

Redistribution, investment, and human

capital accumulation:

The case of Agrarian Reform in the Philippines

Klaus Deininger

Pedro Olinto

Miet Maertens¹

¹ World Bank, Washington DC; Department of Agrarian Reform, Manila; KU Leuven. We thank Agnes Quisumbing and Kei Otsuka for kindly giving us access to their data and Alain de Janvry, Elisabeth Sadoulet, Karen Macours, and participants at the GDN workshop in Bonn for helpful comments. Funding from the Swiss Special Studies Trust Fund is gratefully acknowledged. The findings and views of this paper are our own and do not necessarily reflect those of the World Bank, its Executive Directors, or the countries they represent.

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Abstract: We examine whether there is empirical support at the household level for theoretical models that suggest that redistribution of productive assets can enhance opportunity and overall growth. To do so, we use a long panel data set for beneficiaries and non-beneficiaries from land reform in the Philippines. Results indicate that land reform resulted in higher investment in physical capital, a greater increase in the intergenerational transmission of human capital, and greater household welfare and productivity. The impact of obtaining land was several orders of magnitude higher than that of education and, if anything, negatively related to initial endowments. This positive impact notwithstanding, we find that the way in which land reform was implemented has reduced access to land for the landless and led to a worsening of the functioning of land rental markets. A strategy that would replace administrative mechanisms (land ownership ceilings) with economic incentives (land tax) could be associated with gains in efficiency and equity.

1 Introduction: Redistributive policies and land reform

An increasingly influential theoretical literature suggests that, contrary to earlier beliefs, redistribution can be good for growth. However, up to date there exists little empirical evidence to support, let alone quantify, such an “opportunity-enhancing effect of redistribution”, especially in developing countries. In this paper we use the example of land reform in the Philippines to assess the impact of a one-time asset transfer on households’ investment and intergenerational transmission of human capital. Availability of data spanning a 30 year period enables us to make inferences on the impact of redistribution on investment and long-term asset accumulation. We find not only that there are important long-term effects but also that these are likely to outweigh static productivity impacts, providing support to the hypothesis that redistribution of productive assets can help increase growth. At the same time, we find that the way in which such redistribution was accomplished may actually have limited its outreach and impact. For the concrete case at hand we use this to make recommendations on how a more inclusive, effective, and above all speedy program could be implemented.

1.1 Asset ownership and growth

Whether redistribution and the associated focus on equity of opportunity are conducive or harmful to a growth-oriented strategy has been a key concern in development economics. Traditionally, in a literature that was motivated by empirical observation and aiming to discover and explain regularities in the data,

there was consensus that growth would require high and/or increasing inequality; a notion often associated with the famous hypothesis by Kuznets (1955).² This was contested by scholars emphasizing the importance of “growth with equity” and of redistribution as a basis for subsequent growth (Adelman 1995). More recently, the distribution-growth relationship has been re-discovered by economic theorists who noted that, in the presence of capital market imperfections, a one-time lump sum redistribution may be associated with a long-term increase in levels of growth (Aghion et al. 1999). Possible reasons for a more equitable distribution of assets and the associated economic opportunities to be associated with higher levels of aggregate growth are the presence of externalities and moral hazard (Bardhan et al. 1999; Aghion and Bolton 1997; Banerjee and Newman 1993), indivisible discrete investments in items such as schooling that can not be used as collateral (Galor and Zeira 1993), and segregation of economic agents according to wealth with local public goods affecting future growth (Benabou 1996).

Although these theoretical advances have generated significant interest, most of the empirical literature thus far has focused on describing the relationship between levels of distribution and growth, rather than the impact of redistributive measures. At the aggregate cross-country level, a negative relationship between the distribution of *assets* and subsequent growth appears to emerge (Birdsall and Londono 1998; Deininger and Squire 1998). Differences in initial income distribution has been argued to generate significantly different development trajectories, for example, in Britain and France (Piketty 1997) and are related to broader socio-economic phenomena such as crime (Fajnzylber et al. 1998) and issues of political economy (Binswanger and Deininger 1997).³ At the micro level, initial wealth and the ensuing borrowing constraints have been shown to be a determinant of households’ ability to make productive investments, acquire human capital, and start up enterprises (Blanchflower and Oswald 1998). In developing countries, a relationship between asset endowments and productivity has been postulated in the “efficiency wage” hypothesis (Dasgupta and Raj 1986 and 19987). Although far from conclusive, there is growing evidence for the presence of “poverty traps” (Fafchamps and Pender 1997; Jalan and Ravallion 1999), i.e. situations in which poverty is perpetuated not because of lack of ability but because economic agents lack endowments.

Although the theoretical literature predicts that transfers of (productive) assets could be one way to get out of poverty traps (Putterman et al. 1998; Hoff, 1996; Kanbur and Lustig 1999), there is little evidence on whether redistributive programs that advance equity and improve efficiency exist and can be implemented in the real world. This would be of relevance from a policy perspective and to provide

² The three main reasons for higher inequality to be associated with higher growth are if (i) the marginal propensity to save for the rich is higher than it is for the poor according to the Kaldorian model; (ii) investments are indivisible (e.g. steam power) and capital markets non-existent; and (iii) there is moral hazard with unobservable effort supply.

insight on a number of issues (e.g. whether one-time redistribution can have permanent effects) on which different theoretical models provide different predictions. However, to make empirical statements on this issue, information on an actual asset transfer is necessary. In this paper we use the case of land reform in the Philippines. We examine the impact of this intervention on beneficiaries and also ask to what degree the policy pursued to make this feasible might have had undesirable side-effects.

1.2 Land reform in international perspective

Land reform has traditionally been viewed as an ideal redistributive policy. One reason is that, in view of the immovability and indestructibility of land, land reform may provide a basis for a non-distortionary lump-sum redistribution (e.g. Banerjee 1999). A second reason is that a large and influential literature on the presence of an inverse farm-size productivity relationship (e.g. Berry and Cline 1979) predicts that land reform can serve as a mechanism to increase not only equity but also the efficiency of resource use in the rural sector. Finally, in a number of countries, legal discrimination has prevented access to land by the poor, implying that policies to redistribute land – is shown to be an efficient and effective means to reduce poverty- could count with broad popular support.⁴

The selective inventory of land reforms (excluding socialist ones) provided in table 1 illustrates that, historically, the magnitude of land reform efforts has been enormous, both in terms of the number of beneficiaries and the size of area redistributed.⁵ The well-known land reforms in Japan, Korea, and Taiwan at the end of the second world war redistributed between 30% and 40% of the cultivated area and affected about two thirds of rural households. Other reforms that were not imposed externally were drawn out over long periods of time (e.g. the Mexican reform that lasted from 1915 to 1992) and are less clearly linked to high levels of economic growth.⁶ This notwithstanding, the efforts undertaken were large - reforms in Bolivia, Nicaragua, Peru, and Mexico involved about a third of the rural population and affected sizeable portions of the national arable land endowment. Due to large differences in land quality and countries' land endowments, the physical size of area redistributed varies considerably – from almost 60 hectares in Zimbabwe, about 50 hectares in Brazil, to between 0.4 and 0.6 hectares in Korea, Taiwan,

³ For obvious reasons, among others the fact that available conventional measures of income distribution reflect the after-tax situation, the evidence concerning an impact of income inequality on subsequent growth is much less clear-cut. See, for example Forbes 1998, Li and Zou, 1998.

⁴ The importance of land ownership of the poor is at the root of programs to increase tenure security (e.g. through conflict resolution, boundary demarcation, legal clarification, or titling). As such programs will benefit only those who already use land, complementing them with specific policies to enhance land access by the poor would appear as a necessary extension in environments where historically land has been distributed very inequitably (Binswanger et al. 1995). A number of studies have shown that, especially in rural environments where other markets are imperfect, such interventions can help improve their nutritional status, risk-bearing capacity, and investment incentives, in addition to enhancing their ability to access credit markets (e.g. Burgess 1998 for the case of China).

⁵ The purpose of this table is merely illustrative, and to provide an indication of the orders of magnitude involved. Figures on area redistributed and number of beneficiary households are taken from the cited sources and percentages have been calculated by taking the total area of arable land (from FAO statistics) and the rural population divided by 5 (to obtain an estimate of the number of rural households).

⁶ Key reasons for failing to do so were that land reform was often politically motivated and strongly linked to other non-economic objectives (e.g. the establishment of collectives), that too little thought was given to the need to provide adequate compensation and the goal of establishing viable farms rather than merely redistributing land (Deininger, 1999).

and Japan. Although rigorous evidence on the impact of land reforms remains spotty, the table suggests little relationship between the amount of land redistributed per beneficiary and the ultimate impact of the land reform effort.

In fact, even though land reforms have occupied a prominent place in political and ideological debates, empirical evidence to evaluate their impact is scant. Most of the evaluations from East Asia focused on aggregate indicators rather than aiming to establish causality, taking it for granted that land reform was a desirable intervention. This makes it difficult to thus assess whether, and if yes to what degree, the experience from East Asia may be replicable in other contexts (Herring, 1983). Evaluations from Latin America similarly emphasized achievement of physical targets (Dorner 1992; Powelson 1988; Prosterman et al. 1993; Eckstein et al. 1979; Barraclough 1970) and analysis of the political economy (Thiesenhusen 1989; de Janvry and Sadoulet 1989; Alston et al 1999) underlying land reform implementation. The impact on productivity and household welfare was rarely analyzed, except in the case of collectives where the failures were too obvious to be glossed over.⁷ Finally, attempts at in-depth economic evaluation of land reform (e.g. Scott et al. 1976 for Kenya) are often hampered by the fact that available data cover only a short period of time and are thus ill-suited to assess the longer-term impact of land reform.

It may therefore not come too surprising that the two recent studies of the topic (Banerjee et al. 1998; Besley and Burgess 1998) focus on India, rather than the more “classical” land reform countries. Rather than a direct transfer of land ownership, they evaluate tenancy reform, i.e. a set of legislative initiatives which, by conferring implicit property rights, aimed to improve tenants’ bargaining position vis-a vis the landlord. While providing interesting evidence, both studies are based on aggregate, rather than household level, evidence. Interestingly, they also come to different conclusions - while one study find that land reform reduces poverty but has no impact on productivity, the other one finds a strong and significant impact of land reform on productivity. Finally, the longer-term impact of land reform legislation on investment and the functioning of land markets is not analyzed – although this would be necessary to examine whether such a policy could be recommended as growth-enhancing rather than merely redistributive.

The lack of systematic study of the issue is surprising given the fact that, since the end of the cold war, the interest in redistributive policies has experienced somewhat of a revival. This can be attributed to a number of reasons. In an economic regime characterized by reliance on decentralized markets rather than central government planning, households’ asset ownership will be a critical determinant of their ability to utilize economic opportunities opened up through macro liberalization. Access to assets offers an

⁷ Even though many historical land reforms (e.g. in Peru, Nicaragua, El Salvador, Zimbabwe, Vietnam, Cuba) aimed to establish collective forms of production, these did not have the desired success and are now widely recognized as not offering potential for replication. We therefore refrain from an in-depth discussion of this issue.

opportunity of overcoming the legacy of structural impediments to economic advancement of the poor, by reducing at least some of the barriers that have historically impeded their participation in markets (de Janvry et al. 1999; World Bank 2000). Issues involving the distribution of assets have surfaced as important in the peace efforts for quite a number of countries (e.g. Guatemala, Colombia, Honduras, El Salvador, Brazil, South Africa, Zimbabwe, the Philippines).⁸ In all of these countries land reform has assumed high political visibility and is viewed as an instrument to overcome dualism and lay the basis for peaceful, inclusive, and democratic economic development. Understanding the lessons from past efforts, in particular their impact on household welfare, investment, and productivity, is therefore of more than theoretical and academic interest.

1.3 Land reform in the Philippines

Land reform in the Philippines is a hotly debated policy issue the beginnings of which date back almost one century.⁹ The foundation for “modern” land reform was laid by the 1972 Presidential Decree (PD) 27 which provided the basis for “Operation Land Transfer” (OLT) and “Operation Leasehold”, respectively, and the 1988 Republic Act (RA) 6657, also known as the Comprehensive Agrarian Reform Law (CARL); see Wurfel 1988; Riedinger 1995; Putzel 1992; and Fuwa 2000 for analysis of the background and political economy of this measure.

PD 27, the applicability of which is limited to rice and corn lands, consists of two key provisions. First, it calls for a land ownership ceiling of 7 hectares and the mandatory sale of all land that is owned in excess of this limit to tenants. Second, it outlaws share tenancy and mandates the conversion of tenants on landholdings below 7 hectares to leaseholders with a rent ceiling of 25% of crop revenue after appropriate deductions for inputs. Not surprisingly, the second of these provisions was much easier to implement and came to affect a large number of households. As illustrated in table 2, “operation leasehold” had, by 1985, benefited about 0.5 million households.¹⁰ Progress of OLT was much slower – by end of 1985 only 17,116 beneficiaries on 11,197 hectares (i.e. less than 3% of the target population of 588,000) had received emancipation patents. Reasons for the failure to implement the program more quickly include a supply-driven approach to implementation –which was the sole responsibility of DAR staff without

⁸ For Brazil see Buainain et al. 1999, Navarro 1998 and the documents at <http://www.dataterra.org.br> and <http://www.nead.gov.br>; for Colombia Machado and Suarez 1999, for Guatemala see the Peace Accords (Government of Guatemala 1996), for Honduras see Korczowski, 1999; for the Philippines see Hayami et al. 1990 and Deininger et al. 1999, for Zimbabwe see Moyo 1998 and Government of Zimbabwe 1998. The underlying concept of providing a grant for poor people to acquire land has also been applied in India (Agarwal, 1998).

⁹ The first systematic attempt at land redistribution, undertaken by the US colonial government in 1903, involved the purchase of about 166,000 has from the Catholic Church. It was followed by the 1933 Rice Share Tenancy Act which limited share rent to 50% and imposed a ceiling of 10% per annum on credit extended by the landlord and two major pieces of Agrarian Reform legislation under the Magsaysay administration, namely the 1954 Agricultural Tenancy Act and the 1955 Land Reform Act. The former aimed to improve the situation of tenants by limiting share rent to 30%, further reducing the interest ceiling to 8-1-%, and improving the enforcement of existing legislation. The latter was to provide for expropriation of large estates, but in practice remained rather ineffective (Riedinger 1995).

¹⁰ This figure refers to share-tenants who were officially transformed into leaseholders and does not indicate to what degree the rent ceilings were actually enforced.

beneficiary involvement- and the fact that disputes over land valuation resulted in long delays or completely stalled the process (Riedinger, 1995).

The 1988 CARL expanded the scope of land reform in two respects. First, land reform was no longer limited to rice and corn land but was expected to cover the whole country. Implementation was to occur in three main phases over the subsequent 10 years, to be funded by a special “Agrarian Reform Fund” based on ill-gotten wealth in the Marcos era. Second, the range of beneficiaries was to be increased to include not only cultivators but, at least in principle, landless households. Finally, full land ownership was to be granted automatically to all the beneficiaries who had benefited from the earlier land reform under PD 27. Implementation of these measures was expected to proceed in three distinct steps over a total period of 10 years. A first phase, expected to last 4 years, aimed to complete coverage of tenanted rice and corn lands, transfer ownership to PD 27 beneficiaries, and include lands voluntarily offered for sale, alienable public lands, and holdings with a size above 50 hectares. A second phase of three years’ duration, was to cover agricultural holdings between 24 and 50 hectares. Finally, land reform was to be completed during the last 3-4 years through redistribution of lands between 5 and 24 has. Agri-business operations and plantations were exempted from land reform for a period of 10 years to allow recovery of fixed investments and supposed to be subjected to redistribution once the remainder of CARP had been implemented.

More than ten years after the promulgation of CARL, i.e. at a point where land reform should already be a thing of the past, 1.75 million hectares out of 4.3 million remain to be covered (table 2). Even if the historical pace of implementation were to be maintained, completing the Government’s targets would take more than 17 years. However, additional issues threaten to strain the consensus that has up to now supported land reform in the Philippines.

The most important constraint is financial. Contrary to legislation to improve tenants’ rights or the redistribution of public lands, almost all of the remaining scope of CARP land is privately owned. The need to pay compensation implies that, in the country’s present fiscal situation, and with the failure of contributions to the Agrarian Reform Fund to materialize, funding will be a main constraint to the government’s ability to implement a program of the type envisaged. Some observers fear that inability to secure the needed funds together with the political inability to discontinue the program, could lead to a lengthy and drawn-out process with negative side-effects on rural investment, diversification, and growth.

Also, even though there is strong support for land reform in general, the economic gains from redistributing private lands between 5 and 25 ha, as well as functioning plantations are likely to be much smaller than the gains that could result from bringing underutilized but artificially sub-divided land into

production.¹¹ At the same time, a large portion of underutilized lands remain outside the scope of CARL because they are either held under special legal arrangements to which land reform legislation is not applicable, artificially subdivided to evade the impact of land reform, or because they are viewed as forest lands. All of this begs the question not only whether further efforts at redistributive land reform would be warranted but also what form such reform should take, if it is indeed justified.¹² A review of the impact of land reform on beneficiaries, and the broader context in which land reform take place would therefore be useful.

In the next section we discuss the data used and descriptive background information on the study villages as well as the evidence on productivity of different tenure categories. Section three presents a brief review of the conceptual background and the empirical evidence regarding targeting of land reform efforts and its impact on beneficiary welfare, investment, and productive efficiency. Section four puts land reform in the broader context of rural factor market development by asking whether land reform can be linked to changes in land access and the functioning of land markets between 1985 and 1998. Section five summarizes and concludes with a number of suggestions for policy and further research.

2 Data and background information on the study villages

To examine the longer-term impact of land reform, we utilize data from five villages in Central Luzon and Iloilo typical of the rice and corn growing areas that were the focus of the 1972 land reforms. One of the villages in each province (Maragol in Central Luzon and Pandon in Iloilo) represents favorable agroclimatic environments with irrigated rice production. Two other villages in a less favorable environments combine reliance on rainfed production with supplemental irrigation during the dry season. The fifth village (Signe) is located in mountainous and marginal environment. Between 300 and 400 households in these villages were surveyed three times, in 1985, 1989, and 1998 (see Otsuka et al. 1992; Nagarjan et al. 1991; Otsuka 1991; Estudillo et al. 1999). Combining information on agricultural production from the 1985 and 1998 surveys with intergenerational dynamics (including inheritances and children's education) provides a fairly complete picture of the situation of different households, as well as changes over time.

¹¹ In Mindanao, holdings that were handed out to colonists only one generation ago are now being subjected to compulsory acquisition by the state and redistribution (Wurfel, 1988).

¹² An additional issue is that subdivision and renting out of land that had been received under the land reform program is strictly prohibited. Many of the beneficiaries who received land in 1972 are by now too old to farm themselves and there is considerable anecdotal evidence suggesting that their children have acquired education and taken on non-agricultural jobs (e.g. Hayami and Kikuchi, 2000). If this is true, elimination of these restrictions would be vital to ensure not only efficiency of land use but also the ability of a "second generation" to benefit (at least indirectly) from the earlier land reform.

2.1 Intergenerational dynamics

Population and occupational dynamics of the villages are illustrated in table 3. Generation II, the respondent population in the surveys to be analyzed below, was born around 1940. Their average age was 32 years in 1972 when PD 27, the first land reform law, was passed; 45 years in 1985 when the first survey was fielded; and almost 60 years in 1998 when the ultimate survey instrument was applied. Descriptive statistics indicate that, on average, they had about 6 years of schooling, with 63% having completed primary and 19% secondary education. The large majority (79%) of males was occupied as farmer on their own account while the large majority of females (79%) were occupied as housekeepers. Even for males, temporary (9%) and permanent (3%) non-agricultural employment were of limited importance, and confined to favorable agro-ecological endowments. Full time agricultural wage labor remained of marginal importance and was practiced only in advanced villages, presumably since households still could engage in self-employment using either land at the frontier or obtaining such land through the rental market-.

Comparing this generation to its parents who were, on average, born in 1910, brings out a number of features. First, there was a significant advance in terms of educational attainment across generations –the mean level of education increased by 2.4 years from an average of 3.8 years for generation I to 6.2 for generation II. Females, who had lower levels of education in generation I (3.2 years as compared to 3.8 years for males) caught up with their male counterparts, and attained a level of education slightly higher than males (6.3 as compared to 6.2 years) in generation II. Second, the occupational structure was little different from that of generation II with the possible exception of a slightly higher percentage of females who, in generation II, did no longer engage in full-time housekeeping. Finally, the variation in the share of population who was actually born in the locality also points to the fact that the main waves of immigration into the villages occurred at different points in time.

Going forward to the respondents' children who were, on average, born in 1966, reveals profound changes in the villages' economic structure. The trend towards educational advancement continued, but clear gender differences emerged – between generation II and III female education increased by 3 years as compared to 1.9 years for males.¹³ One also notes a differentiation whereby full-time employment in own agriculture has ceased to provide the mainstay of economic activity - only 30% of the male population with completed schooling are full-time farmer. A quarter each are permanent agricultural laborers and in temporary non-agricultural occupations and the remainder (slightly less than 10%) are in permanent non-

¹³ These changes are explored in more detail by Estudillo, Qusiumbing, and Otsuka (1999) who explain this in terms of a choice between inheritance of land and human capital. Note that this is likely a lower bound of the educational advancement achieved as about 20% (of both males and females) are still attending school at the time of the 1989 survey (which was the only one that collected information on respondents' children).

agricultural occupations. More importantly, even though the majority of the population still relies on agriculture in some form or another, about 40% of females and 30% of males have migrated out of the village.¹⁴ Out-migration of off-spring has been particularly widespread in the marginal villages where 50% of males and 60% of females left.

2.2 Welfare, income, and asset ownership

Total expenditure (in equivalent of 1998 US \$s) allows comparison of welfare across villages and identification of households' location on the broader poverty map.¹⁵ With an equivalent of US \$ 311 average household expenditure is above the poverty line (US \$ 266) in the aggregate but close to or significantly below this line in the marginal villages -Rizal with 266.43 and Signe with 211.56 (see table 4). Both in 1985 and in 1998, agricultural income accounted for approximately two thirds of total income. However, income levels almost doubled between the two periods. Changes in the size and composition of income between 1985 and 1998 point towards a post-green revolution environment where income growth in rice was more modest than what was gained from diversification into other crops and livestock which have attained increasing importance especially in the more marginal environments. Overall growth of non- farm income was comparable to that of total income. Within this income category, a sharp increase in unearned income, largely remittances, dominated more modest increases in self-generated non-farm and off-farm income, especially in some regions such as Pandon where the magnitude of non-earned income more than tripled.

Land was a predominant component of household wealth in all of the villages, accounting for about 73% of total assets (excluding owner-occupied housing for which data were very sparse) in 1985 and 59% in 1998. The decrease in its importance over time was due to increased investment in non-land assets such as livestock (the value of which more than doubled between the two periods), productive assets and savings, and consumer durables.

Comparison of changes in land tenure between 1985 and 1998 suggests that implementation of land reform has been uneven across villages and that legislative intervention did not succeed in eliminating share tenancy in marginal environments.¹⁶ In the aggregate, we note a significant increase in the number of owners, from 25% to 37%, and a reduction of the proportion of share tenants, from 12% to 8%. However, these figures hide differences in tenure structure and the level of land reform implementation across villages. Most importantly, land reform was implemented most quickly and effectively in favorable environments – share tenancy was already virtually non-existent in Gabaldon and Maragol in 1985 and

¹⁴ Manila is an important destination for migration (6% of males and 9.5% of females), as is Mindanao (3.4% and 1.7%, respectively) and other countries (1.2% and 3%).

¹⁵ To make poverty comparisons we use the poverty line for Iloilo (P 8,061) established by the World Bank Poverty Assessment and an exchange rate of P 29 to the US \$).

was completely eliminated thereafter. By contrast, land reform was much less successful in eliminating share tenancy in marginal areas where, more than 25 years after the establishment of legislation to outlaw this form of tenure, between one sixth and one third of land owners continued to remain share tenants. More importantly, land reform implementation following the 1988 CARP appears to have consolidated the gains from the first phase of land reform but was much less successful in reducing landlessness.

2.3 Agricultural production and productivity

The study villages represent a post-green revolution environment in the sense that adoption of HYVs was, with 89% in the wet season and 99% in the dry season, virtually complete in by the time of the first survey in 1985 – in fact only Rizal and Signe reported any use of non-HYV varieties in the wet season. Similarly, fertilizer use was, with 93% of producers in the wet and 99% in the dry season, widespread and about two thirds of producers used a tractor for cultivation. Between 1985 and 1998, profits before payment of rent and family labor increased by about 80%, due largely to diversification and real price movements with virtually constant rice yields.

The impact of the transfer of rents implicit in land reform implementation can be seen from the fact that more of these profits actually benefited producers – the rate of increase in the same measure of profits after the payment of rent was 30% higher than that before rent. In line with what was found earlier, this increase was distributed unevenly across villages; while profits more than doubled in the two irrigated villages, aggregate increases were more modest in less favorable environments where profits after payment of rent increased by barely 30%.¹⁷

To explore the static economic gains that could serve as a justification for land reform, we regress profits from agricultural production per hectare on households' assets, education, land tenure, and village dummies to control for remaining unobserved variation in infrastructure access etc.. The purpose of doing so is not to establish a behavioral causality but rather to highlight correlation and to illustrate the improvements in productivity and welfare that could be expected by improving the tenure status of share tenants or landless households, respectively. Results, illustrated in table 5, indicate that from a point of view of static productivity gains, the case for land reform in the Philippines is much weaker than would be expected. Even in 1985, the impact of share tenancy on production was only marginally significant and of modest magnitude (15%). By 1998 even this relatively small impact had largely evaporated and we are unable to ascertain any significant relationship between tenure status and agricultural productivity.¹⁸

¹⁶ The following analysis is based only on panel households interviewed both in 1998 and 1985.

¹⁷ Since there was a natural disaster in Rizal in 1998, we can not make any inferences for this village, thus reinforcing the need for econometric analysis. Note, however, that the government's policy of high rice prices appears to provide benefits that are strongly biased in favor of well-endowed regions and to discourage diversification into livestock and other crops.

¹⁸ Unfortunately, we do not have production data for 1972 to examine whether the failure to find a significant effect of share tenancy in 1985 was an impact of land reform implementation or other factors.

Although this does not imply that land reform will not affect productivity, the failure of finding a strong static relationship suggests that in an environment such as the Philippines, land ownership may have an impact more through household investment and credit access rather than via static effort supply.

Compared to the apparently weak evidence on an impact of tenancy arrangements on productivity, we find a stronger impact of asset ownership and land ownership status on income. Figures reported in table 5 lead to two conclusions. First, the return to assets, in terms of contemporaneous income, has markedly increased between 1985 and 1998 from about 10% to about 18%. To the degree that they are sustained over time, measures to increase households' asset endowment do therefore appear to offer an opportunity for reducing poverty. Secondly, holding other endowments constant, landless and share tenants have significantly lower levels of income than owners and leaseholders in 1998.

3 Land reform: Targeting and impact

To measure the impact of land reform on investment, social mobility, and human capital accumulation, we use the data described earlier which contain information on beneficiaries as well as a control group of non-beneficiaries. We find that this type of asset redistribution was not biased in favor of the rich and had a strong impact on investment in physical as well as human capital and in the longer term on growth of income, productivity, and investment.

3.1 Conceptual framework and econometric model

Past analyses of land reform have often focused on whether or not land reform has been associated with improvements in welfare, poverty, or short-term agricultural productivity. Given that the whole purpose of land reform is the redistribution of assets, this appears to measure the incidence of such an intervention more than the impact. By itself, such analysis provides little information as to whether the observed increases were sustainable and enabled beneficiaries to set in motion the dynamic process of increased asset accumulation that would be predicted by theoretical models. To answer this question, it is necessary to examine whether the transfer of productive assets was associated with increased investment.

There are principally three channels through which a one-off asset transfer could result in higher levels of accumulation of physical and human capital. First, the increased security of property rights associated with the transition from tenancy to ownership is likely to increase the payoff to investments, especially those relying on family labor (for a theoretical model see Birdsall et al. 1999). An intuitive example is that land improvements are no longer subject to (full or partial) appropriation by the land owner, implying that beneficiaries are likely to have a higher investment demand. Second, by increasing beneficiaries' level of asset ownership and thereby eliminating credit constraints, land reform may expand their ability

to make investments that require credit access, as in the model by Galor and Zeira (1993) with respect to human capital. Finally, land reform can increase the payoffs to public good investments and social cohesion at the local level (Bardhan and Ghatak 1999), possibly resulting in higher levels of public goods being provided for the whole community.

To analyze these issues empirically, we use information on 296 panel households who were included in the 1985, the 1989, and the 1998 surveys described earlier. About 30% of the sample had benefited from the 1972 land reform legislation, mainly in the years between 1972 and 1975. With the recall information collected in 1985, which includes a complete inventory of the households' asset accumulation history, the data span a period of more than 30 years, enabling us to emphasize the longer-term impact of land reform that have thus far been difficult to capture in the literature. In doing so we focus on physical investment, human capital accumulation, and eventually more common indicators of household welfare (income) and productivity.

A simple before-after comparison of outcome variables for beneficiaries would therefore run the risk of confounding the effects of this policy intervention with that of a host of other policy-initiatives. To overcome this problem, we use before- and after- information on beneficiaries as well as a control group of non-beneficiaries, and to estimate double difference equations to obtain a measure of the impact of land reform. Formally, we want to estimate parameters in the model

$$(1) \quad Y_{it} = \alpha_0 + \alpha_1 S_t + \beta D_{it} + \theta_1 X_i + \theta_2 X_i S_t + \mu_i + \varepsilon_{it}$$

where Y_{it} denotes the observed level of the outcome variable Y (i.e. endowment with physical and human capital assets, welfare, and production) for individual i at time t . We are interested in β , which measures the impact of land reform on the outcome variable Y_{it} . D_{it} is an indicator variable that takes the value of 1 if household i benefited from the land reform program and 0 otherwise, X_i is a vector of household specific and time-invariant observable attributes (e.g. education and location relative to infrastructure as proxied by village dummies) that is hypothesized to affect the outcome variable Y_{it} , S_t is a time trend variable reflecting changes in the overall environment (e.g. macro-economic performance) which affects all households regardless of their program participation, and α_0 , α_1 , β , θ_1 , and θ_2 are parameters to be estimated. In addition to the variables and parameters above, the equation contains a composite error term $\mu_i + \varepsilon_{it}$. μ_i is a time invariant component that captures the effects of household specific unobserved attributes (e.g. managerial ability, land quality, social capital) on Y_{it} while the time variant component ε_{it} captures time and household specific unobserved effects such as random climatic or health shocks. In line with convention, we assume that $E[\varepsilon_{it} | S_t, D_{it}, X_i] = 0$ and that ε_{it} is orthogonal to S_t , D_{it} , and X_i .

Given that unobserved household specific characteristics that affect the outcome variable Y_{it} are also likely to affect program participation (e.g. more entrepreneurial households also being more likely to participate in the land reform program), it would clearly be wrong to assume that μ_i is orthogonal to D_{it} . The least squares estimator of program effect β (β_{OLS}) would therefore be biased and inconsistent. However, under the assumptions above, a consistent estimator of β can be obtained by taking first differences of (1) and thereby eliminating the time invariant component μ_i . Doing so gives

$$(2) \quad (Y_{it} - Y_{it-1}) = \alpha_1(S_t - S_{t-1}) + \beta_w (D_{it} - D_{it-1}) + \theta_2 X_i (S_t - S_{t-1}) + (\epsilon_{it} - \epsilon_{it-1})$$

where we have replaced β with the within estimator β_w . This equation can be estimated consistently using OLS. Because $d_i \equiv (D_{it} - D_{it-1})$ is uncorrelated with the transformed error term $(\epsilon_{it} - \epsilon_{it-1})$, β_w is an unbiased and consistent estimator of the impact of the land reform program β . Also note that α_1 provides the estimate for an independent time trend due, for example, to improvements in infrastructure, the overall macro-economic environment, or other donor-financed projects which affect beneficiaries and non-beneficiaries equally. This is of particular importance since many donor-funded programs have aimed to provide general infrastructure, technical assistance, and community-development in “Agrarian Reform Communities”,¹⁹

We report results for two sets of regressions. First, to measure the immediate impact of land reform, we let $t-1=1972$ and $t=1985$. In this case, $(S_t - S_{t-1})=1$ and because all of the households received land after 1972, $D_{it} - D_{it-1}=1$ for beneficiaries and 0 for non-beneficiaries. The parameters of the estimated equation, α_1 , β_w , and θ_2 then denote an independent time trend, changes in the impact of or returns to exogenous factors and endowments included in X_i , and the impact of land reform, all in terms of changes in the dependent variable $Y_{it}-Y_{it-1}$ over time. Second, to make the best of existing data for measuring the longer-term impact of land reform we let $t-1=1985$ and $t=1998$ but still include a dummy indicating whether a household benefited from land reform during the 1972-85 period as explained earlier.

The project evaluation literature has shown that, if the treatment and control group are drawn from two very different populations, double difference estimators of the program effect may be biased (Heckmann 1998). In this case it would be preferable to compare between two groups that are matched on observable characteristics. As the 1972 reform was explicitly targeted to households who already cultivated land, this would be a concern if cultivators were significantly different from non-cultivators. To examine whether this is an issue in our data, we estimate a simple probit equation of land reform participation. In addition

¹⁹ The assumption of these programs affecting both groups equally is crucial. If, for example, donor programs were targeted to land reform beneficiaries, rather than to the whole community, their impact would impart an upward bias on β_w , leading us to overestimate the impact of land reform. In view of the fact that many of these investments (e.g. roads and markets) are difficult to target to land reform beneficiaries and that project documents by the World Bank as well as other donors emphasize the community-development aspects of such projects, this assumption appears to be justified.

to revealing whether control and treatment groups share the same support, doing so can also be relevant from a policy point of view to identify to what extent program implementation has been targeted to the poor.

3.2 Impact of land reform

Descriptive evidence on the original status of land reform beneficiaries, as demonstrated in table 6a, indicates that, in line with program design, the 1972 land reform failed to benefit the landless but rather targeted share tenants and leaseholders. Almost 50% of the beneficiaries from this land reform effort came from the ranks of share tenants, one quarter from leaseholders, and another quarter from the class of owners. Estimating probit equations for land reform participation using the initial conditions from the 1985 sample suggests that, apart from selecting non- or small owners who actually cultivated land under tenancy arrangements, few observable variables seem to have played a role in selecting beneficiaries. In the absence of information on income and other household characteristics in 1972, we use the head's land and non-land assets (the latter proxied by inheritances), education, and cultivation status at the time of land reform promulgation.²⁰ Results, reported in table 6b, indicate that the early phase of land reform has benefited households with low levels of education and low land assets but that, once these factors are taken into account, there was little difference between beneficiaries and non-beneficiaries concerning their ownership of non-land assets.

This allows us to reject the hypothesis that land reform implementation was biased towards rich cultivators. From a policy perspective, this confirms that government officials generally were not able to target the program to the poorest within the overall universe of agricultural cultivators but at the same time supports the hypotheses that a land reform program targeted towards cultivating households may offer a satisfactory (though not outstanding) mechanism of self-selection. From a methodological point of view, failure to find strong observable differences between beneficiaries and non-beneficiaries (with the possible exception of cultivation in 1972) implies that we can use the whole sample rather than only a subset of matched households to make inferences on the impact of land reform.

We construct the dependent variable from data on households' initial and inherited land and non-land asset endowments broken together with the value of assets owned in 1985.²¹ Land reform beneficiaries continued to pay rent to their landlord originally but most were transformed into de-facto owners some time in the late 1980s.²² Although they were expected to amortize the land, the subsidy element included

²⁰ Recall that the households were, on average, 32 in 1972 and therefore had completed their education.

²¹ Note on inherited assets.

²² Although the legal provisions came in place only in 1988, a significant number of leaseholders was transformed into owners in the final Marcos years, in an attempt to shore up political support (Riedinger 1995). It appears that a fairly high share of households used to make such payments. Of course, the payment schedule involved an interest subsidy (at nominal interest rates of 6%) as well as an implicit sharing/insurance arrangement whereby amortization payments could not exceed a certain percentage of the harvest.

implies that the appropriate measure to gauge the impact of land reform on investment is the change in non-land, rather than total assets. Using the change in this variable between 1972 and 1985 allows estimation of the impact of land reform on physical capital accumulation as described earlier.

Results from the double difference estimation for non-land assets and education are reported in table 7 where, as before, money values have been transformed into US \$s for easier interpretation and village dummies have been suppressed. The first row suggests that land reform made a significant and quantitatively important contribution to non-land investment in the order of magnitude of about US \$ 1,500. Even considering that this reflects accumulation over a 16-year horizon, the size of the estimated impact suggests that land reform beneficiaries had a significantly higher propensity to save and/or were able to invest in activities with significantly higher return.

The only other independent variables available, in addition to village dummies, are the head's education and the level of initial assets. The significant coefficient on education in the OLS regression implies that higher levels of initial education have contributed to faster growth of non-land investment. One more year of education by the head would, according to the estimates, have increased investment by an equivalent of US \$ 250, almost the value of the mean annual income in the sample. Comparing this with the coefficient on land reform, we note that the investment-effect of land reform participation was equivalent to an increase of about 5.8 years in the head's education – i.e. almost a doubling of educational levels (the sample mean is 6.2 years). We also note that the level of initial assets owned is positive but not significant. This points towards the presence of divergence, rather than convergence, across households. In other words, households who started out with higher endowments of non-land assets appear to have been also been characterized by higher levels of investment.

To explore whether levels of initial assets affected land reform beneficiaries' subsequent performance, we include an interaction term between the level of initial asset endowments and a beneficiary dummy. Results, reported in the second row, show a negative though insignificant coefficient. Thus, in contrast to the overall population, poor land reform beneficiaries appear to have been able to catch up with their more wealthy peers. Targeting land reform to poor households would not be expected to reduce its impact; if anything it appears to have increased the impact of this policy intervention.

Even though households who were landless in 1985 may not differ too much from cultivating households in observable attributes, we can not exclude the possibility of differences in unobservable characteristics (e.g. initiative and agricultural ability) that might systematically be correlated with subsequent performance under the program. Comparing beneficiaries to such a control group might bias the estimated effect of land reform implementation. To account for this possibility, we re-estimate the above equation using only households who had been cultivating land in 1985. We find that the substantive results are not

affected. By the same token, using all the households included in the 1985 sample, rather than only the panel households for which information was obtained also in 1998 increases the magnitude of the point estimate for the impact of land reform and leaves the significance of the coefficient largely unchanged. This is consistent with the interpretation that there was indeed non-random attrition, i.e. that households who dropped out of the sample between 1985 and 1998 were less able than the average. We will return to this below.

To avoid neglecting possible impacts of land reform on human capital investment, we complement the analysis with a consideration of educational investment. This is of relevance as rural households transmit a significant portion of their wealth to offspring in the form of better levels of education, which is often viewed as a substitute for land assets (Estudillo et al. 1999). Anecdotal evidence also suggests that a major impact of land reform has been the higher level of human capital accumulation that allows children to subsequently leave agriculture and take jobs in the non-agricultural sector (Hayami and Kikuchi, 2000). Exploring the impact of land reform on human capital formation is facilitated by the presence of data on educational achievements of all the households' children (i.e. not only the ones living in the household or present at the time of the survey).

Although there are different channels through which a sudden increase in land wealth may affect schooling decisions, it will affect only those children who, at the time of land transfer, have not already completed their education. Thus, we define as "affected by land reform" all those children of beneficiaries who had not yet completed their education at the time when the land was received – leaving us with about 70% of the children included in the sample. The dependent variable used is the inter-generational advance in education, i.e. the difference between the level of schooling completed between the parent generation and the children.

Results, reported in the third line of table 7, suggest that the educational advance of children affected by land reform was about 0.60 years higher than that of non-beneficiaries (significant at the 10% level). This apparent contribution of land reform to human capital accumulation is over and above a very strong overall convergence effect whereby overall educational expansion is estimated to have helped children from lower educated families is estimated to make up for between 70% and 76% of their shortfall. In addition, for 68 beneficiary households who had both children who completed their schooling before receiving land and children who did so after the household benefited from land reform, we are able to conduct the same test "within" the same household. A simple t-test points towards an even higher and highly significant ($t = 5.01$) difference of 3.32 years, although other factors may come into play.²³ Thus,

²³ Even though part may be due to unobserved ability and life-cycle phenomena unrelated to land reform (households taking their first child out of school early to have a secured successor and send the others to school for longer), it suggests that further investigation between changes in asset ownership and households' education decisions may be of interest.

over and above the impact on accumulation of physical capital, the one-time asset transfer implicit in land reform caused beneficiary households to significantly increase investment in their children's education.

Both of these results support the hypothesis that a merely static perspective on land reform may could fail to account for some important benefits of such an intervention. Also, they suggest that land reform should be viewed not only in terms of agricultural productivity but in the broader context of households' economic strategy and the transmission of different forms of wealth across generations. One immediate implication is that, if children in beneficiary households are better educated and inherit higher levels of wealth from their parents, they might want to leave the agricultural sector and take jobs in the higher-paying non-farm economy. Current policies restrict rather than facilitate the transfer of land (through rental or sale) by the second generation and could thereby possibly preclude transmission of the benefits from land reform to a "second generation" through regular land markets. In the worst case this could lead to the off-spring of land reform beneficiaries transforming themselves into a new class of absentee landlords who cultivate the land that was received by their parents based on wage labor in a way that is not necessarily conducive to overall efficiency.

Limitations in the availability of data prevented us from producing estimates regarding the impact of land reform on consumption (or on efficiency of production). We can try to partially compensate for this shortcoming by making use of the wider range of variables available for the 1985-98 period. In this way, we can examine the longer-term impact on households' per capita income during the wet season, as well as on agricultural variables such as levels of productivity, rice yields, and investment. This is unproblematic under the assumption that beneficiaries' unobservable characteristics that determine land reform participation are uncorrelated with changes in productive performance over this period.

Results from the income regression, in the fourth line of table 7, suggest that in 1985-98, beneficiaries' income grew at a faster rate than that of non-beneficiaries. The difference in income growth between beneficiaries and non-beneficiaries is estimated at US \$ 86, almost half of the original level of income. One also notes a long-term impact on rice yields: households who benefited from the 1972 land reforms increased their rice yields by between 565 and 637 kilograms more than non-beneficiaries. The point estimate for the increase in profits is positive and significant at the 10% level. Only the coefficient on longer-term asset accumulation is insignificant (though positive), possibly reflecting the fact that some of the beneficiaries already have started transferring assets to the next generation. All of these support the hypothesis that a transfer of productive assets to the poor did act as a catalyst to facilitate a permanent change in households' pattern of asset accumulation as well as their welfare and productivity.

It is worth noting that, contrary to the literature that has focused on the static efficiency losses associated with share tenancy (Otsuka et al. 1992), our results suggest that land reform has a more significant impact

on asset accumulation and intergenerational transfers of human capital. Agricultural productivity appears to be affected only indirectly, via changes in these variables. This suggests that, in a context such as that of the Philippines, land reform policies need to be assessed in terms of their broader implications for overall equity and the process of rural development. Seeing this type of policy intervention only from an agricultural perspective would be myopic and inappropriate.

4 Modalities of land reform implementation

The fact that the land reform program generated significant benefits for those who participated implies positive social returns only if the costs, both direct and indirect, were less than the benefits. Unfortunately, we were unable to obtain any information on the administrative and fiscal cost of program implementation that would have allowed making some preliminary inferences regarding this issue. There are, however, two other areas, investment and land market access where land reform implementation has long been argued to be associated with significant cost. The argument concerning reduced investment is related to the fact that, in order to alleviate fiscal constraints, the government has tried to reduce the cost of land acquired under the program through compulsory acquisition and land ownership ceilings. The associated threat of expropriation may have a significant investment-reducing effect, especially in the case of establishment and expansion of labor-intensive ventures such as plantations.

While we have no information on a counterfactual to assess the impact of land reform legislation on investment, we can make some inferences on how land reform affected the functioning of land markets. This will happen if landlords' fear of losing out to land reform prevents them from renting out land and making them instead rely on wage-labor based cultivation. Such behavior would constrain productivity and at the same time reduce land access and the ability of the poor to acquire skills and capital that normally are provided by a well-functioning tenancy market.²⁴ Limitations on land transactions by land reform beneficiaries who are prohibited from renting out or selling land may further exacerbate existing restrictions on land access.

The need to investigate issues of land access in a more comprehensive context to arrive at a realistic assessment of the costs and benefits of land reform is supported by the literature. In fact, a number of contributions advance the hypothesis that, in the Philippines, land reform was very successful in creating a new class of land owners. However, in view of the limited number of beneficiaries, and because in case studies reform legislation has been shown to effectively block entry by landless to the agricultural tenancy market, the net social benefit may not be that large - and could even be negative (Hayami et al. 1990;

Hayami and Kikuchi 2000). If true, this would have far-reaching implications for the way in which government might want to think about implementing a redistribution of land that would maximize efficiency and equity. We therefore use our data to test whether or not land access has decreased during the 1985-98 period as compared to the earlier one.

4.1 Descriptive and non-parametric evidence

The notion of a structural shift in land access related to CARP legislation is confirmed by transition matrices for the 1971-88 and the 1989-98 periods. In the first phase, land markets were still relatively active and there was considerable upward movement, not only among leaseholders and share tenants, but also among the landless (table 9a).²⁵ During the first period, exactly 50% of the landless were able to move up the agricultural ladder, about 20% making it to leaseholder or beyond, about 20% moving to share contracts, and the remainder engaging in pawning transactions. Thus, even though (as noted earlier) the 1972 land reform legislation did not make provision for landless non-cultivators (e.g. agricultural wage workers) to become direct beneficiaries, this group still had been able to improve its tenure status through relatively unhindered entry into the regular land tenancy market.

The transition matrix for the 1989-98 period suggests that, in the wake of CARP legislation, the ability of the poor and landless to gain access to land through established markets has worsened significantly (table 9b). Even though landless non-cultivators were now explicitly included as potential beneficiaries, their opportunities appear to have declined significantly making them stuck at the bottom of the agricultural ladder with little chance of making it to the first rung.²⁶ Interestingly, this phenomenon was not due to a general lack of movements up and down the “agricultural ladder”; in fact large portions of leaseholders and amortizing owners moved towards full ownership and a significant population of share tenants managed to improve their tenure status as well. There is, however, hardly any upward movement for the landless,²⁷ supporting the earlier finding of a reduction in the scope of households to access land through rental in the wake of land reform legislation.

Further support in favor of a shift in the ability of landless households to access land tenancy markets can be obtained by non-parametric regressions of operated on owned land area. To motivate this, note that if land and other markets function perfectly, one would expect the ownership and the operational distribution of land to be completely independent from each other (Feder 1985). In this case,

²⁴ The establishment of mahagonay plantations and the widespread use of short term wage labor contracts as well as landlords’ resistance to any longer-term investment are a clear indication of this.

²⁵ : 24 of the 75 leaseholders (30%) moved up to become either amortizing or full owners, and 36% of the share tenants in the sample moved up to become leaseholders, with another 18% becoming either full owners or CLT holders.

²⁶ Descriptive evidence indicates that the majority of cultivators moved “down” the tenancy ladder –mostly to give up farming- did so voluntarily, mainly because they receive remittances from kin who had moved out of the village. Neither age nor intergenerational transfers appear to be able to explain the phenomena observed –only about 10% of households had bestowed part of their landholdings to their offspring and excluding them does not change the substantive conclusions reported here.

irrespective of the ownership distribution of land, all cultivating households should converge to what is, under local conditions and existing endowments, the “optimal” farm size. Plotting cultivated against owned land should thus produce a perfectly flat line. By contrast, if markets do not function at all, everybody would cultivate exactly their endowment and plotting owned against cultivated land would produce a 45 degree line. Comparing non-parametric regressions of the performance of land rental markets at two points in time thus provides an opportunity to observe whether the functioning of land markets has changed over time (Olinto et al. 1999 provide a theoretical and graphical illustration). The advantage of such techniques is that they allow to conduct a test of this hypothesis without imposing a specific functional form. This allows to capture non-linearities that may arise from the fact that the relationship between owned and operated land area may be different for producers across the farm size distribution.

The two regressions with a bandwidth of 1 and the Epanechnikov kernel, are graphed in figure 1. We restrict ourselves to the farm size group below 3.5 hectares which comprises more than 97% of the observed farm ownership sizes. In 1985, land markets appear indeed to have to be functioning relatively well. Almost everybody seems to have converged to an “optimal” operational farm size of slightly more than one hectare. Most interestingly from our point of view, even landless households (i.e. those with an owned land endowment of zero) do not seem to have faced significant barriers in land access and cultivated about the same amount of land as did those who owned much larger pieces of land. Things are different in 1998 when the slope of the overall regression line is much steeper. This suggests that, in the second period, households’ cultivation decision was more closely linked to their land endowment with larger land holders were less likely to rent out and small ones less likely to rent in.²⁸ At the same time, land access for the landless has decreased significantly. Although the data at hand do not allow to distinguish whether this was due to CARP or some other factor, this provides a first indication that land access might indeed have decreased during the period under concern.

4.2 Parametric evidence

To test these notions more formally and thus test for the presence of changes in land access during the period under concern we estimate a reduced form equation for the amount of rented

$$(3) \quad A_{it} = \alpha_0 + \alpha_1 S_t + \alpha_2 X_{it} + \eta_i + \varepsilon_{it}$$

where A_{it} is the quantity of land rented in (or, alternatively, a 0/1 indicator for whether or not the household rented land), S_t is a time trend, X_{it} is a vector of household characteristics (including

²⁷ Note that we are unable to discern which of the upward movements were due to land reform and which ones were due to other events.

²⁸ Note that the ability to make inferences about large landholders is constrained by the fact that in a survey people are unlikely to admit to owning more than the legal maximum of land.

educational status, farm and non-farm assets, owned land, family labor endowments, etc.) relevant for land access, and $\eta_i + \varepsilon_{it}$ is a composite error term that is assumed to be orthogonal to X_{it} .²⁹ A number of concerns regarding the sample available and the interpretation of α_1 need to be addressed before actually proceeding to estimation of this equation. Regarding sample characteristics, we need to account for non-random attrition which was noted as a problem earlier, the fact that land reform implementation has affected households' propensity to access land through the rental market, and life cycle phenomena.

First, due to land reform implementation, a significant share of households included in the 1985-98 panel shifted from leaseholder to become land owner. All of these households were recorded as renting in land in 1985 but, after benefiting from land reform, ceased to participate in the land rental market. Including these households in the estimation of equation (3) would create spurious appearance of reduced rental market activity in the second period. To avoid this, we exclude all land reform beneficiaries from the estimation.

Second, we do not want to confound changes in the functioning of the land rental market with life cycle effects. This would apply to households who were active producers in 1985 but who had already "retired" in 1998. To prevent age related phenomena from affecting our estimates, we restrict the sample for parametric estimates to households who were less than 50 years of age in 1998.

Finally, we would like to use a random sample of the population in 1998 for which information on the earlier period is available as well. Unfortunately, our sample is the opposite - a random sample of the population in 1985 out of which a (non-random) subset was interviewed again in 1998. Due to a combination of factors (including physical destruction of a subset of the questionnaires), information is available only for 248 of the 396 households who had been interviewed in 1985.³⁰ Attrition was clearly non-random; probit equations for sample attrition (not reported) indicate that the landless had, at the mean of all other variables, a probability of dropping out that was 33% higher than of those who had land. Furthermore, higher levels of education significantly reduced the probability of drop-out through attrition. To gauge how this might affect our estimates, we note that migration of a complete household is quite different from out-migration of children. While intergenerational mobility, often associated with job search, is chosen by individuals with higher education who then receive higher incomes and normally send considerable remittances (Lanzona 1998), moving a complete household may signify a social decline (Amacher et al. 1998).³¹ To avoid biases of this nature, and to clearly focus the parametric approach on land access by the landless, we restrict our sample to include only households who were landless in both

²⁹ Under the condition that $\eta_i + \varepsilon_{it}$ is uncorrelated to X_{it} , the above equation can be estimated using OLS. In the likely case that there is an unobserved and time invariant household fixed effect, η_i , use of fixed effect techniques would be appropriate.

³⁰ 25 questionnaires from the 1998 survey got lost and are not included in the probit analysis of attrition.

periods, i.e. we look at the scope for accessing land conditional on being poor. We estimate tobit and probit equations, respectively for land access by households who did not possess any land. Also, to allow for possible unobservable household effects within this group, we estimate regression with household level fixed effects.

Results from these regressions are presented in table 9. One notes that there was, indeed, a statistically significant and quantitatively important reduction in the probability of land access for the landless between the two periods; the coefficient in the probit equation suggests that a landless person's probability of getting access to land decreased by 45% between 1985 and 1998. The probit equation also suggests that possession of farm assets significantly increased the possibility of land access – evaluating the figures suggests that an asset endowment of about US \$ 600 would have been needed to compensate for the independent time trend in land access. Similar conclusions emerge from the pooled tobit regression and the fixed effect panel estimation with cultivated area as the dependent variable. All of these indicators suggest that it had become more difficult for the landless to access land than it had been in 1985.

Absence of a suitable control group prevents us from being able to attribute these changes to land reform legislation in a causal way.³² It is, however, worth noting that, in a context (as in the Philippines) of macro-economic growth accompanied by increased specialization and off-farm migration, one would expect increased rather than decreased activity of land rental markets.³³ In light of the evidence from other countries, it is even more surprising to note not only that CARP legislation countervailed such improved functioning of rental markets. Moreover, it suggests that, the 1988 expansion of land reform legislation across all commodities did restrict access to land by the landless via the tenancy market and thus actually decreased the scope for these households to start cultivation and climb up the “agricultural ladder”.

While the quantitative evidence is too weak to allow even back of the envelope calculations of the potential welfare impact of such reductions in land access, we note that, in view of the magnitude of landlessness, the impact on poverty can be quite large. Comparison of per capita consumption of landless households (i.e. those who did not own any land) who were unable to rent in to consumption of the landless who were able to rent in land in 1998 suggests that inability to access land reduced welfare (proxied by consumption) by about 30%.³⁴ At the same time, of the households who have at least one

³¹ If attrition was largely caused by lack of economic opportunities and possibly a households' inability to access land, the out-migration of a large sample is likely to impart a significant downward bias on our estimate of α_1 .

³² To establish causality, one would need a control group of villages not subject to CARP, something precluded by the nation-wide coverage of this policy.

³³ Indeed, for Mexico, Nicaragua, Uganda, and China, it has been shown that episodes of macro-economic growth were accompanied by growth of the non-farm sector, and significant improvements in the functioning of land rental markets (Olinto and Deininger 2000, Deininger 1999, Deininger and Okidi 2000, Carter and Yang 1999).

³⁴ While the ability of looking at changes in welfare for households who had access to land in the first period but not in the second one would be more appropriate because it would control for unobservable household-level fixed effects, this is impossible because no expenditure information

member working in agriculture, 68% are landless, i.e. do not have access to land other than their residence (Annual Poverty Indicator Survey). Our earlier results suggest that landless households are the poorest group in rural society. By comparison, only 3% of the same cultivating population indicate to have benefited from land reform.³⁵ Thus, even a small land-reform related reduction in the probability of land access by the landless could outweigh considerable benefits on the part of direct beneficiaries – quite independently of the program cost. Even if this were not the case, the distributional impact of a land reform that benefits a randomly selected *cultivating* household but reduces the scope to access land for the landless may not be that favorable.

4.3 Policy implications

Our analysis thus far suggests that land reform had a beneficial long-term impact on participants. The instruments chosen have, however, been relatively blunt and seem to have caused negative side effects (in the form of reduced land access for the landless) while land reform implementation appears to have been neither sufficiently rapid nor targeted to the poor to be able to compensate for this. In this section we examine whether there could be alternative forms of redistribution that could reduce the social cost of providing the poor with assets, restricting ourselves to land reform (see Hayami et al. 1990, Balisacan 1996, and Fuwa 2000 for contributions to this issue).

We note that the current program's main shortcomings can be traced mainly to the unintended consequences of administrative efforts aiming to increase the supply of land (or to reduce the cost at which such land can be acquired), possibly together with the failure to target land reform to the landless. To increase supply of land, the government has prohibited share tenancy and imposed land ownership ceilings. These measures are not only costly to implement (and often circumvented by spurious subdivision) but also restrict access to land through the rental market and are likely to discourage land-related investment in labor intensive agro-export and plantation crops. In addition, such restrictions do little to help overcome the lack of resources which (together with unrealistic land valuations) poses the single most important constraint on a more speedy implementation of land reform that would benefit a larger number of beneficiaries.³⁶

Are there alternative mechanisms that would be less costly in administrative as well as economic terms, provide higher incentives for increased efficiency of production, and at the same time solve the issue of financing? Better enforcement of (existing) land taxes at the local level appears to be able to respond to

was collected in 1985 and the coverage of income data varied significantly between the two surveys. The decline in income for households who lost land appears to be even larger than the 30% difference in expenditure above. To err on the conservative side, we decided to choose the latter.

³⁵ Note that this deviates significantly from the official estimates in terms of beneficiaries (see table 1). Exploring reasons for such a divergence is beyond the scope of this paper.

³⁶ The fact that land ownership ceilings are not applicable to a large amount of formerly public lands that have an extraordinarily high potential for productivity-enhancing land reform, imposes additional constraints.

these issues and establish the basis for a one-time effort to adjust the Philippines' agrarian structure that would at the same time strengthen the revenue basis for local governments and thus boost decentralization. Making large landlords pay taxes is clearly a political issue. However, the ability to link such tax payments to visible implementation of land reform at the local level and, eventually, the elimination of economically deleterious land ownership ceiling (and the associated attenuation of property rights) could create a win-win situation that would ensure political acceptability of such a measure.³⁷ This would not only be preferable in terms of fiscal sustainability and speed, but also have the potential of increasing efficiency of land use outside the land reform sector.

First, and most importantly, contrary to the current scheme whose pace of implementation depends critically on the allocation of appropriate funds through Congress, collection of a land tax would make the program independent of such central decisions and thus ensure its fiscal sustainability. Moreover, it could accomplish the overall goals set for CARP much faster than any imaginable alternative mechanism. To see this, note that at the current pace of redistributing about 100,000 hectares a year, it would take the Philippines more than 17 years to accomplish the targets set by CARP. Levying a land tax of 2% of the value of land on all holdings exceeding 3 hectares and assuming that 50% of the cost of the land can be funded through beneficiaries' own participation, bank loans, and other sources, would allow to complete a land reform program of the envisaged size within 6 years.³⁸

Second, the present administrative mechanism does little to improve efficiency of land use – to the contrary spurious subdivision of land to evade ownership ceilings and the associated absentee land ownership (often the legal owner is unknown) and wage-labor based cultivation are likely to have the opposite effect. Moreover, large areas of formerly public lands with high potential for land reform are outside the current land reform legislation and can therefore not be redistributed. A land tax would avoid both of these problems and provide strong incentives for increased productive efficiency even outside the land reform sector. It would at the same time provide local governments with a rationale for upgrading of the outdated registry and cadastre system in the Philippines, thus establishing the basis for modern system of land administration. Land whose owners is unknown (and that is not claimed by any heirs) could be auctioned off with proceeds feeding into a land fund. If such a land fund (to be fed in addition by land tax

³⁷ The fact that various plantation owners have indicated their willingness to purchase or develop irrigated rice land that would provide a basis for the sustenance of their workforce in return for permanent exemption of their plantations from the threat of expropriation suggests that there is indeed scope for a solution that would benefit everybody.

³⁸ According to the 1980 Agricultural Census, there are about 10 million has of arable land in the Philippines, about 30% of which are too small to be taxed. Using a 2% tax on land (which is high by international standards but not impossible) to finance a land purchase fund that would provide poor (landless) households with a fixed land purchase grant that would, on average, amount to 50% of the value of land plus associated improvements would allow the government to redistribute about 280,000 hectares every year (4% of the tax base of 7 million hectares, assuming no quality differences). With a scheme like this, it would take 6 years for the target of 1.7 million hectares to be accomplished – rather than the 17 years that would be necessary if the traditional pace of land reform implementation were to be maintained. While the establishment of an efficient system for tax collection would require some startup-funds, it would constitute a long-term investment in the capacity (and fiscal sustainability)

receipts) can be established at the local level by the community according to transparent procedures, the link between land tax collection and land reform implementation thus established could increase the political acceptance of land taxes. This would also avoid the disincentives for investment that are inherent to existing instruments. To the extent that it can be combined with a more demand-driven mode of implementation and beneficiary selection at the local level, this could help the government to comply with its ambitious targets.

In fact, the main constraint to increased collection of revenue from land taxes is not the legal situation but an outdated system of valuations. At present, local Governments have the facility of updating valuations and setting rates of land tax collection even though the revenue has to be shared with higher levels of government. Even though not all of the proceeds from such taxation could therefore be used for land reform, this would offer mechanisms to increase incentives for more efficient use of land –and the supply of land to the market– which, if combined with a reduction of the threat of expropriation, could address many of the problems identified earlier. Using a land tax, rather than administrative mechanisms, as a basis for increasing supply of land to the market will avoid the negative implications in terms of land access that have been shown to be associated with a more traditional form of land reform implementation. It would encourage, rather than preclude a well-functioning land rental market thus providing a clear opportunity to the poor. By acting as a “stepping stone” towards full ownership to be acquired under a decentralized redistributive program,³⁹ a land rental market could reduce the cost of the asset transfer involved in land reform.

5 Conclusion

Before drawing conclusions, it is worth pointing out that the present study is based on a relatively small sample drawn mainly from Central Luzon, an area well-served with infrastructure and other support services and that the reform evaluated pre-dates CARP. This implies that, even though we find a significant and positive impact of the one-time asset transfer involved in land reform, further study will be necessary to determine how this result can be generalized to different situations. Such study would also allow to make more intelligent inferences on the interaction between land transfer and other government services (e.g. roads, technical assistance, etc.) which are likely to be of importance in this context.

Bearing these caveats in mind, the results obtained could nonetheless be of relevance for research as well as policy. From a research perspective, they provide household level evidence to support the hypothesis

of local governments. The recurrent costs of such a scheme would almost certainly be significantly lower than what is spent on the current program.

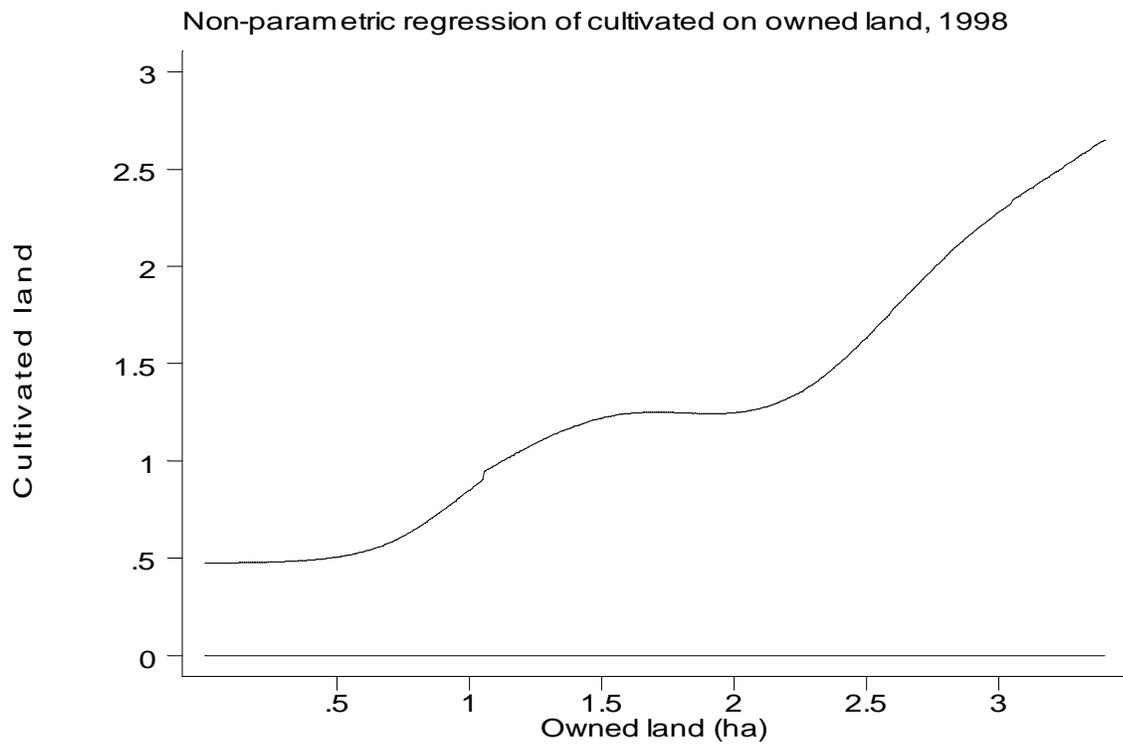
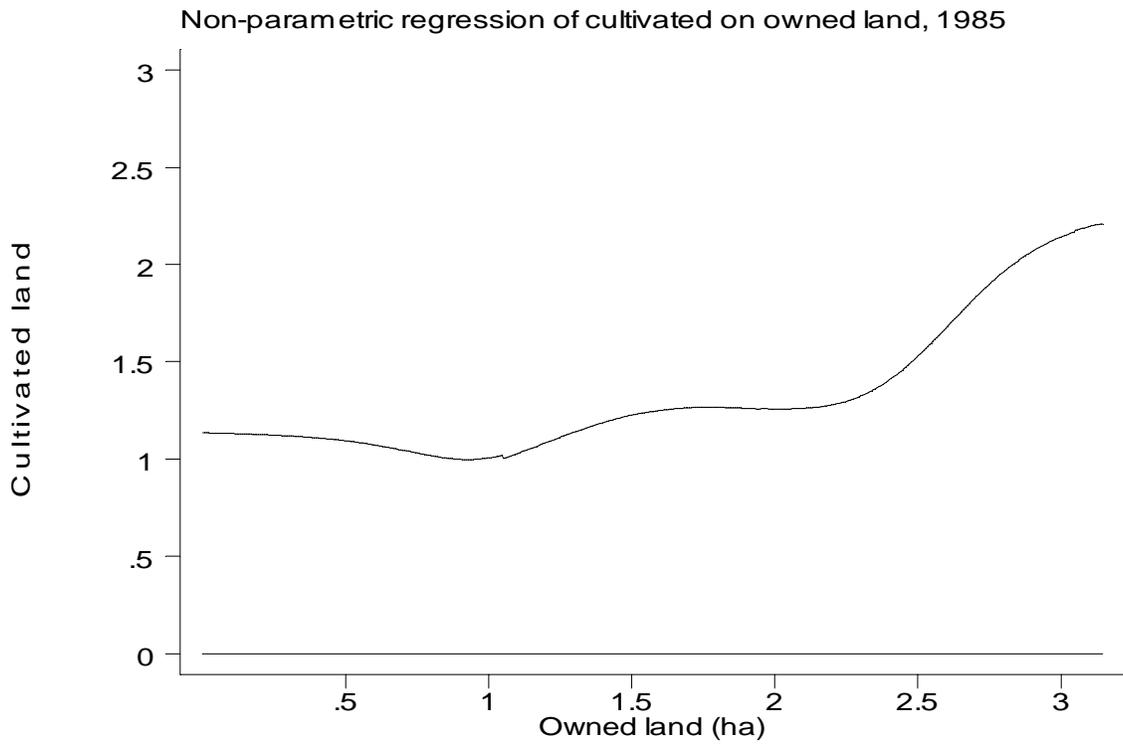
³⁹ This has been quite successfully accomplished in example of “negotiated” land reform in other countries (Deininger 1999).

that a one-time asset transfer can have a long-term effect on beneficiaries' ability to accumulate physical as well as human capital. This is in line with arguments made in the theoretical literature according to which one-time transfers of productive assets can contribute to sustainable poverty reduction and a tangible increase of welfare. The need to take a longer-term view is supported by the fact that cross sectional regressions pointed to a fairly limited scope for productivity increases from changes in households' tenure status.

From a policy perspective, the ability to demonstrate a long-term impact of asset redistribution policies suggests that, in focusing on households' asset position, governments have identified a key issue for poverty reduction. At the same time, evidence on land access even in the Philippines suggests that, in addressing these problems, governments have not always chosen the most appropriate instruments. In fact, the history of agrarian reforms all over the world is replete with examples for policies with unintended and often harmful consequences (Banerjee 1999). Imposition of land ceilings and bans on certain forms of rental transactions which was found to have reduced land access in the Philippines is also a common characteristic of land laws in South Asian countries (e.g. India, Bangladesh, Nepal, Sri Lanka). It has been held responsible for a large reduction in land access by the landless (Appu 1997).

From a policy perspective, the combination of decentralized modernization of land administration, collection of a land tax, and a program of grants to facilitate acquisition of land ownership advocated here may also offer scope for these countries to improve the functioning of land markets, agricultural efficiency, rural investment, and land access by the disadvantaged. Careful study of the extent to which pilot schemes of this nature succeed to complement, rather than substitute for, existing markets to achieve redistribution of assets more effectively could provide interesting insights and help in designing a land reform program that is not only more sensitized to market forces but also more targeted towards the poor.

Figure 1: Non-parametric regressions on cultivated on owned land



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Table 1: Size and characteristics of different land reforms

Country	Area		Beneficiary households		Area per Household (has.)	Time period
	Total area (1000 has)	% of arable land	Number (1000s)	% of rural households		
Asia						
Japan	2,000	33.3%	4,300	60.9%	0.47	1946-49
South Korea	577	27.3%	1,646	45.5%	0.35	1948-58
Taiwan	235	26.9%	383	62.5%	0.61	1949-53
Philippines	1,092	10.8%	1,511	24.2%	0.72	1940-85
Africa						
Egypt	390	15.4%	438	10.0%	0.89	1952-78
Kenya	403	1.6%	34	1.6%	11.85	1961-70
Zimbabwe	2,371	11.9%	40	3.1%	59.28	1980-87
Central America						
El Salvador	401	27.9%	95	16.8%	4.22	1932-89
Mexico	13,375	13.5%	3,044	67.5%	4.39	1915-76
Nicaragua	3,186	47.1%	172	56.7%	18.52	1978-87
South America						
Bolivia	9,792	32.3%	237	47.5%	41.32	1953-70
Brasil	13,100	11.3%	266	5.4%	49.32	1964-94
Chile	9,517	60.1%	58	12.7%	164.09	1973
Peru	8,599	28.1%	375	30.8%	22.93	1969-79

Sources: Hayami et al. (1990); Powelson and Stock (1987); Scott et al. (1976); Hall (1990); Grindle (1990); McClintock (1981); Prosterman et al. (1990); El Ghonemy 1990; Eckstein et al. 1978.

Table 2: Land Distribution Status by Land Type and Mode of Coverage, 1972-1997

Land Type	Target	Accomplishment	% accompl.	Balance
Department of Agrarian Reform				
Tenanted Rice/Corn	579,520	500,643	86.39	78,877
Voluntary Offer-to-Sell	396,684	265,744	66.99	130,940
Voluntary Land Transfer	284,742	276,307	97.04	8,435
Govt. Financing Institution-owned	229,796	148,900	64.80	80,896
Compulsory Acquisition: >50 has.	456,588	74,687	16.36	381,901
Compulsory Acquisition: >24-50 has.	312,355	6,251	2.00	306,104
Compulsory Acquisition: >5-24 has.	736,420	20,483	2.78	715,937
Kilusang Kabuhayan at Kaunlaran lands	657,843	606,347	92.17	51,496
Settlements	662,727	662,727	100.00	0
Total DAR:	4,316,675	2,562,089	59.35	1,754,586
Department of Environment and Natural Resources				
Public Alienable & Disposable Lands	2,502,000	927,734	37.08	1,574,266
Integrated Social Forestry areas	1,269,411	832,651	65.59	436,760
Total DENR:	3,771,411	1,760,385	46.68	2,011,026
Total CARP:	8,088,086	4,322,474	53.44	3,765,612

Source: Garilao (1997)

Table 3: Socio-economic characteristics and land tenure status in sample villages across three generations

	Central Luzon			Panay Island		Signe
	Total sample	Gabalton	Maragol	Pandon	Rizal	
GENERATION I						
Year of birth	1909	1906	1912	1909	1907	1907
Males	678	127	198	110	147	96
Born in the municipio	37.6%	45%	19%	44%	38%	70%
Mean educational level	3.78	4.24	3.71	3.75	3.88	3.23
Main occupation famer	79.3%	81%	88%	59%	73%	92%
Main occupation agricultural laborer	2.7%	4%	3%	5%	2%	0%
Main occupation permanent non-ag.	6.3%	4%	4%	11%	10%	3%
Main occupation temporary non-ag	11.4%	11%	6%	25%	13%	4%
Females	674	127	194	110	147	96
Born in the municipio	32.5%	25%	24%	51%	32%	50%
Mean educational level	3.26	3.99	2.74	3.36	3.39	3.04
Main occupation housekeeper	91.3%	87%	89%	92%	93%	99%
Main occupation agricultural laborer	1.6%	2%	2%	4%	0%	0%
Main occupation permanent non-ag.	0.3%	0%	1%	0%	1%	0%
Main occupation temporary non-ag	4.3%	8%	6%	5%	1%	1%
GENERATION II						
Year of birth	1940	1944	1942	1938	1937	1938
Males	344	64	100	57	74	49
Born in the municipio	49.4%	55%	47%	37%	66%	37%
Mean educational level	6.22	6.47	6.21	6.67	6.42	5.1
Main occupation famer	79.1%	78%	84%	61%	76%	96%
Main occupation agricultural laborer	7.6%	9%	12%	11%	3%	0%
Main occupation permanent non-ag.	2.6%	0%	1%	5%	5%	2%
Main occupation temporary non-ag	8.7%	12%	3%	14%	14%	2%
Females	299	54	97	45	62	41
Born in the municipio	45.8%	37%	49%	40%	61%	32%
Mean educational level	6.32	6.31	5.89	7.09	7.05	5.44
Main occupation housekeeper	79.3%	76%	80%	67%	79%	95%
Main occupation agricultural laborer	6.0%	11%	8%	7%	2%	0%
Main occupation permanent non-ag.	3.0%	2%	3%	4%	5%	0%
Main occupation temporary non-ag	7.0%	7%	4%	18%	8%	0%
GENERATION III						
Year of birth	1966	1968	1967	1966	1965	1966
Males (over 14-year old)	645	109	198	105	122	111
Mean educational level	8.32	7.86	8.46	9.08	8.44	7.65
Main occupation famer	30.6%	26%	37%	9%	42%	32%
Main occupation agricultural laborer	19.8%	20%	28%	10%	7%	27%
Main occupation permanent non-ag.	6.6%	6%	7%	6%	11%	4%
Main occupation temporary non-ag	20.9%	25%	13%	36%	18%	21%
Still in school	20.0%	23%	13%	36%	19%	14%
Residing in the municipio	71.6%	65%	83%	63%	67%	51%
Residing in other region:	11.3%	8%	2%	13%	20%	27%
Mindanao	3.4%	1%	1%	4%	12%	5%
Manila	6.0%	6%	2%	4%	7%	15%
Residing in other country	1.2%	0%	1%	4%	0%	2%
Females (over 14-year old)	600	101	183	92	136	88
Mean educational level	9.37	8.75	9.40	10.24	9.92	8.27
Main occupation famer	4.7%	5%	10%	0%	2%	1%
Main occupation housekeeper	36.1%	38%	30%	40%	36%	43%
Main occupation agricultural laborer	7.7%	9%	14%	2%	6%	2%
Main occupation permanent non-ag.	9.0%	4%	8%	17%	10%	6%
Main occupation temporary non-ag	21.5%	25%	16%	21%	21%	30%
Still in school	18.4%	20%	19%	16%	21%	12%
Residing in the municipio	60.0%	48%	65%	38%	56%	44%
Residing in other region:	13.7%	14%	7%	19%	22%	25%
Mindanao	1.7%	1%	1%	5%	2%	1%
Manila	9.5%	12%	6%	9%	16%	16%
Residing in other country	3.0%	2%	3%	6%	3%	4%

Table 4: Household income, assets, and production structure, in sample villages, 1985 and 1998

	Central Luzon			Panay Island		Signe
	Total sample	Gabalton	Maragol	Pandon	Rizal	
1998						
Income and expenditure						
Total expenditure	311.63	344.69	321.43	393.70	266.43	211.56
Total income, wet season	281.72	348.57	329.02	203.77	264.76	161.76
Farm income (wet season)	194.29	180.24	262.05	127.60	171.28	127.95
Rice farm income	110.56	101.64	201.03	54.11	49.98	33.20
Other crop farm income	24.32	31.77	17.39	14.15	32.78	32.44
Livestock income	59.42	46.83	43.63	59.33	88.52	62.30
Non-farm income (wet season)	87.43	168.33	66.97	76.17	93.48	33.81
Off-farm income	24.12	92.25	17.18	9.29	9.14	2.39
Non-farm income	23.13	19.88	25.81	10.42	32.06	14.69
Unearned income	40.17	56.20	23.98	56.47	52.28	16.73
Assets						
Total assets	7021.98	2721.91	8467.86	7845.80	7680.15	5576.82
Land	2674.45	878.66	4234.75	1922.75	2198.11	2164.80
Housing	2500.42	827.16	1960.12	3705.59	3876.49	1739.70
Productive assets and savings	848.91	467.84	1279.87	1200.64	463.74	295.32
Animals	513.72	369.07	420.32	307.82	605.32	1215.89
Consumer durables	484.47	179.17	572.80	709.00	536.49	161.11
Production						
Farm size	1.26	1.24	1.46	1.05	1.07	1.37
Rice yields (kg/ha)	3357.42	4040.52	4527.73	3344.68	1934.88	1847.69
Profits per ha before rent	422.36	605.06	644.83	381.44	141.70	154.84
Profits per ha after rent	354.46	526.77	587.44	272.45	85.62	92.15
Land Tenure Structure						
Owners	38%	24%	39%	32%	45%	48%
CLT holders	10%	18%	17%	8%	0%	0%
Leaseholders	21%	21%	20%	27%	24%	4%
Share tenants	8%	0%	0%	5%	11%	43%
Landless	23%	37%	23%	27%	19%	4%
1985						
Income						
Total income, wet season	136.10	140.48	151.99	110.70	153.58	62.16
Farm income (wet season)	87.40	89.98	108.55	53.51	95.68	34.42
Rice farm income	68.76	74.81	88.60	34.85	76.91	15.48
Other crop farm income	3.65	3.16	4.74	1.98	1.18	9.65
Livestock income	14.99	12.01	15.22	16.68	17.59	9.29
Non-farm income (wet season)	48.70	50.50	43.44	57.18	57.89	27.74
Off-farm income	11.93	20.82	10.92	6.62	13.39	5.70
Non-farm income	20.71	11.83	18.41	34.93	21.09	20.26
Unearned income	16.06	17.86	14.10	15.63	23.41	1.77
Assets						
Total assets	4547.67	2814.19	5960.81	4027.40	4783.13	2360.80
Land	2839.80	1240.96	3264.16	2873.15	3752.34	1703.14
Housing	667.06	431.17	967.53	630.89	447.51	338.34
Productive assets and savings	581.22	727.84	1024.09	360.19	188.41	69.82
Animals	210.96	274.57	199.87	108.86	249.86	210.41
Consumer durables	248.63	139.66	505.17	54.30	145.01	39.08
Production						
Farm size	1.65	1.83	2.14	1.02	1.29	1.13
Rice yields (kg/ha)	3395.45	3274.62	3612.01	4189.42	3306.88	2063.78
Profits per ha before rent	233.09	232.92	194.75	297.52	297.34	158.77
Profits per ha after rent	167.49	175.90	132.25	205.12	239.50	81.68
Land Tenure Structure						
Owners	25%	21%	13%	22%	37%	48%
CLT holders	13%	24%	24%	3%	0%	0%
Leaseholders	34%	39%	48%	30%	24%	9%
Share tenants	12%	0%	2%	16%	13%	39%
Landless	17%	13%	11%	30%	23%	4%

Note: Expenditures are in adult equivalents

Table 5: Regression for production and income, 1985 and 1998

	Income				Production			
	1985		1998		1985		1998	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Log of assets	0.1057	2.85	0.1803	3.55	0.0250	1.50	0.0948	3.05
Education	0.0435	2.24	-0.0179	-0.90	0.0096	1.16	-0.0102	-1.01
CLT holder	-0.1611	-0.71	-0.2257	-1.04	-0.0594	-0.68	0.0524	0.53
Leaseholder	-0.1838	-1.12	-0.2386	-1.46	-0.0451	-0.72	0.1301	1.76
Share tenant	-0.6287	-2.75	-0.6002	-2.35	-0.1468	-1.71	0.0002	0.00
Landless	-0.0629	-0.27	-0.6451	-3.68				
Maragol	0.1279	0.69	-0.4640	-2.52	0.1298	1.78	0.0461	0.46
Pandon	-0.0640	-0.29	-0.7596	-3.45	0.2879	3.00	-0.2677	-2.24
Rizal	0.1408	0.69	-0.7131	-3.50	0.0163	0.19	-0.8896	-8.15
Signe	-0.7870	-2.95	-0.9158	-3.20	-0.4774	-4.46	-0.7984	-5.79
Intercept	3.8219	12.01	4.7482	10.90	7.8459	53.23	7.5844	29.55
Adjusted R ²	0.1742		0.1696		0.2736		0.5213	

Table 6a: Original tenure status of households who benefited from land reform (1972 -1988)

<i>Highest tenure In 1972</i>	<i>Total</i>	<i>Non- beneficiaries</i>	<i>Beneficiaries</i>	<i>% of group</i>	<i>% of beneficiaries</i>
Owner	98	83	15	15%	16%
Amortizing owner	12	6	6	50%	6%
Leaseholder	72	47	25	35%	26%
Share-tenant	86	40	46	53%	48%
Landless	69	66	3	4%	3%
Total	337	242	95		

Table 6b: Targeting of the 1972 land reform

	Probit of land reform participation					
	coefficient	z-value	coefficient	z-value	Coefficient	z-value
Age	0.0330	3.51	0.0338	3.54	0.0345	3.69
Age2	-0.0003	-2.70	-0.0003	-2.70	-0.0003	-2.72
Education	-0.0175	-1.98	-0.0163	-1.82	-0.0186	-2.11
Members in working age	0.0362	1.06	0.0358	1.05	0.0169	0.50
Cultivating at promulgation					0.1824	3.43
Value of inherited non-land assets			0.0261	0.37	9.6953	0.63
Value of land assets at promulgation			-0.0363	-1.22	-29.0367	-3.06
Maragol	0.1113	1.59	0.1190	1.68	0.0748	1.09
Pandon	-0.1780	-2.81	-0.1809	-2.83	-0.1865	-3.01
Rizal	-0.2803	-4.66	-0.2754	-4.54	-0.2647	-4.36
Signe	-0.2563	-4.27	-0.2548	-4.22	-0.2486	-4.17
Log likelihood	-146.24		-145.04		-137.57	
Pseudo R ²	0.2703		0.2763		0.2968	
Number of observations	337		337		337	

Table 7: Impact of the land reform on human capital formation, asset accumulation, and long-term productivity and income

Dependent Variable	Independent Variables	OLS	
		Coefficient	t-statistic
Asset accumulation: Inherited to 1988	Beneficiary	1486.504	3.21
	Education	258.183	3.51
	Initial assets	0.813	0.48
Asset accumulation: Inherited to 1988	Beneficiary	1525.735	3.24
	Education	258.524	3.51
	Initial assets	1.366	0.68
	Initial assets*Beneficiary	-1.909	-0.52
Increase in education	Beneficiary	0.602	1.83
	Initial education	-0.762	-14.19
Increase in income 1985-98	Beneficiary	86.119	2.08
	Education	-0.570	-0.09
	Income in 1985	-0.684	-6.76
Asset accumulation 1985-98	Beneficiary	605.181	0.78
	Education	263.768	2.01
Increase in rice yields 1985-98	Beneficiary	637.910	2.26
	Education	8.180	0.17
Increase in profits 1985-98	Beneficiary	102.399	1.88
	Education	-0.839	-0.09

Table 8a: Transition matrix for movement in land tenure status between 1972 and 1988

Tenure Status in 1988	Tenure status in 1971					Total	
	Owner	Amortizing Owner	Lease- holder	Share tenant ¹	Landless		
Owner	90		4	5	4	103	30%
Amortizing owner	1	12	20	10	1	44	13%
Leaseholder	6		37	31	8	82	24%
Share tenant	1		3	30	13	47	14%
Pawning out			6	2	5	13	4%
Pawning in			1		3	4	1%
Landless	1		4	8	34	47	14%
Total	99	12	75	86	68	340	
	29%	3%	22%	25%	20%		

¹ Includes sub-tenants and sub-leaseholders

Table 8b: Transition matrix for movement in land tenure status between 1988 and 1998

Tenure Status in 1998	Tenure status in 1988							Total	
	Owner	Amortizing Owner	Lease- holder	Share tenant ¹	Pawning out	Pawning in	Landless		
Owner	53	13	16	8	1	2	1	94	38%
Amortizing owner		12	12	1				25	10%
Leaseholder	8	6	25	8	1	1	3	52	21%
Share tenant	5		1	13				19	8%
Landless	4	6	8	4	10	1	23	56	23%
Total	70	37	62	34	12	4	27	246	
	28%	15%	25%	14%	5%	2%	11%		

Table 9: Determinants of land access for the landless

	Pooled sample				Fixed effect panel est's	
	Probit		Tobit of net rental		Net rental	
	Coefficient	z-value	Coefficient	t-value	Coefficient	t-value
Age	-0.0289	-0.436	0.1065	0.833		
Age squared	0.0006	0.686	-0.0010	-0.558		
Farm assets	0.0007	4.532	0.0009	5.227	0.0004	5.492
Non-farm assets	0.0000	1.056	0.0001	3.277	0.0000	1.582
Members	-0.0534	-0.761	-0.0249	-0.188	0.0602	1.019
1998 Dummy	-0.4502	-2.469	-1.0748	-2.788	-0.2833	-2.585
Maragol-Dummy	0.3111	3.035	-0.0023	-0.009		
Rizal-Dummy	0.0944	0.686	-0.3581	-1.188		
Signe-Dummy	0.2142	1.759	-0.0682	-0.203		
(Pseudo) R ²	0.3049		0.2604		0.5074	
Log likelihood/F	-43.7900		-91.8100		11.07	