With better measures of access, it will be possible to study the impact of access to different financial services on development outcomes such as growth and poverty reduction. Such data will also make it possible to evaluate how reforms to financial policies influence the economic opportunities of the poor and the intergenerational persistence of relative incomes. And to be able to assess such impact it is also essential to build micro datasets at the firm and household level (World Bank, 2007). Randomized experiments that evaluate the impact of improving access to different types of financial services also hold promise.

Only through better measurement and evaluation of impact can research make progress in understanding which financial services are important in promoting growth and poverty reduction.

These results will in turn influence (i) the design of policy measures and financial sector reforms to broaden access, and (ii) efforts to narrow down which access indicators to track over time, in order to evaluate the impact of such policies.

#### **4. Conclusions**

Our critique of the literature stresses an overarching point: There are good conceptual reasons for believing that financial market frictions exert a first-order impact on the persistence of relative income dynamics, but too little theory and empirical research examines the impact of national financial sector policies on both the evolution of relative income levels and the opportunities faced by individuals with different relative income levels. Exciting developments in theory link the dynamics of income distribution and aggregate growth in unified models. These provide a natural environment for jointly studying the impact of financial sector policies on growth and changes in income distribution. Similarly, new databases on both access to finance and national financial sector policies offer opportunities for conducting better empirical work in the future. While it is unclear what answers researchers will find, the magnitude of the question advertises the value of pursuing this research agenda.

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