Commission on Growth and Development

WORKING PAPER NO.53

Investment Efficiency and the Distribution of Wealth

Abhijit V. Banerjee

WORKING PAPER NO. 53

Investment Efficiency and the Distribution of Wealth

Abhijit V. Banerjee

On behalf of the Commission on Growth and Development
1818 H Street NW
Washington, DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org
www.growthcommission.org
E-mail: info@worldbank.org
contactinfo@growthcommission.org

1 2 3 4 5 11 10 09 08

This working paper is a product of the Commission on Growth and Development, which is sponsored by the following organizations:

Australian Agency for International Development (AusAID)
Dutch Ministry of Foreign Affairs
Swedish International Development Cooperation Agency (SIDA)
U.K. Department of International Development (DFID)
The William and Flora Hewlett Foundation
The World Bank Group

Cover design: Naylor Design

About the Series

The Commission on Growth and Development led by Nobel Laureate Mike Spence was established in April 2006 as a response to two insights. First, poverty cannot be reduced in isolation from economic growth—an observation that has been overlooked in the thinking and strategies of many practitioners. Second, there is growing awareness that knowledge about economic growth is much less definitive than commonly thought. Consequently, the Commission's mandate is to "take stock of the state of theoretical and empirical knowledge on economic growth with a view to drawing implications for policy for the current and next generation of policy makers."

To help explore the state of knowledge, the Commission invited leading academics and policy makers from developing and industrialized countries to explore and discuss economic issues it thought relevant for growth and development, including controversial ideas. Thematic papers assessed knowledge and highlighted ongoing debates in areas such as monetary and fiscal policies, climate change, and equity and growth. Additionally, 25 country case studies were commissioned to explore the dynamics of growth and change in the context of specific countries.

Working papers in this series were presented and reviewed at Commission workshops, which were held in 2007–08 in Washington, D.C., New York City, and New Haven, Connecticut. Each paper benefited from comments by workshop participants, including academics, policy makers, development practitioners, representatives of bilateral and multilateral institutions, and Commission members.

The working papers, and all thematic papers and case studies written as contributions to the work of the Commission, were made possible by support from the Australian Agency for International Development (AusAID), the Dutch Ministry of Foreign Affairs, the Swedish International Development Cooperation Agency (SIDA), the U.K. Department of International Development (DFID), the William and Flora Hewlett Foundation, and the World Bank Group.

The working paper series was produced under the general guidance of Mike Spence and Danny Leipziger, Chair and Vice Chair of the Commission, and the Commission's Secretariat, which is based in the Poverty Reduction and Economic Management Network of the World Bank. Papers in this series represent the independent view of the authors.

Acknowledgments

I am grateful to Roberto Zagha for his encouragement.

Abstract

The point of departure of this paper is that in the absence of effectively functioning asset markets the distribution of wealth matters for efficiency. Inefficient asset markets depress total factor productivity (TFP) in two ways: first, by not allowing efficient firms to grow to the size that they should achieve (this could include many great firms that are never started); and second, by allowing inefficient firms to survive by depressing the demand for factors (good firms are too small) and hence factor prices. Both of these effects are dampened when the wealth of the economy is in the hands of the most productive people, again, for two reasons: first, because they do not rely as much on asset markets to get outside resources into the firm; and second, because wealth allows them to self-insure and therefore they are more willing to take the right amount of risk. None of this, however, tells us that efficiency-enhancing redistributions must always be targeted to the poorest. There is some reason to believe that a lot of the inefficiency lies in the fact that many medium-size firms are too small.

Contents

Investment Efficiency and the Distribution of Wealth

Abhijit V. Banerjee [1]

1. Introduction

One of the potentially most attractive features of market economies is that they put investment decisions in the hands of those who have the talent and the drive to invest well. Unfortunately, none of this is quite automatic: It all turns on asset markets doing their job well.

2. An Example

To appreciate what the issue is here, consider an economy where wealth has some distribution $G(w)$ with mean wealth W. There is only one good in this economy, and one production technology: This technology requires a minimum investment of K, but then yields an output of aK some time later, where a is the talent level of the entrepreneur making the investment. Assume that a is distributed, once again uniformly, between $\underline{a}$ and $\bar{a}$ and assume that talent is distributed independently of wealth.

We will speak about this technology of investment as if the outputs are widgets, but there is nothing in the formalism that stops them from being educated or healthy children. In other words, the basic logic applies as much to investment in human capital as any other kind.

How do those whose wealth is below K get to invest? The obvious answer is that they borrow. Suppose the interest rate is r. Then every entrepreneur who has a return of $a \geq 1 + r$ would be happy to borrow to invest. So assuming that there is not enough capital to make it worthwhile for everyone to invest—that is, the average wealth in the economy, W, is less than K, the minimum required

[1] Abhijit Vinayak Banerjee is currently the Ford Foundation International Professor of Economics at the Massachusetts Institute of Technology. In 2003 he founded the Abdul Latif Jameel Poverty Action Lab, along with Esther Duflo and Sendhil Mullainathan and remains one of the directors of the lab. He is a past president of the Bureau for the Research in the Economic Analysis of Development, a Research Associate of the NBER, a CEPR research fellow, International Research Fellow of the Kiel Institute, a fellow of the American Academy of Arts and Sciences and the Econometric Society, and has been a Guggenheim Fellow and an Alfred P. Sloan Fellow. His areas of research are development economics and economic theory. He has authored two books as well as a large number of articles and is the editor of a third book. He finished his first documentary film, "The Name of the Disease," in 2006.

investment—then the interest rate will have to clear the capital market. Only those whose a is high enough will then invest, and the rest will lend them their wealth. In particular, the marginal investor will be such that

$$\frac{\bar{a} - a^m}{\bar{a} - \underline{a}} K = W$$

or

$$a^m = \bar{a} - \left(\bar{a} - \underline{a}\right)\frac{W}{K},$$

and the market clearing interest rate will be $1 + a^m$.

If W/K were 1/10,[2] example, this would imply that the market clearing interest rate would have to go up to the point where only the top 10 percent most talented people would invest. The average productivity of those who invest will be

$$\begin{aligned} A_{av} &= \frac{\bar{a} + a^m}{2} \\ &= \bar{a} - \frac{1}{20}\left(\bar{a} - \underline{a}\right) \end{aligned}$$

The problem with this happy narrative is that it requires some people to borrow a very large multiple of their wealth (think of the person who has almost no wealth but invests an amount K). Suppose as an alternative that people can only borrow multiple $\lambda(r)$ of their wealth, where r is the going interest rate. Most models of credit markets suggest that λ should go down when r goes up. This ought to make sense—lenders try to limit their lending to individuals because they are worried about not getting repaid, and they must worry more when the interest rate is higher and therefore there is more to be repaid.

The presence of credit constraints immediately means that not everyone has the option of investing: In order to reach K, your wealth has to be at least $K/(1 + \lambda(r))$. What is a plausible value for the $\lambda(r)$ that applies to an average Indian firm? Unfortunately not very much is known about this: The one exception is Timberg and Aiyar's (1984) study of nonbank lenders in India, who

[2] Is this a reasonable value for K/W? Davies et al. (2006) estimate the per capita wealth to be $1,100 in India ($144,000 in the United States). This means that average household wealth is about $5,500 (family size is around 5). Of this, about 30 percent is real estate (Davies et al., 2006). The rest, that is about $4,000, is what is available for investment. We are therefore setting the minimum efficient scale in India to be $40,000, which is equivalent to about $250,000 in U.S. prices. $250,000 is the price of a very small business in the United States. Therefore, prima facie, there seems no reason to rule out a W/K ratio of 0.1 or even less.

report that some of the Shikarpuri and Rastogi lenders set an explicit credit limit that is proportional to the borrower's net worth. Several lenders said that they would lend no more than 25 percent of the borrower's net worth, though another said he would lend up to 33 percent—in other words $\lambda = 1/3$ or less. We will assume that λ is no more than 1: A λ of 1 corresponds, for example, to the case where the entrepreneur invests all his assets in a factory, and then is able to mortgage the full value of the factory to raise working capital. In this case the minimum wealth for someone to start a business will be $K/2$ or $20,000.

How many people in India have $20,000 in wealth? Davies et al. (2006) report that the top 10 percent of Indians own 53 percent of the wealth and the top 5 percent own 38 percent of the wealth. This means that the average wealth of those between the 90th and 95th percentile in the wealth distribution is 3 times the average wealth, which, we assumed, was about $6,000,[3] or $18,000. In other words, only those who are in the top 10 percent of the population can start a business.

Since only the top 10 percent can start a business, as compared to the entire population when there were no credit constraints, the fraction of that segment that starts a business must be 10 times as large. Obviously, this means dipping much deeper into the talent distribution. To see how much difference this makes, observe that the lowest a person who starts a business in this case, a^c, must be given by

$$\frac{\bar{a} - a^c}{\bar{a} - \underline{a}} = 10 \frac{\bar{a} - a^m}{\bar{a} - \underline{a}},$$

from which it follows that the average productivity of those who invest in this case will be

$$A_{av} = \bar{a} - \frac{1}{2}\left(\bar{a} - \underline{a}\right)$$

compared to

$$\bar{a} - \frac{1}{20}\left(\bar{a} - \underline{a}\right)$$

absent credit constraints.

If $\bar{a} = 2$ and $\underline{a} = 1$, this says that the average productivity would go down from 1.95 to 1.5. As is well-known, in this linear production model, the growth rate of this economy is simply proportional to the average net productivity,

[3] Note that we are allowing people to invest their total wealth into their firm and not just their nonhousing wealth.

$A_{av} - 1$. Given the numbers we have assumed, this would imply that the growth rate is effectively halved in the presence of credit constraints.

3. Why the Distribution of Wealth Matters

Suppose in the example of the previous section was altered so that everyone was equal in terms of their wealth. Then, the imperfect credit markets notwithstanding, if the capital markets clear the outcome should be as if the capital market was working perfectly. This is because if anyone is using the capital, this must include the most productive people (since they are willing to outbid everyone else to get the capital), who are the same people who would have done the investing absent credit constraints.[4]

In other words, the reason why the credit constraints were hurting in that example was because some less talented rich people are able to bid the capital away from some poorer but more gifted entrepreneurs (or, equivalently, the rich father of a mediocre student can bid away a seat in a good college from the poor father of the next would-be genius). This is what Caballero and Hammour (2005) call scrambling—the order of who gets to invest is all scrambled up.

Scrambling could actually be the best thing that could happen under these circumstances! We have been assuming all along that the capital market actually clears. In other words, the interest rate falls enough to make $\lambda(r)$ so large that the borrowers are able to absorb the entire amount of available capital. But what if this implies that the interest rate paid to lenders needs to be negative? Clearly, if, for example, the lenders prefer to stuff the money into their mattresses rather than lend it out at negative rates, the interest rate may not fall all the way to clear the market. Then things could be even worse: Some of the capital might end up "invested" in the "mattress" technology, which presumably earns no return, even if all the potential investors are highly productive.

The central point is that lenders do not care, per se, about what the borrower will do with the money. What matters to them is that they would get their money back with enough interest and if that is not the case, they would prefer not to lend or to lend to those potentially less productive people who are preferred borrowers. The distribution of wealth matters—and can potentially can matter a lot, as we saw above—because being a preferred borrower might have a lot to do with the ownership of wealth.

[4] Actually, in this case there are many equilibria, including the one we describe above; but almost any perturbation of the model that allows the credit supply to respond even a little bit to productivity would pick out the one we chose.

4. What We Know about the Ability to Borrow

A well-functioning credit market, as every student of basic economics knows, is one where there is a single interest rate and everyone can borrow or lend as much as they want at that rate.

How close are real markets to this idealized market? Chambhar is a market town in Sindh, on the east bank of the Indus. In 1980–81, farmers from the area around Chambhar got most of their credit from a population of about 60 professional moneylenders. Based on detailed data from 14 of these lenders and 60 of their clients (see Aleem, 1990), the average borrowing interest rate charged by these lenders seems to have been 78.5 percent. On the other hand, if these farmers wanted to lend their money out, the banking system would only pay them about 10 percent. However, it is possible that they may not have been depositing in the banks. An alternative measure of the deposit rate relevant for these farmers is the opportunity cost of capital to these moneylenders, which is 32.5 percent. In either case, it suggests a gap of at least 45 percentage points between the borrowing and lending rates. The borrowing rate also varied enormously across borrowers: The standard deviation of the interest rate was 38.14 percent compared to an average lending rate of 78.5 percent. In other words, an interest rate of 2 percent and an interest rate of 150 percent are both within two standard deviations of the mean. One possibility is that these differences reflect differences in the default rate: Perhaps the expected repayment is the same for everybody, because those who pay higher rates are more likely to default. Also the expected repayment could be equal to the actual interest rate paid to the depositors, if the default rate is high enough. However, default actually is very rare: The study gives default rates for each individual lender. The median default rate is between 1.5 and 2 percent and the maximum is 10 percent.

The same pattern—high and variable borrowing rates, much lower deposit rates, and low default rates—also shows up in the *Reports on Informal Credit Markets in India* (Dasgupta, 1989), which reports results from a number of case studies that were commissioned by the Asian Development Bank and carried out under the aegis of the National Institute of Public Finance and Policy. For the urban sector, the data is based on various case surveys of specific classes of informal lenders. For the broad class of nonbank financial intermediaries called Finance Corporations, it is reported that the maximum deposit rate for loans of less than a year is 12 percent while the minimum lending rate is 48 percent. These Corporations offer advances for a year or less at rates that vary from 48 percent per year to the utterly astronomical rate of 5 percent per day. The rates on loans of more than a year vary between 24 percent and 48 percent. Default, once again, is only a small part of the story: Default costs only explain 4 percent of total interest costs. The same report also tells us that for hire-purchase companies in Delhi, the deposit rate was 14 percent and the lending rate was at

least 28 percent and could be as high as 41 percent. Default costs were 3 percent of total interest costs.

Table 1 reports borrowing rates from the rural version of the same report. This was based on surveys of six villages in Kerala and Tamil Nadu, carried out by the Centre for Development Studies, Trivandrum. Interest rates are high, but they are also variable and the rich (those with Rs. 100,000 or more in assets) both get most of the credit (nearly 60 percent) and pay a relatively low rate (33 percent), while those with assets between Rs. 20,000 and Rs. 30,000 pay rates of 104 percent and get only 8 percent of the credit. Also while not reported in the table, the average interest rate charged by professional moneylenders (who provide 45.61 percent of the credit) in these surveys is about 52 percent. Although the average deposit rate is not reported, the maximum from all the case studies is 24 percent and the maximum in four out of the eight case studies is no more than 14 percent. Within the category of professional moneylenders, about half the loans were at rates of 60 percent or more, but another 40 percent or so had rates below 36 percent. Default rates were higher than in the urban sector, but still cannot explain more than 23 percent of the interest costs.[5]

The same Asian Development Bank project that gave us interest rates from India also surveyed borrowers in Thailand. Ghate (1992) reports on that survey: He finds interest rates of around 2–3 percent a month in the more developed south but much higher rates—5–7 percent a month, or between 80 percent and 125 percent per year—in the north and northwest. Note also that 5 percent a month and 7 percent a month are hardly the same rate.

Table 1: Asset Groups and Loans

Asset group (RS)	Average loan size	Average interest rate (% p.a.)	Cumulative proportion of credit
0–5,000	799.84	50	10.23
5,000–10,000	116.67	120	10.79
10,000–15,000	633.37	35	12.31
15,000–20,000	285.91	71	13.91
20,000–30,000	668.00	104	21.93
30,000–50,000	652.50	58	27.15
50,000–100,000	1267.83	48	41.34
100,000 and above	4075.00	33	100.00

Source: Ghate (1992).

[5] See also Swaminathan (1991).

None of these facts are necessarily surprising. Contract enforcement in developing countries is often difficult, and in particular, it is not easy to get courts to punish recalcitrant borrowers.[6] As a result, lenders often spend lots of resources making sure that their loans get repaid: It is plausible that these are the resources that drive a wedge between the borrowing rate and the lending rate. Indeed, the paper by Aleem (1990) actually calculates the amount of resources spent by lenders on monitoring borrowers and shows that they are enough to explain the nearly 50 percentage point gap between the lending and borrowing rates in his data. Moreover, it is easy to imagine that borrowers who are easier to monitor will enjoy better rates, which would explain why lending rates vary so much.

Taken together, these observations make clear that there are favored borrowers. The fact that borrowing rates and lending rates are so different, for example, means that people have very different returns from investing in their own firms and lending to others: The most preferred borrower typically is you yourself. This obviously gives richer people a strong reason to invest more. The same argument also implies that those with strong social connections with wealthy people will be in a better position to invest than others, since lenders presumably have more leverage over such connected borrowers.

More generally, the fact that interest rates vary such much means that some people will invest even when their returns are relatively low, while others with high returns will not be able to make it. Since richer people typically have both lower interest rates and more lax borrowing constraints, there is, in particular, a tendency towards overinvestment by the rich and underinvestment by the poor, though this observation will need to be qualified in light of what we will say in section 8.

5. Mitigating Factors

The world described in our opening example is, of course, very stylized in many different ways. We assumed, for one, that those who cannot invest at least K get nothing from their investment. This is obviously an exaggeration: The world, and especially the developing world, is full of very small businesses.

The presence of these small businesses means there is now an alternative that dominates lending to the most inept entrepreneurs. However given how small these firms tend to be, it is not clear how much this helps. Moreover, as we will see, there is some disagreement about how productive these businesses are, and therefore about their capacity to absorb capital.

Similarly, the assumption that there is no point investing more than K means that many rich people cannot invest as much as they can. If the rich can invest

[6] See Djankov et al. (2003).

more without facing significant diminishing returns, then a lot more of the capital can find productive uses.

We also assumed that richer people are no more likely to be more talented than poorer people. One does not need to believe in the innate superiority of the rich to find this implausible. After all, the fact that more able people tend to make more money, must, over the medium run, make them richer than the average person. Caselli and Gennaioli (2005), who calibrate a model to assess the importance of this mechanism, conclude that in the long run it does serve to limit the effects of credit constraints. However even then productivity remains 20 percent below what it would be, absent credit constraints. Moreover in a more recent piece of work, Buera, Kaboski, and Shin (2008) conclude that the steady output distortion can be much larger (50 percent) if there are fixed costs

Finally, credit constraints are an inducement to save. By saving more you not only get the additional resources from your own saving—you are also in a position to borrow more. In other words there is the incentive to save your way out of whatever inefficient situation you might be in.

However, Banerjee and Duflo (2007), reviewing data from household surveys from 13 poor to middle-income countries, conclude that the poor do not save as much as they are physically able to. The average poor family spends very substantial fractions of their total expenditures (more than 15 percent in many countries) on the combination of alcohol, cigarettes, sugar, and entertainment,[7] all of which they could, in principle, save without compromising their nutrition or any of their other investments.

One reason why the poor may be reluctant to save is the logic of credit constraints making you save only works if you are close to the point where the extra resources start to pay off. In the world of our opening example, if you are so far from K that you cannot expect to get anywhere close to it in your left-time, even if you save everything you earn, you will not want to take on saving (see Buera (2008) for a formalization of this is idea). Moreover, Banerjee and Mullainathan (2008) suggest that the view of savings implicit in this claim may be somewhat naive, at least where the poor are concerned. They argue that for the poor, many of things that everyone else takes as granted—an extra cup of tea, a glass or two of wine, a surprise present for your child—is a temptation they are meant to resist. For this reason, saving for them is a particular challenge.

6. Reinforcing Factors

We have so far been assuming that that the only constraint on investment is the lack of access to credit, which creates the impression that everyone wants nothing more than an opportunity to invest. This is neither a priori obvious, nor

[7] It is true that sugar is a source of calories, which they need, but there are many, much cheaper (and less unhealthy) ways to get those calories.

clear in the data. There a number of reasons why people might be reluctant to invest even if they had the capital. We come to these one by one.

Lack of Insurance

Starting a business typically involves bearing some risk. Insurance markets, of which the stock market is an important example, exist partly to allow business owners to reduce the amount of risk they have to bear by selling a part of their revenue streams to others. In addition, insurance allows owners to get rid of other risks—health expenditure risk, for example—that may also discourage them from taking on the additional risk implied by starting a new business.[8]

Exposure to risk might be a particular problem for the poor, since for them failure can mean starvation or worse. Yet formal insurance markets typically do not each out to the poor,[9] primarily because there are substantial transaction costs involved, especially compared to what the poor can pay. And only the very largest companies get to sell their assets on the stock market, largely because of the (rather elaborate) regulatory requirements for being a traded company.

The poor therefore rely heavily on informal insurance, which is another name for tacit or explicit agreements to help each other out in times of need. The question is how effective are these arrangements.

The ideal insurance market is one in which people bear no avoidable risks. In a setting where a single village constitutes a separate insurance market closed to the rest of the world (so that only people in the village can insure other people in the village, in some kind of mutual insurance arrangement), this comes down to the requirement that individual consumption should only respond to aggregate (village-level) income fluctuations, and not to fluctuations in the income of specific individuals. Or to put it in less abstract terms, your income fluctuations should not translate into fluctuations in your own consumption, as long as aggregate consumption is unchanged. Given that what an individual does has very little impact on aggregate uncertainty, this means that when insurance markets work well, risk considerations should not have a significant impact on the choices made by people, irrespective of their wealth.

While a perfect insurance market is a more complex object than a perfect credit market, and hence harder to detect, there have been a number of attempts to test the prediction about the irrelevance of fluctuations in your own income. The Côte d'Ivoire Living Standards Measurement Surveys from 1985 to 1987 provide panel data on the income and consumption of up to 800 households, where each household is tracked for 2 consecutive years (1985 and 1986 or 1986 and 1987).

---

[8] For a wide class of standard preferences, including both constant relative and absolute risk aversion, an increase in background risk causes investors to takes less risk.

[9] See for example the evidence presented in Banerjee and Duflo (2006).

Table 2: OLS and IV Estimates of the Effects of Income on Consumption

	West Forest		East Forest		Savannah		All rural	
				OLS 1985–86				
No dummies	0.290	(6.2)	0.153	(3.2)	0.368	(5.8)	0.259	(8.8)
Village dummies	0.265	(5.7)	0.155	(3.5)	0.373	(5.7)	0.223	(7.7)
Own income	0.265	(5.3)	*0.155*	(3.2)	0.373	(5.6)	0.223	(7.1)
Village income	0.199	(1.4)	−0.031	(0.2)	−0.050	(0.2)	0.252	(3.0)
				IVE 1985−86				
No dummies	0.192	(3.9)	−0.003	(0.1)	0.271	(4.0)	0.126	(4.0)
Village dummies	0.171	*(3.5)*	0.029	(0.6)	0.270	(3.8)	0.107	(3.4)
Own income	0.171	(3.2)	0.029	(0.5)	0.270	(3.7)	0.107	(3.1)
Village income	0.161	(1.1)	−0.417	(2.0)	0.E020	(0.1)	0.144	(1.6)
				OLS 1986−87				
No dummies	0.458	(8.8)	0.162	(5.3)	0.168	(4.0)	0.239	(10.4)
Village dummies	0.424	(8.1)	0.173	(5.6)	0.164	(3.8)	0.235	(10.1)
Own income	0.424	(7.9)	0.173	*(5.3)*	0.164	(3.8)	*0.235*	(9.7)
Village income	0.350	(2.0)	−0.094	(1.0)	0.061	(0.4)	0.039	(0.5)
				IVE 1986−87				
No dummies	0.418	(7.8)	0.090	(2.8)	0.088	(2.0)	0.177	(7.4)
Village dummies	0.388	(7.3)	0.105	(3.2)	0.087	(1.9)	0.177	(7.3)
Own income	0.388	(7.1)	0.105	(3.1)	0.087	(1.9)	0.177	(7.0)
Village income	0.353	(2.0)	−0.127	(1.3)	0.015	(0.1)	−0.002	(0.0)

Source: Deaton (1997).

Note: Absolute values of *t*-values are shown in brackets. The first row of each panel shows the coefficient on income change of a regression of consumption changes on income changes. The second row reports the same result when village dummies are included in the regression. The third and fourth rows show the estimates from a regression of consumption changes on individual household and village average changes in income. The IV regressions use the change in the value of cash income, individual and village average, as instruments for total income including imputations; the *t*-values on these instruments in the first-stage regressions are large, typically larger than 30. Because village dummies "sweep out" the village means, the coefficients—but not the standard errors—are identical in the second and third rows in each panel.

The relation between changes in consumption and changes in incomes is reported in table 2 separately for the three main regions and separately for 1985–86 and 1986–87. The first row of the first block for each year reports the basic correlation between income and consumption: A fall in income always hurts consumption, though the coefficient varies between a low of 0.09 ($1 reduction in income means that consumption goes down by 9 percent) to a high of 0.46. The next row does the same thing, but now there is a village dummy, intended to pick up any village-level changes in consumption. Remarkably, the coefficients on own income, which under perfect insurance should have fallen to zero once we controlled for village level changes, do not budge at all.[10]

Not all the evidence quite so pessimistic. Townsend (1994) used detailed household level data from four villages intensively studied by the International Crop Research Institute in the Semi-Arid Tropics (ICRISAT) in India, to see

[10] See Deaton (1997) for more details.

whether it is consistent with the data. He found that while the data did reject the exact prediction, it did not miss by very much. In other words, his evidence suggested that villagers do insure each other to a considerable extent: Movements in individual consumption in his data seem largely uncorrelated with movements in income.

However later work by Townsend himself, based on data he collected in Thailand, turned out to be less encouraging.[11] Some villages seemed to be much more effective than others in providing insurance to their residents. Townsend describes in detail how insurance arrangements differ across villages: While in one village there is a web of well-functioning risk-sharing institutions, the situations in other villages are different. In one village, the institutions exist but are dysfunctional; in another village, they are nonexistent; finally, in a third village close to the roads, there seems to be no risk-sharing whatsoever, even within families.[12]

As in the case of credit, it is possible that the failure of insurance has something to do with informational asymmetries. It is not easy to insure someone against a shock that he alone observes, since he has every incentive to always claim that things had gone badly.

However, as Duflo and Udry (2003) demonstrate, spouses in Côte d'Ivoire do not seem to be willing to insure each other fully against rainfall shocks that affect them differentially. Since rainfall is obviously observable, the problem has to be elsewhere. One possibility is that the problem is limited commitment: People may be happy to claim what was promised to them when it is their turn to be paid, and then default when it comes for them to pay. This may be particularly easy in a setting where the social relations between the set of people who are insuring each other are not particularly close: This is perhaps why Townsend finds no insurance in the village closest to the road.

The Limitations of the Land Market

The land market is crucial for investing for the simple reason that starting a business requires real estate. This is especially an issue for the poor, because agriculture is one of the industries where the poor tend to congregate. Moreover, land is often the one asset they own.

The ideal land market is one where anyone can buy or lease as much land as they want for as long as they want at a price that only depends on the quality of the land (and the length of the lease). Moreover, the lease should be at a fixed rent, so that the lessor is the residual claimant on the produce of the land. The fact that land can be freely bought and sold ensures that there is no particular advantage or disadvantage to owning land compared to any other asset of

[11] See Townsend (1995).

[12] Fafchamps and Lund (2003) find that in the Philippines, households are much better insured against some shocks than against others. In particular, they seem to be poorly insured against health risk, a finding corroborated by Gertler and Gruber (2002) in Indonesia.

comparable value. The fact that the lessor is a residual claimant means that the land is put to optimal use.

In practice, both properties fail systematically. Many developing (and some developed countries) countries have regulations about who can buy land and how much or how little. Binswanger, Deininger, and Feder (1995) argue that almost every developing country today went through a phase when it had regulations on land ownership that were intended to generate concentrated land ownership. By contrast, Besley and Burgess (2000) provide a list of regulations from different states in India, each an attempt to limit the concentration of ownership in land. It is also often unclear who has the right to sell a particular plot of land, since there is frequently no single person/family who has a clear, undisputed, legal title to the land. This, in turn, reflects the importance of encroachments and land grabs in the evolution of land rights, as well as the importance of custom in governing land relations, especially in Africa. The recent popularity of land titling as a social intervention is a direct consequence of the growing recognition of this fact.

Where lease contracts exist, they are not always of the fixed-rent type, at least when the land is used for cultivation. Many countries, including the United States, have a long tradition of an alternative contractual form, namely sharecropping. Under sharecropping, the farmer only gets a fraction of the produce of the land, but he does not need to pay a fixed rent. As Alfred Marshall pointed out more than one hundred years ago, this weakens incentives and reduces the productivity of the land, but the near universality of sharecropping suggests that it is a response to a real need. There is some disagreement among economists about the exact nature of that need,[13] but it is plausible that it is related to the fact that farmers are often poor, and making them pay the full rent when their crop does poorly is difficult and probably not desirable.

Finally, leaseholds in developing countries tend to be relatively short-lived. The norm is for it to last either a year or a season. Longer leases are not unknown but are rare. This might reflect the fact that it is custom rather than law that secures most of these leases: Perhaps it is too much to rely on custom to enforce leases of arbitrary length.

The Peculiarities of the Family

One thing that makes human capital different is that a lot of the decisions get taken by parents (or other family members) on behalf of their children. In other words, those who are taking these decisions are often different from those who get the human capital. Gary Becker's classic formulation of the problem of investment in human capital avoids this problem by assuming that the family can borrow against the child's future income, thereby turning the problem into a

[13] See Banerjee (2000) for a discussion of the alternative views.

conventional investment decision. The amount invested in that scenario will not depend on the families wherewithal.

In the more plausible circumstance where parents cannot borrow against their children's future income, they might still hope that when he grows up and reaps the benefits of their investment, he might feel obligated to pay them back by taking care of them in their old age, but they know that he has no legal obligation to do so. If he does, it is either because he feels for his parents or because society expects him to do so. But then it is not clear that he would feel comfortable in entirely abandoning his parents if they failed to educate him. This is not to say that parents do not benefit by making their children richer, or even that they do not vicariously enjoy their children's success, but to suggest that investment in human capital may be driven as much by the parents' sense of what is the right thing to do, as by any calculation of costs and benefits.

Once we accept this premise, it becomes clear that children's human capital is not very different from any other consumption good, and therefore richer families will tend to invest more in their children's health and education. Also, as a consumption decision, human capital decisions may be more a product of culture and tradition than the cold calculation of benefits. This is not to say that benefits are irrelevant, but the responsiveness to them may not be as large as one might have expected.

7. The Evidence on Underinvestment

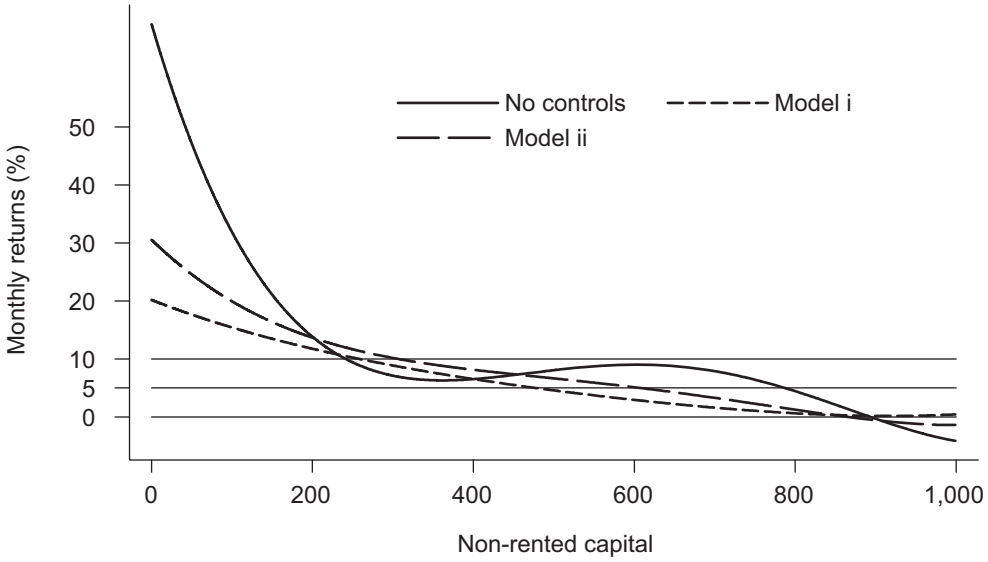
The argument so far has been that there are many reasons why those who do not have enough wealth of their own might underinvest. Is this actually a real issue in the world?

Evidence from Industry and Trade

Direct estimates of the marginal product suggest that there are in fact a lot of unexploited investment opportunities. Figure 1 plots nonparametric relationships between from earnings and firm capital in Mexico.[14] Even ignoring the astronomical returns at the very low values of firm capital, this figure suggests huge returns to capital for these small firms: For firms with less than $200 invested, the rate of returns reaches 15 percent per month, well above the informal interest rates available in pawn shops or through microcredit programs (on the order of 3 percent per month). Estimated rates of return decline with investment, but remain high (7 percent to 10 percent per month for firms with investment between $200 and $500, and 5 percent for firms with investment between $500 and $1,000). These firms are therefore all too small, given that real interest rates on savings in Mexico are substantially less than 10 percent per month.

[14] From McKenzie and Woodruff (2006).

Figure 1: Parametric Returns, $0–1,000 Capital



Source: Mckenzie and Woodruff (2006).

Trade credit is an important form of credit everywhere and perhaps especially where the formal institutions of the credit market are underdeveloped. Fisman (2001) looked at the relation between access to trade credit and capacity utilization in a sample of 545 firms in Cote d'Ivoire, Kenya, Tanzania, Zambia, and Zimbabwe and finds that firms that get trade credit from all its three main suppliers (on average, about one out of the three suppliers provide trade credit) have 10 percent better capacity utilization than firms that have no trade credit. Moreover the relation is much stronger in industries where it is important to carry large inventories.

However such studies present serious methodological issues: The basic problem comes from the fact that investment levels are likely to be correlated with omitted variables. For example, in a world without credit constraints, investment will be positively correlated with the expected returns to investment, generating a positive "ability bias" (Olley and Pakes, 1996). Mckenzie and Woodruff attempt to control for managerial ability by including the firm owner's wage in previous employment, but this goes only a part of the way if individuals choose to enter self-employment precisely because their expected productivity in self-employment is much larger than their productivity in an employed job. Conversely, there could be a negative ability bias if capital is allocated to firms in order to avoid their failure.

Banerjee and Duflo (2003a) take advantage of a change in the definition of the so-called "priority sector" in India to circumvent these difficulties. All banks in India are required to lend at least 40 percent of their net credit to the "priority sector," which includes small-scale industry, at an interest rate that is required to be no more than 4 percent above their prime lending rate. In January 1998, the

limit on total investment in plants and machinery for a firm to be eligible for inclusion in the small-scale industry category was raised from Rs. 6.5 million to Rs. 30 million. Banerjee and Duflo first show that after the reforms, newly eligible firms (those with investment between Rs. 6.5 million and 30 million) received on average larger increments in their working capital limit than smaller firms. They then show that the sales and profits increased faster for these firms during the same period. Putting these two facts together, they use the variation in the eligibility rule over time to construct instrumental variable estimates of the impact of working capital on sales and profits. After computing a nonsubsidized cost of capital, they estimate that the returns to capital in these firms must be at least 94 percent.

A very different kind of evidence for underinvestment comes from the fact that many people pay the very high interest rates reported in the previous subsection. Given that this money typically goes into financing trade and industry, our presumption is that the people borrowing at these rates of often 50 percent or more must have a marginal product of capital that is even higher. On the other hand, the average marginal product in developing countries seems nowhere near 50 percent. One way to get at the average of the marginal products is to look at the Incremental Capital Output Ratio (ICOR) for the country as a whole. The ICOR measures the increase in output predicted by a one unit increase in capital stock. It is calculated by extrapolating from the past experience of the country and assumes that the next unit of capital will be used exactly as efficiently (or inefficiently) as the last one. The inverse of the ICOR therefore gives an upper bound for the average marginal product for the economy—it is an upper bound because the calculation of the ICOR does not control for the effect of the increases in the other factors of production, which also contributes to the increase in output.[15] For the late 1990s, the IMF estimates that the ICOR is over 4.5 for India and 3.7 for Uganda. The implied upper bound on the average marginal product is 22 percent for India and 27 percent in Uganda.

The fact that many firms in India have a marginal product of 50 percent or more, while the average marginal product is only 22 percent or so, is strong prima facie evidence for the misallocation of capital. The firms with the marginal product of 50 percent and more are clearly too small, while other firms (the ones that bring the average down to 22 percent) must in some sense be too large.

Finally De Mel, Mckenzie, and Woodruff (2007) estimate the returns to small enterprises in Sri Lanka from a randomized experiment where they offer a random sample of firms either SLR 10,000 or SLR 20,000 as a capital infusion. They find *average* monthly returns in the 4–5 percent range, though this does not correct for the cost of any additional work time spent by the owner or his/her family members (who are not directly paid) because of the inflow of the capital (probably not huge). This is to be compared to the annual real return on bank

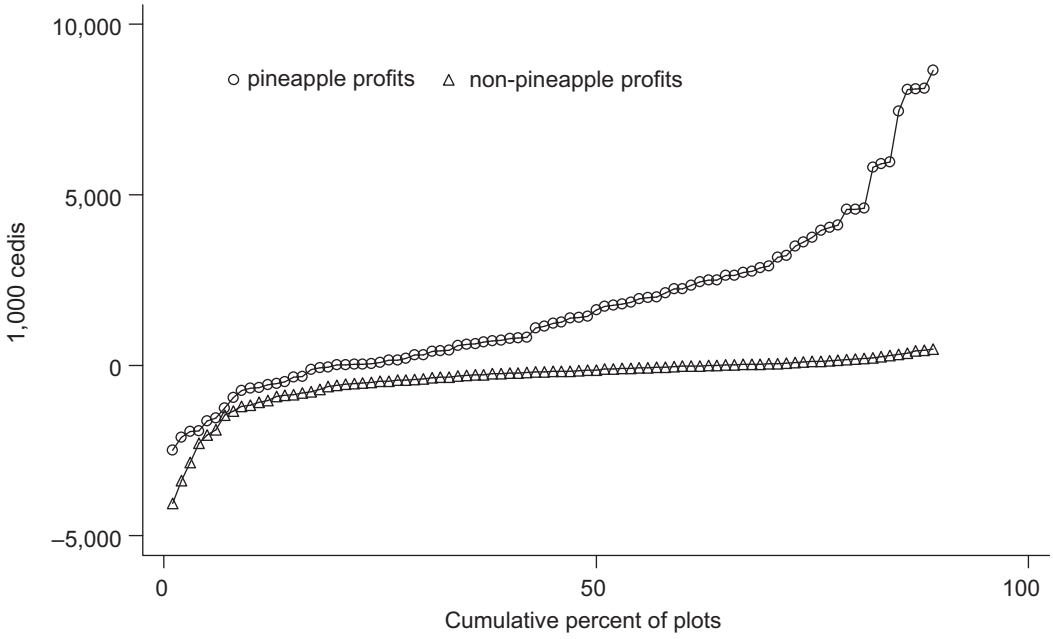
[15] The implicit assumption that the other factors of production are growing is probably reasonable for most developing countries, except perhaps in Africa.

loans, which was of the order of 3–7.5 percent in Sri Lanka at that time. Clearly there is no evidence of the two returns being equalized.

Evidence from Agriculture

There is also direct evidence of very high rates of returns on productive investment in agriculture. In the forest-savannah in southern Ghana, cocoa cultivation has been receding for many years because of the swollen shoot disease. It has been replaced by a cassava-maize inter-crop. Recently pineapple cultivation for export to Europe has offered a new opportunity for farmers in this area. In 1997 and 1998 more than 200 households in four clusters in this area, cultivating 1,070 plots, were surveyed every six weeks for approximately two years. Figure 2 reports the distribution of profits (in 1,000 cedis) on the traditional cassava-maize inter-crop and on pineapples based on this survey.[16] Pineapple production first order stochastically dominates the traditional inter-crop; and the average returns associated with switching from the traditional maize and cassava intercrops to pineapple is estimated to be in excess of 1,200 percent! Yet only 190 out of 1,070 plots were used for pineapple. The authors say that the "The virtually unanimous response to the question 'Why are you not farming pineapple?' provided by our respondents was 'I don't have the money'," [17] though some heterogeneity between those who have switched to pineapple and those who have not cannot be entirely ruled out.

Figure 2: Distribution of Per Hectare Profits (1,000 cedis)



Source: Goldstein and Udry (1999).

[16] From Goldstein and Udry (1999), figure 4.

[17] Goldstein and Udry (1999), page 38.

Evidence from experimental farms also suggests that, in Africa, the rate of returns to using chemical fertilizer (for maize) would also be high. However, this evidence may not be realistic, if the ideal conditions of an experimental farm cannot be reproduced on actual farms. Foster and Rosenzweig (1995) show, for example, that the returns to switching to high-yielding varieties were actually low in the early years of the green revolution in India, and even negative for farmers without an education. This is despite the fact that these varieties had precisely been selected for having high yields, in proper conditions. But they required complementary inputs in the correct quantities and timing. If farmers were not able or did not know how to supply those, the rates of returns were actually low.

Chemical fertilizer, however, is not a new technology, and the proper way to use it is well understood. To estimate the rates of returns to using fertilizer in actual farms in Kenya, Duflo, Kremer, and Robinson (2008), in collaboration with a small NGO, set up small-scale randomized trials on people's farms: Each farmer in the trial delimited two small plots. On one randomly selected plot, a field officer from the NGO helped the farmer apply fertilizer. Other than that, the farmers continued to farm as usual. They find that the rates of returns from using a small amount of fertilizer varied from 169 percent to 500 percent depending on the year, although of returns declined fast with the quantity used on a plot of a given size.

Evidence for a different type of underinvestment in agriculture is illustrated in Table 3. This is the so-called negative size-productivity relationship, the idea that the smallest farm tend to be the most productive. Each column of the table compares the productivity of small and large farms within a particular country.

Table 3: Farm-Size Productivity Differences, Selected Countries

Farm size [a]	Northeast Brazil [b]	Punjab, Pakistan [c]	Muda, Malaysia [d]
Small farm (hectares)	563	274	148
	(10.0–49.9)	(5.1–10.1)	(0.7–1.0)
Largest farm (hectares)	100	100	100
	(500+)	(20+)	(5.7–11.3)

Source: Barry and Cline (1979).

Notes:

a. 100 = largest farm size compared with second smallest farm size. Second smallest farm size used in calculations to avoid abnormal productivity results often recorded for the smallest plots.

b. Table 4-1. Northeastern Brazil, 1973; Production per Unit of Available Land Resource, by Farm Size Group, p. 46. Index taken using average gross receipts/areas for size group 2 (small) and 6 (large), average for all zones excluding zone F, where sugarcane and cocoa plantations skew productivity average for large farms.

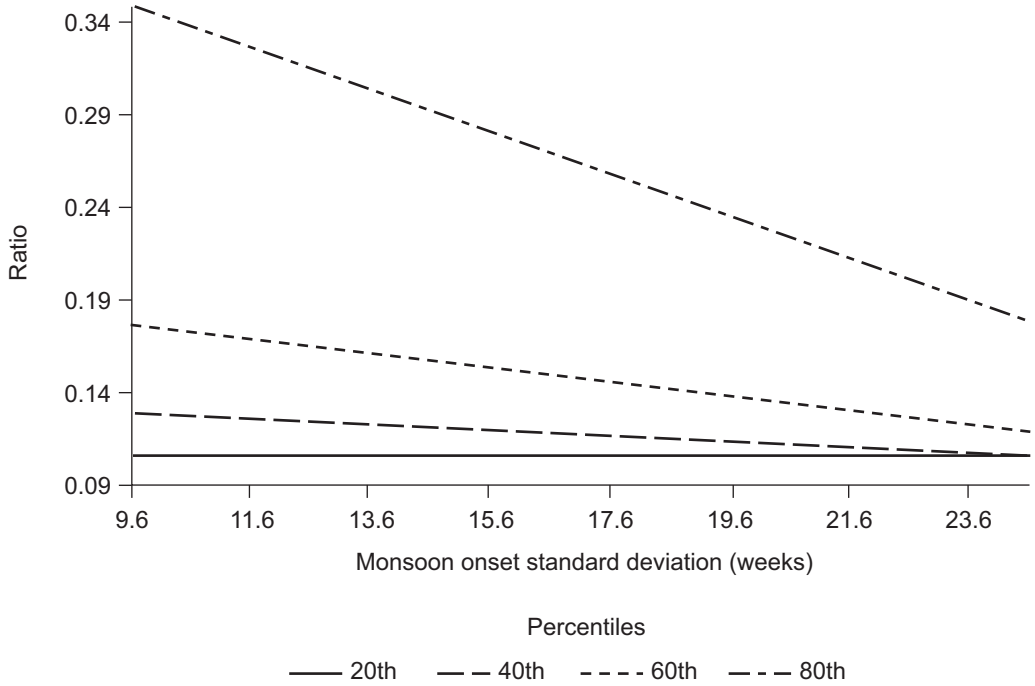
c. Table 4-29. Relative Land Productivity by Farm Size: Agricultural Census and FABS Survey-based Estimates Compared, (1968–9) p. 84. Index taken using value added per cultivated acre for second smallest size group and largest.

d. Table 4-48. Factor Productivity of Muda River Farms by Size, Double Croppers, 1972–3 p. 117. Index taken from value added in agriculture/relong (0.283 ha = 1 relong).

The gap is enormous: a factor of 6 in Brazil and a factor of 2.75 in Pakistan. It is smaller (only 1.5) in Malaysia, but then the large farm in Malaysia is not very large. Taken together, it provides strong prima facie evidence that markets are somehow not allocating the right amount of land to those who currently farm the smaller plots.

The problem with this kind of evidence is that it ignores the many reasons why the bigger farm may be inherently less productive—worse soil quality for example. However, similar, but somewhat less dramatic, results show up even after we control for differences in land quality. Figure 3 shows the results of such an exercise: Each straight line in this figure represents the relationship between the profit-wealth ratio and a measure of underlying risk, namely the standard deviation of the date of monsoon onset, for four different size categories of farms. The data comes from the Indian ICRISAT villages. The first observation about the figure is that the profit-wealth ratio is the highest for the smallest farms, and when risk is comparatively low, the gap is more than 3:1. Because wealth includes the value of the land, the measure implicitly takes into account differences in the quality of the land, as long as land prices are a reasonable measure of land quality.

Figure 3: Profit-Wealth Ratios and Weather Variability, by Wealth and Class



Source: Rosenzweig and Binswanger (1993).

The second notable fact about this figure is that all the lines slope down: When risk goes up, the average return goes down. In part this may be inevitable, but it may also reflect the fact that the lack of insurance encourages people to avoid risky (but remunerative) choices.[18] This is consistent with the fact that profitability falls faster for the poorer farmers (who are less able to self-insure) as the risk goes up. Specifically, a one standard deviation increase in the coefficient of variation of rainfall leads to a 35 percent reduction in the profit of poor farmers, 15 percent reduction in the profit of median farmers, and no reduction in the profit of rich farmers. The study also finds that input choices are affected by variability in rainfall and in particular, poor farmers make less efficient input choices in a risky environment.

In related work, Morduch (1993) specifically investigated how the anticipation of credit constraint affects the decision to invest in high-yielding variety (HYV) seeds. Specifically he splits the sample into two groups, one group of landholders who are expected to have the ability to smooth their consumption, and one group that owns little land, whom we expect a priori to be constrained. He finds that the more constrained group devote considerably smaller fraction of their land to HYV seeds for rice and castor.

Another consequence of lack of insurance is that it may lead households to use productive assets as buffer stocks and consumption smoothing devices, which would be a cause for inefficient investment. Rosenzweig and Wolpin (1993) argue that bullocks (which are an essential productive asset in agriculture) serve this purpose in rural India. Using the ICRISAT data, covering three villages in semi-arid areas in India, they show that bullocks, which constitute a large part of the households' liquid wealth (50 percent for the poorest farmers), are bought and sold quite frequently (86 percent of households had either bought or sold a bullock in the previous year, and a third of the household-year observations are characterized by a purchase or sale), and that sales tend to take place when profit realizations are high, while purchases take place when profit realizations are low. Since there is very little transaction in land, this suggests that bullocks are used for consumption smoothing. Because everybody needs bullocks around the same time, and bullocks are hard to rent out, Rosenzweig and Wolpin estimate that, in order to maximize production efficiency, each household should own exactly two bullocks at any given point in time. The data suggest that, for poor or mid-size farmers there is considerable underinvestment in bullocks, presumably because of the borrowing constraints and the inability to borrow and accumulate financial assets to smooth consumption: Almost half the households in any given

[18] Some of the effects of lack of insurance may be quite subtle. Banerjee and Newman (1998) argue, for example, that the availability of insurance in one location (the village), combined with its unavailability in another (the city), may lead to inefficient migration decisions, since some individuals with high potential in the city may prefer to stay in the village to remain insured.

year hold no bullock (most of the others own exactly two).[19] Using the estimates derived from a structural model where household use bullocks as a consumption-smoothing device in an environment where bullocks cannot be rented and there is no financial asset available to smooth consumption, they simulate a policy in which the farmers are given a certain nonfarm income of 500 rupees (which represents 20 percent of the mean household food consumption) every period. This policy would raise the average bullock holding to 1.56, and considerably reduce its variability, due to two effects: The income is less variable, and by increasing the income, it makes "prudent" farmers (farmers with declining absolute risk aversion) more willing to bear the agricultural risk.

There is also compelling evidence that sharecropping tenants are less productive than similar farmers who own their land. Binswanger and Rosenzweig (1986) and Shaban (1987) both show that, controlling for farmers' fixed effect (that is, comparing the productivity of owner-cultivated and farmed land for farmers who cultivate both their own land and that of others) and for land characteristics, productivity is 30 percent lower in sharecropped plots. Shaban also shows that all the inputs are lower on sharecropped land, including short-term investments (fertilizer and seeds). He also finds systematic differences in land quality (owner-cultivated has a higher price per hectare), which could in part reflect long-term investment. In related work, Lafont and Matoussi (1995) use data from Tunisia to show that a shift from sharecropping to owner cultivation raised output by 33 percent, and moving from a short-term tenancy contract to a longer-term contract increased output by 27.5 percent.[20]

Evidence from Human Capital

According to the report of the Commission for Macroeconomics and Health (WHO, 2001), returns to investing in health are the order of 500 percent. However, these numbers have been arrived at on the basis of cross-country growth regressions, and are not as easy to interpret as what would actually happen if someone would invest an extra dollar on health. That being said, there are clearly examples of specific health interventions that have enormous private and social returns: There is substantial experimental evidence that supplementation in iron and vitamin A increases productivity at relatively low cost. Basta et al. (1979) study an iron supplementation experiment conducted

[19] The fact that there is underinvestment on average, and not only a set of people with too many bullocks and a set of people with too few, is probably due to the fact that bullocks are a lumpy investment, and owning more than two is very inefficient for production—there is no small adjustment possible at the margin.

[20] Another piece of relevant evidence comes from the effects of titling non-agricultural land. Field (2003) shows evidence from land titling program in the slums of urban Peru, which suggests that the lack of a clear title to the land where you have built your home reduces the ability of the household members to work outside. Field hypothesizes that this is because someone needs to be home to defend the untitled property from expropriation by others. However, she does not find any evidence that land titling improves access to credit.

among rubber tree tappers in Indonesia. Baseline health measures indicated that 45 percent of the study population was anemic. The intervention combined an iron supplement and an incentive (given to both treatment and control groups) to take the pill on time. Work productivity among those who got the treatment increased by 20 percent (or $132 per year), at a cost per worker-year of $0.50. Even taking into account the cost of the incentive ($11 per year), the intervention suggests extremely high rates of returns. Thomas et al. (2006) obtain lower, but still high, estimates in a larger experiment, also conducted in Indonesia: They found that iron supplementation experiments in Indonesia reduced anemia, increased the probably of participating in the labor market, and increased earnings of self-employed workers. They estimate that, for self-employed males, the benefits of iron supplementation amount to $40 per year, at a cost of $6 per year.[21] The cost-benefit analysis of a deworming program (Miguel and Kremer, 2004) in Kenya reports estimates of a similar order of magnitude: Taking into account externalities (due to the contagious nature of worms), the program led to an average increase in school participation of 0.14 years. Using a reasonable figure for the returns to a year of education, this additional schooling will lead to a benefit of $30 over the life of the child, at a cost of $0.49 per child per year. Not all interventions have the same rates of return however: A study of Chinese cotton mill workers (Li et al., 1994) led to a significant increase in fitness, but no corresponding increase in productivity.

Measured returns on private investment in education tend not to be quite so high. Banerjee and Duflo (2006) survey the cross-country evidence on Mincerian returns, and conclude that "Using the preferred data, the Mincerian rates of returns seem to vary little across countries: The mean rate of returns is 8.96, with a standard deviation of 2.2. The maximum rate of returns to education (Pakistan) is 15.4 percent, and the minimum is 2.7 percent (Italy)." On the other hand, most of the educational benefits of deworming mentioned in the last paragraph would be captured by a child whose parents are willing to spend 50 cents on the deworming medicine. This clearly offers a return that is much higher than the measured Mincerian returns at affordable absolute cost, though they are not strictly comparable, since deworming does not require the child to spend more years in school, but helps her get more out of the years that she is already spending in school. However, when the deworming medicine was offered free to the children, the take-up was only 57 percent. In this sense, it is clear that at least some of the causes of underinvestment have to be sought in the way the family makes decisions, rather than in the lack of resources per se.

[21] This number takes into account the fact that only 20 percent of the Indonesian population is iron deficient: The private returns of iron supplementation for someone who knew they were iron deficient—which they can find out using a simple finger prick—would be $200.

8. Investment Efficiency and the Distribution of Wealth

All of this evidence suggests that markets are imperfect and wealth matters for investment. What does the data have to say about the relation between investment and the distribution of wealth?

A numbers of authors have tried to look at this question by examining the cross-country relation between inequality and growth (which is presumably what investment is meant to achieve). A long literature (see Benabou (1996) for a survey) estimated a long-run equation, with growth between 1990 and 1960 (say) regressed on income in 1960, a set of control variables, and inequality in 1960. Estimating these equations tended to generate negative coefficients for inequality. However there are obvious concerns about whether such a relation could be driven entirely by omitted variables. To address this problem, Li and Zhou (1998) and Forbes (2000) used the Deininger and Squire data set to focus on the impact of inequality on short run (five years) growth, and introduced a linear fixed effect.[22] The results change rather dramatically: The coefficient of inequality in this specification is positive, and significant. Finally, Barro (2000) used the same short-frequency data (he is focusing on ten-year intervals), but does not introduce a fixed effect. He finds that inequality is negatively associated with growth in the poorer countries, and positively in rich countries.

All of these results are based on linearly regressing growth on inequality. Banerjee and Duflo (2003b) regress growth (or changes in growth) nonparametrically on changes in inequality and find the relationship to be an inverted U-shape. In other words, both reductions and increases in inequality seem to be accompanied by a fall in growth. Banerjee and Duflo worry that this result might either be driven by omitted variables or by the fact that inequality is poorly measured.

At a more basic level, what we make of this evidence is severely limited by problems of assigning causality: After all, while inequality might affect growth, growth also affects the distribution of wealth. Moreover policies or underlying economic conditions that drive one, might very plausibly also drive the other.

My view, therefore, is that it makes more sense to focus on specific causal mechanisms that connect the wealth distribution to investment or growth outcomes, and to try to use the available evidence to assess the plausibility of these individual mechanisms.

The Effect on Aggregate Investment

Inequality means that some people have more wealth than others. From what we said in the last sections, at least some of these lucky people will end up

[22] Forbes (2000) also corrects for the bias introduced by introducing a lagged variable in a fixed effect specification by using the GMM estimator developed by Arellano and Bond (1991).

overinvesting, while others, typically those who do not have enough money or the right social connections, will invest too little. Since some people overinvest and others underinvest, it is not obvious that aggregate investment needs to go down. For example, the economy could have a fixed supply of savings supplied inelastically: If the economy is closed, so that investment is always equal to savings in equilibrium, total investment will then be independent of the distribution of investments across population.

On the hand consider a scenario where savings are interest sensitive. An increase in wealth inequality would typically imply that there more people who cannot invest as much they would want to, say because they do not have enough credit or insurance. To compensate for the lack of investment demand from the poor, the rich, who are already in a position to invest as much as they want, would have to demand more capital. But this would only happen if the interest rate were lower and a lower interest rate tends to discourage saving and hence investment.

Where the investment is not a financial investment, but an investment of time or effort, there is no reason why the underinvestment by one person will be matched by an overinvestment by others. For example, consider a hypothetical setting where initially land was equally distributed and every farmer farmed his own land. Then, for some reason, land became more unequally distributed. Now some have more than they want to farm and some have less, and want to work as tenants on the land that the big farmers do not want to farm. However let us assume that they are now too poor to feel comfortable with a fixed-rent contract and become sharecroppers, with the concomitant loss in effort and productivity. This is a pure loss, not compensated by any gain elsewhere, since the land that continues to be owner-cultivated continues to have the previous (efficient) level of productivity.

In such an environment, a government intervention that forces the landlords to give their sharecroppers a higher share of the output than the market would give them should increase effort and productivity. This is exactly what happened in West Bengal, India, when a Left Front government came to power in 1977. The tenant's share of output was set at a minimum of 75 percent as long as the tenant provided all inputs and, in addition, the tenant was guaranteed a large measure of security of tenure, which may have encouraged him to undertake more long-term investments on the land. Survey evidence show that there was a substantial increase in both tenure security and the share of output going to the sharecropper. The fact that the implementation of this reform was bureaucratically driven and proceeded at different speeds in different areas, suggests the possibility of using variation in the implementation of the reform to evaluate its impact. The data suggests that there was a substantial (62 percent) increase in the productivity of the land (Banerjee, Gertler, and Ghatak, 2002) More recent work on the impact of the same tenancy reform program, using

farm-level data, finds similar though somewhat smaller results (Bardhan and Mookherjee (2007)).

One reason why this particular redistributive reform worked so well is that agriculture, at least in labor-abundant countries, is an industry where there seems to be diminishing returns to scale (though this might be changing with the introduction of high-valued-added produce for export).

To see what happens when we move away from diminishing returns, it is worth going back to our opening example: there we said that moving to full equality would lead to the capital being optimally used, *as long as all of the capital gets invested*. The caveat at the end is crucial. The problem is that if K is a lot larger than mean wealth, then it is not clear that the interest rate can fall enough to permit someone with average wealth to borrow all the way up to K (or rather, if the interest rate were to fall that far, people would just keep the money in their mattress). In that case, full equality is disastrous: no one will get to invest. The only way to get some investment in this case is to make some people rich enough that they can borrow the necessary amount, and this would necessarily have to mean that others will end up much poorer (see Galor and Zeira (1993) for an early discussion of this point). However, even here one can have too much inequality: If there are people who are in a position to invest more than K, then taking wealth away from them and handing it to some of those who are too poor to invest will increase the total amount invested.

The Effect on the Scale of Investment

Returns to scale are also central to understanding the relation between wealth inequality and the efficiency of investment. In particular, as long as there are diminishing returns to scale in the aggregate production function, and the amount people can borrow (and therefore the maximum amount they can invest) is proportional to their wealth, greater inequality must lead to less effective investment. This is because with diminishing returns the smaller you are the more productive you are (per dollar invested); more inequality makes the productive small firms even smaller and reallocates that capital to the unproductive large firms that become even larger.

If the production technology exhibits increasing returns over some range, then it is no longer true that the smallest firms are the most productive and redistributing capital from the smallest firms to somewhat larger firms might actually raise productivity.

More generally the effect of inequality will depend on the shape of the production function, and the size of the investment potential of the average person relative to the fixed cost.

How good or bad is the assumption of decreasing returns in the production function of an individual firm? As mentioned above, Mackenzie and Woodruff (2006) attempt to estimate a production function for small Mexican firms. Their estimates suggest that there are strong diminishing returns while Mesnard and

Ravallion (2001) find weak diminishing returns using Tunisian data. These results are reinforced by the evidence from the Sri Lankan experiment by De Mel, Mckenzie, and Woodruff, that was discussed above. The revenues of the firms that were randomly allocated SLR 20,000 in extra capital grew by less than twice as much as the growth in the revenue of the firms that got SLR 20,000.

On the other hand, there are many who argue that firms in developing countries suffer from being too small, and as a result being unable to make use of the most effective available technologies.[23] Certainly this would be a consistent with Banerjee and Duflo's (2003a) finding that the return on capital in a set of what are very large firms in India, is in the neighborhood of 80 percent.

One way to square these two sets of claims is to assume that there are indeed diminishing returns to scale in the smallest firms generated, perhaps, by the standard agency problem (as you expand you need to hire labor, and hired labor is less efficient than family labor). However once you are beyond a certain minimum efficient scale (which may be quite large, at least compared to the wherewithal of the average person in a third world country), the fact that you have access to much better technologies opens up the possibility of increasing returns, at least over some range.

What happens once we cross into the zone of increasing return? Do the returns keep growing with investment or do we eventually go back into diminishing returns? This is, obviously, closely related to a question that often comes up: Is it inequality that we are really concerned with, or is poverty the main issue? Is the real problem that there are people who are too poor to achieve the minimum efficient scale, or are there also firms that are inefficiently large?

While we have no very good way to answer this question, it is worth noting that the very largest firms even in a country like India are traded on the stock market. The average stock market return is therefore a potential proxy for the return on capital in these firms. For the period 1991–2004, the average real return on the SENSEX (the index of the Indian stock market) was 11 percent. These returns probably understate the profitability of these firms, because some of the profits probably gets diverted into the pockets of the controlling shareholders, but the gap between these numbers and the real returns that the firms in Banerjee and Duflo (2003a) were earning (more than 70 percent) is enormous. Of course, these are not random firms—indeed it is possible they got the extra capital probably precisely because they are the most productive firms—but the firms in the study, mentioned above, by De Mel, Mckenzie, and Woodruff (2007) that were earning 4–5 percent per month were in fact chosen at random (albeit in Sri Lanka). There is at least some reason to believe that the largest firms are substantially less productive than many smaller firms.

[23] See, for example, the McKinsey report on productivity in India cited in Banerjee and Duflo (2006).

The Effect on the Quality of the Investment

The logic of scrambling and its connection to wealth inequality has already been discussed. An interesting example of this phenomenon comes from a study of the knitted garment industry in the southern Indian town of Tirupur (Banerjee and Munshi, 2004). Two groups of people operate in Tirupur. First, there are the Gounders, who issue from a small, wealthy, agricultural community from the area around Tirupur, and who have moved into the ready-made garment industry because there was not much investment opportunity in agriculture. Second, there are the outsiders from various regions and communities who started joining the city in the 1990s. The Gounders have, unsurprisingly, much stronger ties in the local community, and thus better access to local finance, but may be expected to have less natural abilities for garment manufacturing than the outsiders, who came to Tirupur precisely because of its reputation as a center for garment export. The Gounders own about twice as much capital as the outsiders on average. Figure 4 plots the capital stock of Gounder and outsider firms as a function of the age of the firm: It demonstrates that Gounder firms of all ages own more capital, though there is a strong tendency towards convergence as the firms age. Figure 5 plots sales, once again as a function of age. It is clear that the Gounders, despite owning more capital, lose their early lead in sales by about year 5, and end up selling less. The outsiders are clearly more able than the Gounders, but they nevertheless invest less[24] because they are less cash-rich and do not have the right connections.

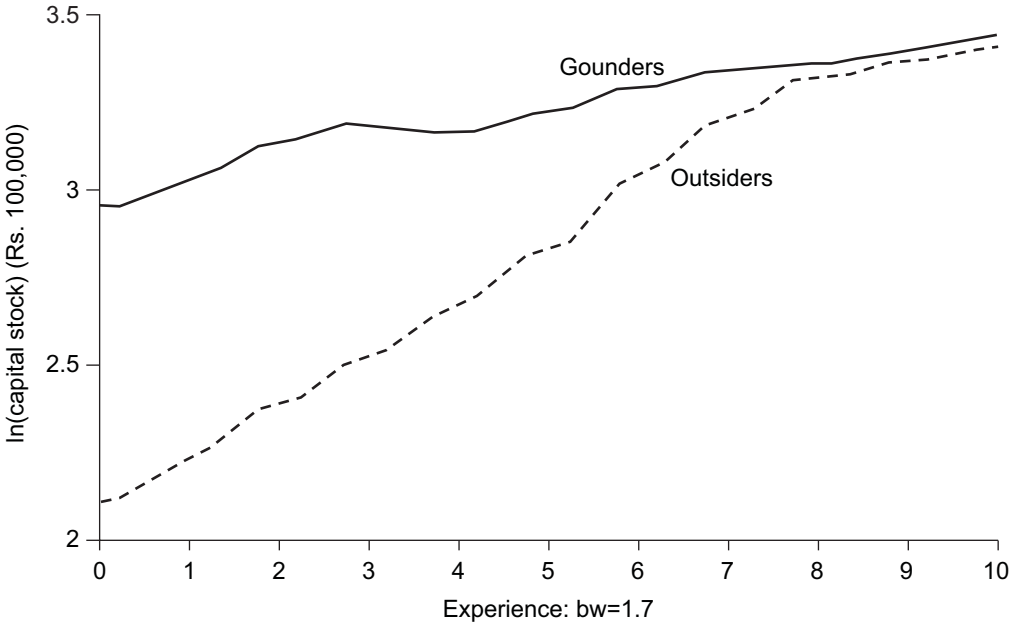
9. Conclusion: Some Take-away Messages

The relationship between the efficiency of investment and the distribution of wealth is anything but straightforward and one purpose of this essay is to bring out the various forces that contribute to that complexity. However there are at least a few important questions where there is something more categorical that can be said.

First, it is clear that the distribution of wealth is something that one needs to worry about, even if one has no normative preferences about the distribution of wealth. In a world where financial markets do not do what they are meant to, which is the world of the developing countries, there is no presumption that the distribution of wealth is anywhere close to what it needs to be to induce efficient investment, and the loss in productivity is potentially very large.

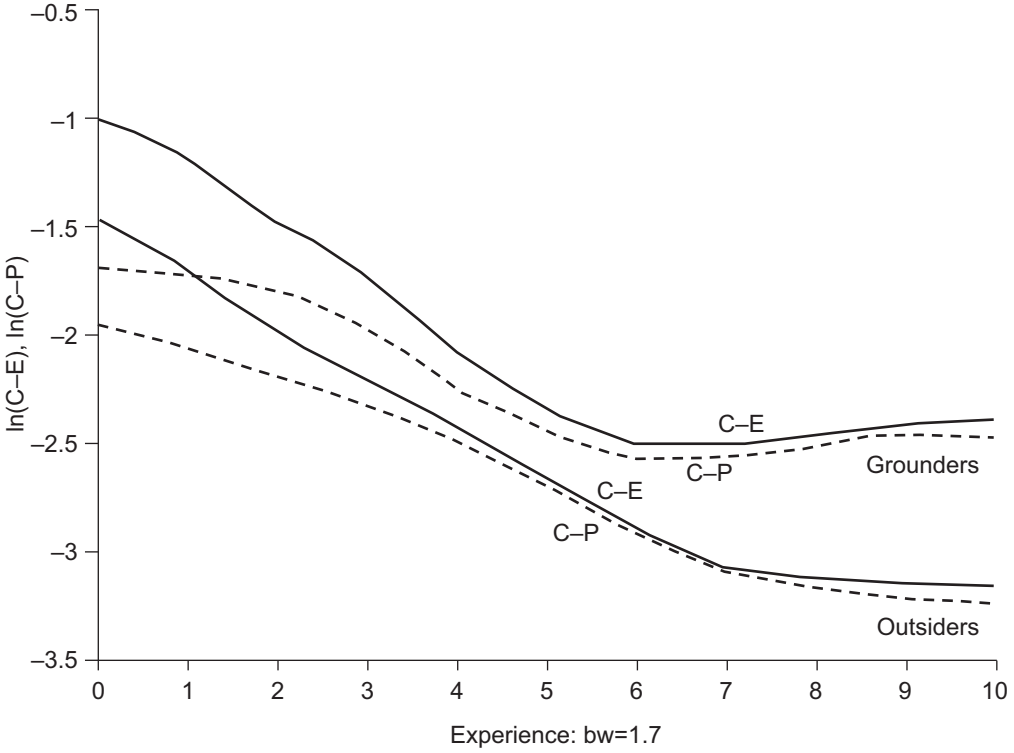
[24] This is not because capital and talent happen to be substitutes. In this data, as it is generally assumed, capital and ability appear to be complements.

Figure 4: Capital Stock—Net Cohort Effects



Source: Banerjee and Munshi (2004).

Figure 5: C–E Ratio, C–P Ratio—Net Cohort Effects



Source: Banerjee and Munshi (2004).

Second, it is not true that we do not need to worry about the rich getting richer, as long as the poor are also getting richer. The point is that the rich and the poor compete for resources, including capital, and making the rich *richer* makes it harder for the poor to compete with them. To see the exact logic behind this point, consider a toy economy where there are two technologies. One requires an investment of K and yields a per dollar invested. The other requires a minimum investment of $K^* > K$ and yields $a^* < a$ per dollar invested. Suppose to start with, neither the poor (who have wealth $W_1^1 < K$, say) nor the rich (who have wealth $W_2^1 > K$) can afford to invest in the more capital-intensive technology but all of them can invest in the other technology: In other words, the initial equilibrium interest rate r^1 is such that

$$K < \left(1 + \lambda\left(r^1\right)\right)W_1^1 < \left(1 + \lambda\left(r^1\right)\right)W_2^1 < K^*$$

The capital market clears by the rich lending to the poor and everyone investing in the less capital-intensive technology. Output per capita is $aW_{average}^1$.

Now suppose W_1^1 goes up to W_1^2 while W_2^1 goes up to W_2^2 and

$$\left(1 + \lambda\left(r^1\right)\right)W_2^2 > K^* > \left(1 + \lambda\left(r^1\right)\right)W_1^2 .$$

In other words, the rich can now try to invest in the capital-intensive technology as long as the interest rate remains the same. Will they want to do it? This depends on whether

$$a^* K^* - r^1\left(K^* - W_2^2\right)$$

is larger or smaller than

$$aK - r^1\left(K - W_2^2\right),$$

which translates into the condition

$$\left(a^* - r^1\right)K^* > \left(a - r^1\right)K$$

for moving to the capital-intensive technology. Though a^* is less than a, the fact that K^* is larger than K makes this possible.

Because the rich want to invest in the more capital-intensive project, they will now stop lending and start trying to borrow. This will bid the interest rate up, which make λ go down. The net result can easily be that the poor can longer reach up to K and as a result turn into lenders. Only the less-productive

technology is now in use and total GDP is $a * W_{average}^2$, which can easily be less than what it used to be, despite the increased wealth.

This argument gets reinforced if, as is likely, the fixed costs of investment go up when overall wealth goes up (because, say, the price of land or the wage rate goes up). If the technology of lending exhibits some increasing returns—as is plausible—this mechanism will apply with even greater force.

Third, as emphasized already, it is not true that the only real problem is that the poor are too poor to invest efficiently. It can also be the case that there is too much capital in the hands of the rich.

Fourth, there is reason to try to redistribute investible resources, not only towards the poor, but also towards specific groups of the nonpoor, including many established but smaller entrepreneurs. In this sense, we might need more policy instruments than just microcredit.

None of this, of course, takes into account the various costs of redistribution—incentive costs, tax collection costs, and the rest. But it does make it clear that redistribution is not just about politics or some vision of a just society, though both of those are, of course, profoundly important: It is also about growth and the ability of societies to take best advantage of the available talent.

References

Arellano, Manuel, and Stephen Bond (1991). "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *The Review of Economic Studies* 58(2): 277–297.

Aleem, Irfan. (1990). "Imperfect Information, Screening, and the Costs of Informal Lending: A Study of a Rural Credit Market in Pakistan." *World Bank Economic Review* 4(3): 329–349.

Banerjee, Abhijit V. (2000), "Prospects and Strategies for Land Reforms." In B. Pleskovic and J. Stiglitz, eds., *Annual World Bank Conference on Development Economics 1999.* Washington, DC: World Bank, pp. 253–284.

Banerjee, Abhijit V., and Andrew Newman (1998). "Information, the Dual Economy and Development." *Review of Economic Studies* 65(4): 631–653.

Banerjee, Abhijit V., and Esther Duflo (2003a). "Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program." Working Paper 2003-5, Bureau for Research in Economic Analysis.

——— (2003b). "Inequality and Growth: What Can the Data Say?" *Journal of Economic Growth* 8: 267–299.

——— (2006). "Growth Theory through the Lens of Development Economics." In P. Aghion and S Durlauf, eds., *Handbook of Economic Growth*, Vol. 1a. Amsterdam: Elsevier, pp. 473–552.

——— (2007). "The Economic Lives of the Poor." *Journal of Economic Perspectives* 21(1): 141–167, Winter.

Banerjee, Abhijit V., and Kaivan Munshi (2004). "How Efficiently is Capital Allocated? Evidence from the Knitted Garment Industry in Tirupur." *Review of Economic Studies* 71(1): 19–42.

Banerjee, Abhijit V., Paul Gertler, and Maitreesh Ghatak (2002). "Empowerment and Efficiency: Tenancy Reform in West Bengal." *Journal of Political Economy* 110(2): 239–280.

Banerjee, Abhijit V., and Sendhil Mullainathan (2008). "The Shape of Temptations: Implications for the Economic Lives of the Poor." Unpublished Manuscript, Massachusetts Institute of Technology, Cambridge, MA.

Bardhan, Pranab, and Dilip Mookherjee (2007). "Land Reform and Farm Productivity in West Bengal." Unpublished Manuscript, Boston University.

Barro, Robert J. (2000). "Inequality and Growth in a Panel of Countries." *Journal of Economic Growth* 5(1): 5–32.

Basta, S., S. Soekirman, D. Karyadi, and N. Scrimshaw (1979). "Iron Deficiency Anemia and the Productivity of Adult Males in Indonesia." *American Journal of Clinical Nutrition* 32(4): 916–925.

Benabou, Roland (1996). "Inequality and Growth." In *NBER Macroeconomics Annual 1996*, ed. Ben Bernanke and Julio J. Rotemberg. Cambridge and London: MIT Press, pp. 11–73.

Besley, Timothy, and Robin Burgess (2000). "Land Reform, Poverty and Growth: Evidence from India." *Quarterly Journal of Economics* 105(2).

Berry, R. Albert, and William R. Cline (1979). *Agrarian Structure and Productivity in Developing Countries*. Baltimore and London: John Hopkins University Press.

Binswanger, Hans P., and Mark R. Rosenzweig (1986). "Behavioural and Material Determinants of Production Relations in Agriculture." *The Journal of Development Studies* 22(3): 503–539.

Binswanger, Hans P., Klaus Deininger, and Gershon Feder (1995). "Power Distortions Revolt and Re-form in Agricultural Land Relations." In J. Behrman and T.N. Srinivasan, eds., *Handbook of Development Economics*, Volume III. Amsterdam: Elsevier Science B.V.

Buera, Francisco (2008). "Persistency of Poverty, Financial Frictions, and Entrepreneurship." Unpublished manuscript, Northwestern University,Evanston, IL.

Buera, Francisco, Joe Kaboski, and Yongshin Shin (2008). "Finance and Development: A Tale of Two Sectors." Unpublished Manuscript, Northwestern University, Evanston, IL.

Caballero, Ricardo, and M. Hammour (2005). "The Cost of Recessions Revisited: A Reverse-Liquidationist View." *Review of Economic Studies* 72 (April): 313–341.

Caselli, Francesco, and Nicola Gennaioli (2005). "Credit Constraints, Competition, and Meritocracy." *Journal of the European Economic Association* 3(2–3): 679–689.

Djankov, Simeon, Rafael La Porta, Florencio Lopez de Silanes, and Andrei Shleifer (2003). "Courts." *Quarterly Journal of Economics* 118: 453–517.

Dasgupta, Arindam (1989). *Urban Informal Credit Markets in India*. New Delhi: National Institute of Public Finance and Policy.

Davies, James, Susanna Sandstrom, Anthony Shorrocks, and Edward Wolff (2006). "The Global Distri-bution of Household Wealth." *Wider Angle* 2: 4–7.

De Mel, Suresh, David Mckenzie, and Chris Woodruff (2007). "Returns to Capital in Microenterprises: Evidence from a Field Experiment." Policy Research Working Paper No. 4230. World Bank, Washington, DC.

Deaton, Angus (1997). *The Analysis of Household Surveys*. Washington, DC: World Bank.

Duflo, Esther, and Christopher Udry (2004). "Intrahousehold Resource Allocation in Cote d'Ivoire: Social Norms, Separate Accounts, and Consumption Choices." NBER Working Paper No. 10498, May. National Bureau of Economic Research, Cambridge, MA.

Duflo, Esther, Michael Kremer, and Jonathan Robinson (2008). "How High Are Rates of Return to Fertilizer? Evidence from Field Experiments in Kenya." *American Economic Review* 98(2): 482–88.

Fafchamps, Marcel, and Susan Lund (2003) "Risk-sharing Networks in Rural Philippines." *Review of Economic Studies* 71(2): 261–287.

Field, Erica (2003). "Fertility Responses to Urban Land Titling Programs: The Roles of Ownership Security and the Distribution of Household Assets." Working paper, Harvard University.

Fisman, Raymond (2001). "Trade Credit and Productive Efficiency in Developing Countries." *World Development* 29(2): 311–321.

Forbes, Kristin J. (2000). "A Reassessment of the Relationship between Inequality and Growth." *American Economic Review* 90(4): 869–887.

Foster, Andrew D., and Mark R. Rosenzweig (1995). "Learning by Doing and Learning from Others: Human Capital and Technical Change in Agriculture." *Journal of Political Economy* 103(6): 1176–1209.

Galor, Oded, and Joseph Zeira (1993). "Income Distribution and Macroeconomics." *Review of Economics Studies* 60: 35–52.

Gertler, Paul, and Jonathan Gruber (2002). "Insuring Consumption against Illness." *American Economic Review* 92(1): 51–76.

Ghate, Prabhu (1992). *Informal Finance. Some Findings from Asia*. Oxford University Press.

Goldstein, Markus, and Christopher Udry (1999). "Agricultural Innovation and Resource Management in Ghana." Mimeo, Yale University.

Lafont, Jean-Jacques, and Mohamed Salah Matoussi (1995). "Moral Hazard, Financial Constraints and Sharecropping in El Oulja." *Review of Economic Studies* 62(3): 381–399.

Li, Hongyi, and Heng-fu Zou (1998). "Income Inequality is Not Harmful for Growth: Theory and Evidence." *Review of Development Economics* 2(3): 318–334.

Li, R., X. Chen, H. Yan, P. Deurenberg, L. Garby, and J.G. Hautvast (1994). "Functional Consequences of Iron Supplementation in Iron-Deficient Female Cotton Workers in Beijing China." *American Journal of Clinical Nutrition* 59: 908–913.

Mckenzie, David, and Christopher Woodruff (2006). "Do Entry Costs Provide an Empirical Basis for Poverty Traps? Evidence from Mexican Microenterprises." *Economic Development and Cultural Change,* October 2006, Vol. 55 (1), pp. 3-42

Mesnard, Alice, and Martin Ravallion (2001). "Wealth Distribution and Self-Employment in a Developing Economy." CEPR Discussion paper No. 3026. Centre for Economic Policy Research, London.

Miguel, Edward, and Michael Kremer (2004). "Worms: Identifying Impacts on Education and Health in the Presence of Treatment Externalities." *Econometrica* 72(1): 159–217.

Morduch, Jonathan (1993). "Risk Production and Saving: Theory and Evidence from Indian Households." Unpublished Manuscript, Harvard University, Cambridge, MA

Olley, G. Steven, and Ariel Pakes (1996). "The Dynamics of Productivity in the Telecommunications Equipment Industry." *Econometrica* 64(6): 1263–1297.

Rosenzweig, Mark R., and Hans P. Binswanger (1993). "Wealth, Weather Risk and the Profitability of Agricultural Investment." *Economic Journal* 103 (January): 56–78.

Rosenzweig, Mark R., and Kenneth I. Wolpin (1993). "Credit Market Constraints, Consumption Smoothing, and the Accumulation of Durable Production Assets in Low-Income Countries: Investments in Bullocks in India." *Journal of Political Economy* 101(21): 223–244.

Shaban, Radwan (1987). "Testing between Competing Models of Sharecropping." *Journal of Political Economy* 95(5): 893–920.

Swaminathan, Madhura (1991). "Segmentation, Collateral Undervaluation, and the Rate of Interest in Agrarian Credit Markets: Some Evidence from Two Villages in South India." *Cambridge Journal of Economics* 15(2): 161–78.

Thomas, Duncan, Elizabeth Frankenberg, Jed Friedman, Jean-Pierre Habicht, Mohammed Hakimi, Nicholas, Ingwersen, Jaswadi, Nathan Jones, Christopher McKelvey, Gretel Pelto, Bondan Sikoki, Teresa Seeman, James P. Smith, Cecep Sumantri, Wayan Suriastini and Siswanto Wilopo (2006). "Causal Effect of Health on Labor Market Outcomes: Experimental Evidence" (September 1, 2006). California Center for Population Research. On-Line Working Paper Series. Paper CCPR-070-06. http://repositories.cdlib.org/ccpr/olwp/CCPR-070-06

Timberg, Thomas A., and C. V. Aiyar (1984). "Informal Credit Markets in India." *Economic Development and Cultural Change* 33(1): 43–59.

Townsend, Robert (1994). "Risk and Insurance in Village India." *Econometrica* 62(4): 539–591.

——— (1995). "Financial Systems in Northern Thai Villages." *Quarterly Journal of Economics* 110(4): 1011–1046.

WHO (World Health Organization) (2001). *Macroeconomics and Health. Investing in Health for Economic Development*. Geneva: WHO.

Eco-Audit

Environmental Benefits Statement

The Commission on Growth and Development is committed to preserving endangered forests and natural resources. The World Bank's Office of the Publisher has chosen to print these Working Papers on 100 percent postconsumer recycled paper, processed chlorine free, in accordance with the recommended standards for paper usage set by Green Press Initiative—a nonprofit program supporting publishers in using fiber that is not sourced from endangered forests. For more information, visit www.greenpressinitiative.org.

The printing of all the Working Papers in this Series on recycled paper saved the following:

Trees*	Solid Waste	Water	Net Greenhouse Gases	Total Energy
48	2,247	17,500	4,216	33 mil.
*40 inches in height and 6–8 inches in diameter	Pounds	Gallons	Pounds CO_2 Equivalent	BTUs

green press INITIATIVE

The Commission on Growth and Development Working Paper Series

44. *From Financieristic to Real Macroeconomics: Seeking Development Convergence*, by Ricardo Ffrench-Davis, January 2009
45. *Setting Up a Modern Macroeconomic-Policy Framework in Brazil, 1993–2004*, by Rogério L. F. Werneck, April 2009
46. *Real Exchange Rates, Saving, and Growth: Is There a Link?*, by Peter J. Montiel and Luis Servén, April 2009
47. *Avenues for Export Diversification: Issues for Low-Income Countries*, by Paul Brenton, Richard Newfarmer, and Peter Walkenhorst, February 2009
48. *Macroeconomic Policy: Does it Matter for Growth? The Role of Volatility*, by Antonio Fatás and Ilian Mihov, February 2009
49. *Current Debates on Infrastructure Policy*, by Antonio Estache and Marianne Fay, February 2009
50. *Explaining China's Development and Reforms*, by Bert Hofman and Jingliang Wu, February 2009
51. *Growth Challenges for Latin America: What Has Happened, Why, and How To Reform The Reforms*, by Ricardo Ffrench-Davis, March 2009
52. *Chile's Growth and Development: Leadership, Policy-Making Process, Policies, and Results*, by Klaus Schmidt-Hebbel, March 2009
53. *Investment Efficiency and the Distribution of Wealth*, by Abhijit V. Banerjee, April 2009

Forthcoming Papers in the Series:

Africa's Growth Turnaround: From Fewer Mistakes to Sustained Growth, by John Page (April 2009)

Remarks for Yale Workshop on Global Trends and Challenges: Understanding Global Imbalances, by Richard N. Cooper (April 2009)

Electronic copies of the working papers in this series are available online at www.growthcommission.org.
They can also be requested by sending an e-mail to contactinfo@growthcommission.org.

The point of departure of this paper is that in the absence of effectively functioning asset markets the distribution of wealth matters for efficiency. Inefficient asset markets depress total factor productivity (TFP) in two ways: first, by not allowing efficient firms to grow to the size that they should achieve (this could include many great firms that are never started); and second, by allowing inefficient firms to survive by depressing the demand for factors (good firms are too small) and hence factor prices. Both of these effects are dampened when the wealth of the economy is in the hands of the most productive people, again, for two reasons: first, because they do not rely as much on asset markets to get outside resources into the firm; and second, because wealth allows them to self-insure and therefore they are more willing to take the right amount of risk. None of this, however, tells us that efficiency-enhancing redistributions must always be targeted to the poorest. There is some reason to believe that a lot of the inefficiency lies in the fact that many medium-size firms are too small.

Abhijit V. Banerjee, *Ford Foundation International Professor of Economics, Department of Economics, MIT*

The mandate of the Commission on Growth and Development is to gather the best understanding there is about the policies and strategies that underlie rapid economic growth and poverty reduction.

The Commission's audience is the leaders of developing countries. The Commission is supported by the governments of Australia, Sweden, the Netherlands, and United Kingdom, The William and Flora Hewlett Foundation, and The World Bank Group.

Australian Government
AusAID
DFID Department for International Development
Dutch Ministry of Foreign Affairs
THE WILLIAM AND FLORA HEWLETT FOUNDATION
Sida
THE WORLD BANK

www.growthcommission.org
contactinfo@growthcommission.org