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Abstract

The Digital Revolution is often argued as providing solutions to the problems of targeting of public expenditure for poverty reduction. This paper revisits the fundamentals of the theory of targeting to pinpoint the possible impacts of the digital revolution on the three dimensions of fine targeting highlighted there—information costs, high implicit marginal tax rates, and political economy. It is argued that while the digital revolution may reduce information costs, although the exact nature of its impact needs to be carefully considered, it does not necessarily address all issues and indeed in some situations may worsen the tradeoffs. Thus the object of this paper is to sound a note of caution. The hype around the digital revolution needs to be duly mitigated by the lessons of the conventional literature on targeting of anti-poverty transfers.

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1. Introduction

One cannot but feel the panacea syndrome in any discussion of the digital revolution. Nowhere is this more so than in the policy arena, where new information technologies are meant to provide new and innovative solutions to old and intractable problems. In particular, of course, "informational" problems are the ones that new information technologies are supposed to address. This is particularly the case in the discourse on targeting anti-poverty programs to the poor. The great stylized fact that is in everybody's mind is that these programs are very badly targeted, with large "leakages" to the non-poor. The former Indian Prime Minister Rajiv Gandhi famously said that only 15% of the outlay on the public food distribution system reached the poor.[1] The move to cash transfers together with use of digital technology is now being presented, in India and elsewhere, as the solution to this problem. New technology like biometrics is meant to help in identifying the poor, and electronic banking in transferring resources to them.

This paper takes a somewhat contrarian stance. Contrarian and cautious, but not Luddite. It accepts the undoubted benefits of new technology but nevertheless urges caution and a deeper examination of the fundamental tradeoffs in fine targeting for poverty reduction. The role of digitization in impacting these tradeoffs needs to be examined carefully, with due reference to institutions and social norms which structure society.

The plan of the paper is as follows. Section 2 begins by setting down the fundamental principles of targeting transfers to minimize poverty, highlighting the costs of fine targeting, to be set against its undoubted benefits.[2] Section 3 then examines the likely impact of digitization and new technology on these costs and benefits, arguing that in some dimensions the tradeoffs are quiet independent of the use or otherwise of new technology, in other cases there are clear benefits, and in yet other cases the tradeoffs faced by targeting may be worsened. Section 4 concludes.

2. The Fundamentals of Targeting

We start by specifying the measurement of poverty. Consider a distribution of income, with incomes y_i ranging from lowest to highest as i = 1, 2,….n:

$$y_1 \leq y_2 \leq \ldots\ldots y_q < z < y_{q+1} \leq \ldots\ldots \leq y_n \qquad (1)$$

[1] Rigorous analysis of recent data, as presented in India's Economic Survey 2016-17 (Government of India, 2017), confirms significant flows to the non-poor from programs meant ostensibly for the poor: "An estimate of the exclusion error from 2011-12 suggests that 40 percent of the bottom 40 percent of the population are excluded from the PDS11" (p 180).

[2] While the paper focuses on poverty reduction as the objective, it should be clear that the issues raised apply as much to more general objectives as well.

Also shown is the poverty line z, with q individuals below the poverty line. The fraction of individuals below the poverty line is thus q/n. The FGT class of poverty indices (Foster, Greer and Thorbecke, 1984) P_α is given by

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q} \left[\frac{z-y_i}{z}\right]^\alpha \qquad (2)$$

Thus the proportional poverty gap $[z - y_i]/z$ for each person is raised to a power α and summed across the q poor individuals. The parameter α measures the degree of "poverty aversion." When α = 0, we get the standard head count ratio measure of poverty, also known as the incidence of poverty:

$$P_0 = (q/n) \qquad (3)$$

When α = 1 we get the poverty gap measure

$$P_1 = \frac{1}{n}\sum_{i=1}^{q} \left[\frac{z-y_i}{z}\right] \qquad (4)$$

When α = 2, the squared poverty gap measure weights larger shortfalls from the poverty line more severely.

Suppose now that a poverty reduction budget B becomes available to the policy maker. Start with a model where the transfers have no impact on individual incentives to earn income. Further, assume that making transfers has no information or administrative cost. What is then the most effective way of using this budget to reduce poverty? The answer depends on the value of α (Bourguignon and Fields, 1990). If α = 0, then the most effective transfer rule is to start with the individual closest to the poverty line, make sufficient transfers to move this individual over the poverty line, then move to the next poorest individual, and so on till the budget is exhausted. If α = 1, then transfer to any individual below the poverty line, so long as the transfer is not so large as to take the individual above the poverty line, is equally effective in reducing poverty P_1. But if α = 2 then the effective strategy is the following: start with the poorest individual and make transfers to this individual to bring income up to the next poorest individual; then make transfers to these two individuals till they are brought up to the next highest income, and so on till the budget is exhausted.

The above exercise highlights the key feature of "perfect targeting"—the transfer to each individual is just enough to bring income up to the poverty line, no more and no less. There is no leakage whatsoever, to those who were above the poverty line to begin with, and those who were below the poverty line are not given more than is necessary. With this scenario, if the budget available was:

$$B = nzP_1 \quad (5)$$

then poverty would be eliminated. With imperfect targeting and inadequate budget, poverty would only be reduced partially. For the P_1 measure, it can be shown (Fiszbein, Kanbur and Yemtosov, 2014) that the reduction in poverty as a result of the transfers is given by:

$$\frac{\Delta P_1}{P_1} = \left[\frac{T_p}{B}\right]\left[\frac{B}{nzP_1}\right] \quad (6)$$

where ΔP_1 is the reduction in poverty and T_p is the sum of the transfers reaching the poor. The impact of the program on poverty is thus composed of two effects. The first term measures targeting efficiency, the fraction of transfers reaching the poor, while the second term quantifies budgetary adequacy, the ratio of the budget to the poverty gap. The two together produce the poverty reduction we observe. With perfect targeting the first term is 1. In contrast, an untargeted universal benefit would give an equal amount to everybody in the population, making the first term equal to the incidence of poverty in the population, definitely less than one. Targeting efficiency and budgetary adequacy measures for almost 50 countries are presented by Fiszbein, Kanbur and Yemtsov (2014).

It is the scenario of fine targeting, even perfect targeting, which people implicitly have in mind as a benchmark when they criticize a program for being inefficient in poverty reduction. They see individuals above the poverty line, sometimes well above the poverty line, receiving transfers while payments to the poor are insufficient and they argue either that more poverty reduction could be achieved with the same budget, or that the same poverty reduction could be achieved with lower budget, if only there could be finer targeting. Indeed this is the start of many a discussion between the IFIs and Ministries of Finance, on food and fuel subsidy programs, for example.

Fine targeting, if costless, is clearly better than weak targeting or non-targeting, if the objective is to minimize poverty with a fixed resource budget. But fine targeting is not costless. There are three major categories of issues which arise—information costs, high marginal tax rates, and political economy.[3]

Fine targeting requires fine information on individual incomes. In principle every single income in the economy needs to be assessed and verified, since someone with high income could still claim to have a below poverty line income. The administration costs of running such programs, with very detailed participation criteria, have been well discussed in the literature (see Coady, Grosh and Hoddinott, 2004; Grosh et. al. 2008).This has led to the large literature on mitigating these informational costs by using easily observable indicators which are correlated with income to undertake contingent targeting. The idea is that income within these categories cannot be distinguished, but statistical properties of the distributions within these groups can be used to design transfer strategies which will be more efficient at poverty reduction than no targeting at all. Thus for example, in an early exercise Kanbur (1987) showed that if the objective is to minimize national P_α then transfers should be in

[3] These headings were formulated in Besley and Kanbur (1993)

proportion to each group's $P_{\alpha-1}$ (for $\alpha \geq 1$). An application to food subsidies was provided by Besley and Kanbur (1988) and to land holding based targeting was provided by Ravallion and Chao (1989). There is now a large literature and the basic analytical issues are reasonably well understood.[4]

An important type of targeting which addresses the information issues is known as "self-targeting." This does not rely on external assessment and validation to identify those who are poor and those who are not. Rather, it sets up an incentive system such that only those whose incomes are sufficiently low would come forward to claim the benefit. The best known example of this a transfer contingent on employment at a public works site. The employment is guaranteed for all those who present themselves, but clearly only those for whom the opportunity cost is less than the wage at the public works site will show up. If the hourly wage at the public works site is 100, why should someone with an alternative wage rate of 200 elsewhere work at the public site? If the opportunity cost is in turn correlated (negatively) with poverty status, the targeting objective is achieved. An early assessment and validation of this argument is presented in Ravallion (1991). A recent application of the argument in the context of the financial crisis is to be found in Kanbur (2010). And analogous reasoning leads to the case for subsidizing coarse rather than fine grains in food subsidies (the non-poor are more likely to prefer the latter).

Employment guarantee schemes are a type of conditional cash transfer (CCT)—the transfer is conditional upon employment at the public works site. However, not all conditional transfers, transfers conditioned on some behavioral response, are self-targeting in the same progressive direction (Rodriguez-Castelan, 2017). Consider the very popular policy intervention of a cash transfer conditional on keeping children in school. But if education is a normal good the well-off will keep their children in school in any case—for them the transfer will be a pure infra-marginal transfer. For poorer households, who are being incentivized to change their behavior, the value of the transfer will be less than the cash value. Indeed for the poorest households it may not be worthwhile to participate in the program at all. As Rodriguez-Castelan (2017) shows, the more efficient use of a given budget to reduce poverty may in fact be to provide an unconditional rather than a conditional cash transfer. No doubt the debate on CCTs will continue, touching also on the issue for cash versus in-kind transfers (Fiszbein et. al. 2009).

The informational costs of fine targeting, and ways of addressing them, are thus well understood and assessed in the literature. There is, however, a far less well understood implication of fine targeting. Recall once again the description of perfect targeting—every individual gets just enough to raise them to the poverty line. Thus higher income-poor individuals get less transfers. In fact, with perfect targeting the reduction is one for one: for every unit increase in pre-transfer individual income, government transfer declines by one unit (the sum of the pre transfer income and the transfer is equal to the poverty line). What we have described, in effect, is an effective tax and transfer schedule with a marginal tax rate of 100%! In any normal context the incentive effects of this would be prominently discussed but not, seemingly, in the context of anti-poverty programs.

In any sort of standard labor supply model, a 100% marginal tax rate over an extended range could lead to zero labor supply. If this happens and l pre-transfer incomes below the poverty line would fall to zero and the cost of the transfer would rise significantly to

[4] For a recent theoretical exploration see Kanbur and Tuomala (2016); for a policy based application, see Nazara and Rahayu (2013).

$$qz > \sum_{i=1}^{q}[z - y_i] \quad (7)$$

Thus in a setting where incentives for earning income are important, the incentive effects of high marginal tax rates implicit in fine targeting will have to be balanced against the targeting gains. Kanbur and Keen (1989) and Kanbur, Keen and Tuomala (1994) present early analyses of this issue, showing the extent to which fine targeting will have to be mitigated in the face of these incentive issues. A more recent literature brings up to date quantification of the labor supply effects of transfer programs (Banerjee et. al. 2015).

There is a connection between this discussion of incentives and the earlier discussion of informational costs and the use of easily observable indicators. The tension between fine targeting and high marginal tax rates can be mitigated if we are allowed to use easily observable characteristics to design different transfer schedules for different groups. The extra instrument of "categorical" targeting allows better use of resources, as shown by Immonen et. al, (1998).

The third dimension of the costs of fine targeting is perhaps most elusive—political economy. Fine targeting means by definition confining transfers to those who are poor. But this means a separation of the interests of the poor from the middle income groups. As the political economy of this plays out, such separation could mean lower overall budgets for poverty reduction transfers. In the words of Gelbach and Pritchett (2002), more for the poor could end up being less for the poor. In an early allusion to these forces, Anand and Kanbur (1991) referred to the reform of the Sri Lankan rice subsidy in the late 1970s, which went from a universal subsidy to being targeted to those below the poverty line. But the real value of the subsidy then fell over subsequent years, with little in the way of political repercussions. Kanbur (2010) also alludes to these forces in discussing the efficacy of employment guarantee schemes as vehicles for rapid response to macro shocks—while their targeting properties are beneficial, for this very reason political support at the local level may be problematic. Gelbach and Pritchett (2002) present a formal model of the forces in play.

3. Implications of the Digital Revolution

Thus fine targeting, while obviously a good thing if it can be implemented costlessly, is not in fact costless. There are a number of tradeoffs which we have discussed under the headings of information, incentives and political economy. Given the tradeoffs identified in Section 2, this section will assess the implications of the digital revolution—can it enhance the benefits of targeting while reducing the costs?

3.1 Digitization and Anti-Poverty Programs

What does the digital revolution mean in the specific context of targeting of anti-poverty transfer programs, as opposed to the general implications for state capacity? There are (at least) three ways in

which digitization is thought to be helpful. The first is ease of payment of cash. Radcliff (2016, p 7) provides a specific example:

"The link between payment access and fuel subsidy reform was powerfully demonstrated by Iran's reform efforts in 2010-11. At this time, the Iranian Government was spending $70 billion per year on fuel subsidies—a clearly unsustainable subsidy bill. But the government couldn't raise fuel prices without offering citizens something in return, lest it face a political backlash. So it decided to replace fuel subsidies with cash transfers, setting aside $30 billion to deliver $40 per month to every citizen…..To make the reform possible, the Iranian Government had to deliver monthly payments to every Iranian household….Today, 67 percent of Iranian adults receive a government payment—higher than any country in the world—and 92 percent of these payments are delivered digitally into an account."

The second is biometric identification, as Gelb and Diofasi (2015, p.61) elaborate for the case of South Africa:

"Provincial governments in South Africa have used fingerprint-based biometric ATMs and smartcards since the mid-1990s to deliver pensions and social grants, including in locations with limited connectivity…..Biometric re-registration of over 20 million social grant recipients was completed in 2013 by the South African Social Security Agency (SASSA) in an effort to streamline the recently centralized system. Even though the system had been able to draw on an extensive identity infrastructure initiated during the apartheid period re-registration enabled SASSA to remove 650,000 social grants going to non-eligible individuals which resulted in savings of over $65 million annually….. The new system also ensures that payments cease once a beneficiary has died without having to rely on death registration records: all grant recipients must present a 'proof of life' once a month by scanning their fingerprints or through voice recognition."

The third is keeping track of payments at the next level up, in the government system itself. Here is how Banerjee et. al. (2016, p.1) reported the results of a recent study in India:

"In collaboration with the Government of Bihar, India, we conducted a large-scale experiment to evaluate whether transparency in fiscal transfer systems can increase accountability and reduce corruption in the implementation of a workfare program. The reforms introduced electronic fund-flow, cut out administrative tiers, and switched the basis of transfer amounts from forecasts to documented expenditures. Treatment reduced leakages along three measures: expenditures and hours claimed dropped while an independent household survey found no impact on actual employment and wages received; a matching exercise reveals a reduction in fake households on payrolls; and local program officials' self-reported median personal assets fell."

There are thus clear benefits from introducing digital technology in social programs, and as the costs of digitization decline the benefit to cost ratio will continue to improve along these dimensions. But notice that the three examples are all somewhat independent of the issue ofanti-poverty targeting as presented in the previous section—ensuring that transfers flow to those, and only those, who are below the poverty line. The Iran example is one where a poorly targeted fuel subsidy program was replaced with a completely untargeted cash transfer program. The problem in the reform was how to make the cash transfer to every household, not how to restrict the transfer to only poor households. The issue in South Africa is how to identify those who meet pension eligibility requirements (basically, age and gender), not how to target flows to the poor. And in the Indian case targeting to the poor is

being taken care of by the self-targeting nature of the public works programs; the issue addressed by digitization is the standard one of public sector corruption.

So we return then to the fundamentals of targeting, with its issues of (i) the need for information on income or consumption of individuals for fine targeting; (ii) the incentive effects of fine targeting; and (iii) the political economy of fine targeting. How, if at all, can the digital revolution help ease the tradeoffs identified in the previous section?

3.2 Information Costs

Clearly, the most obvious entry point is the potential of the digital revolution to reduce information costs in targeting. Biometrics and identification of individuals is often put forward as the solution to the information problem in targeting. However, what fine targeting needs is not just unique identification of individuals, but detailed information which allows computation of their income or consumption, on the basis of which they are to be identified as being poor or not. Further, this computation needs to be updated annually if the program is to continue to be finely targeted. In a small developed highly formalized economy such as Finland, such income information is already digitized and linked in to other national data bases, and the use of such information is not a problem.[5] But in a developing country with a large informal untaxed sector it is not clear how exactly digitization can help, at least not for many years to come. And, it does not seem that informality is declining sharply, or at all, in many developing countries (Kanbur, 2015).

In the absence of detailed income or consumption data at the individual or household level, correlates derived from household surveys can be used to fashion a "proxy means test" as described in the previous section. This provides ground level implementers of the transfer program with a formula which weights a number of observable characteristics, and a cut off value of this weighted sum to identify households to whom the transfer should be made. But this then requires information on these observable characteristics for each household (and in some cases individuals within the household) to be obtained, maintained and updated at the local level. Clearly digitization can help enormously in maintaining and updating these data sets. But verification and validation of some of this information, going beyond births and deaths where digitization of vital statistics is a complementary input, is not a simple straightforward technical exercise. Quality of housing is often an element in proxy means tests—whether or not the house has a tin roof, for example. But this is a subjective assessment--how is a tin roof with holes in it to be counted? Whether the man in a household is employed is another typical criterion, an ambiguous one in rural and agricultural settings. And so on. These are not amenable to easy resolution by digitization.

[5] An amusing account of this phenomenon is to be found in this report of a speeding fine in Finland: "The fines are calculated based on half an offender's daily net income, with some consideration for the number of children under his or her roof and a deduction deemed to be enough to cover basic living expenses, currently 255 euros per month…..Then, that figure is multiplied by the number of days of income the offender should lose, according to the severity of the offense….In today's digital age, however, a few seconds is all it takes for the police, using mobile devices, to get information directly from the Finnish tax office." (Daley, 2015)

3.3 Marginal Tax Rates

Let us turn now to the basic tension between fine targeting and the high implicit marginal tax rates that fine targeting entails. The tension arises in the attempt to make sure that no poor person gets more than needed to reach the poverty line, which is an important element of fine targeting. The tension can be resolved by giving up on this requirement and going for a universal benefit, but then we are at the other extreme from fine targeting—no targeting at all.

However, with a universal benefit there is leakage to those above the poverty line. This leakage can be reduced by conditioning the transfer on individual characteristics through a proxy means test as has been discussed. But everyone with the same value of the proxy is treated identically—there is "universalism" among those in the same observable category. So some of these are getting more than they need to reach the poverty line. There is leakage but since all incomes within a category receive the same transfer, not conditioned on income, there is not an implicit marginal tax rate. Thus to the extent that new information technology helps in managing differential transfers to several groups differentiated by observable characteristics, universalism within each group avoids the high marginal tax rate issue, while proliferation and optimal use of group information allows better targeting.

3.4 Political Economy, Norms and Institutions

Consider now the political economy dimension. The central issue posed in the previous section is that of the middle income groups. The resources needed for poverty reduction, even with fine targeting, will have to come from somewhere. The question then is at what income level does the switch between net recipient and net contributor occur? With perfect targeting, the answer is obvious—it occurs at the poverty line. Those above the poverty line must pay for transfers to those below the poverty line. With no targeting at all, everybody gets an equal amount, but this has to be paid for. The switch point depends on the exact nature of the tax schedule and the income distribution. But it is clear that if the universal transfer is z, enough to make even the lowest income come up to the poverty line, then the switch point will be above the poverty line. Thus with a high enough universal benefit, the poor and the lower middle classes have a common cause.

How is the above argument affected by digitization? On the face of it, not at all. The issue is where the switch point between net gainers and net losers occurs, and it is not clear why digitization should affect this in general. However, suppose now that over and above the costs of the transfer there are operational costs, and that somehow the costs of the whole transfer operation are lowered by digitization—the leaky buckets are plugged better, so that fewer resources need to be extracted from the net payers. Then the switch point will rise and more of the middle income groups will be brought into solidarity with the poor. But such political economy analysis, and the implications of digitization, is in its infancy and needs to be explored further in a complete model which solves simultaneously for the parameters of the tax-transfer schedule as part of the political economy equilibrrium, following on from the work of Gelbach and Pritchett (2002).

Suppose now that we are in the realm of proxy means tests, where transfers are conditioned not on income but on observable characteristics. A political economy framework would now see

advantage in a coalition of those with common observable characteristics, combined with agitation by this coalition for increased transfers to those characteristics. The politics of caste coalitions, and the demands for reservations of government posts and state transfers, are of this nature in India.[6] A theoretical analysis of community based targeting is provided in Dasgupta and Kanbur (2005). Thus while the new information technology makes it easier to develop ever more sophisticated proxy means tests, it may at the same time introduce new and perhaps unintended elements to the political economy of a country, by intensifying the logic of group coalitions, fueled now by the prospect of transfers to the group from anti-poverty programs. Such political economy models also need further development and exploration.

Finally, there is another aspect of the political economy dimension of fine targeting which is perhaps less well understood in the analytical economics literature (it was not addressed, for example, by Besley and Kanbur, 1993), although it is well recognized by those with ground level implementation experience. It links directly to the informational aspects of targeting, and the use of proxy indicators in targeting. There is now a well-developed methodology for deriving these proxies, as weighted sums of observable indicators, and the methodology is being implemented in many parts of the world (see, for example, Nazara and Rahayu, 2013). But, by definition, these proxy methods will have inclusion and exclusion errors. These are weighted appropriately in a loss function in deriving the optimal proxy, but outcomes on the ground are a different matter.

The complicated proxies, derived by technocrats, are not easy to explain to ordinary people, who put down non-receipt versus receipt of transfer across households to political and ethnic connections, thereby undermining solidarity at the local level. Adato (2011) notes in a discussion of CCT in Nicaragua how purely quantitative analysis can lead policy makers astray:

"The survey found that the program was well targeted, with under-coverage rates of 3 to 10 percent. The qualitative research found, however, that people saw themselves as "all poor" and did not understand why households were selected into or out of the program, resulting in several types of stress and tension in the communities."

Such experiences are found in many qualitative studies. Thus one woman recipient of the "PKH" transfer program in Indonesia is reported in Reality Check Analysis (2015, p. 29—"kepala desa" is village head) as follows:

"…she was originally selected via a household survey where she was asked her name, house condition, how much land she owned and her employment. However, she said others got bigger allowances, some as much as IDR 1 million, *'because it was unfairly decided by the last kepala desa - you had to be connected to him'.* The last elections she has voted for a family member to ensure that she will benefit in the future."

Thus if new technology drives implementation of ever more complicated proxy means tests they may end up worsening tensions at the local level even as they satisfy "better targeting" from a technocratic perspective. More generally, the fineness of the targeting may be unrelated to local conceptions and norms of those who deserve the transfer and those who do not, leading to disconnect

[6] There is of course a vast literature on this topic. A recent article targeted towards the generalist is in The Economist (2013).

between technocrats believing they are doing well while the local political economy suffers. At the very least, then, qualitative analysis will be needed to identify these ground level repercussions of fine targeting.

A broader type of institutional issue arose in a field trip the author made a decade ago to Adilabad district in what was then the state of Andhra Pradesh in India. In discussions on the newly introduced National Rural Employment Guarantee Act (NREGA), we were told about the virtues of the new electronic system of payment. In "the bad old days", the muster rolls were used to make physical payment to workers at the public works site. It was alleged, no doubt correctly, that this led to a lot of corruption, with only a part of the payment being handed over, the rest being kept by powerful local interests—their henchmen being the ones who were handing out the payments. But now each worker was required to open an account at a local financial institution and the payment would be made directly into the account electronically, thereby circumventing opportunities for corruption at the public works site. Thus, all seemed well. But further enquiries and private conversations with the workers revealed that in fact the henchmen now gathered outside the post office or local bank to collect their take, and the counter staff of the financial institutions also took their share before handing the cash to the workers.

This anecdotal evidence is not inconsistent with the rigorous experimental evidence provided by Banerjee et. al. (2016) on NREGA in the Indian state of Bihar. While overt corruption, like skimming off the payroll before it is handed out, may be reduced as a result of various forms of e-governance, there is nothing to stop the skimming from happening outside of the gaze of the electronic eye. It is encouraging that Banerjee et. al. (2016) find that "local program officials' self-reported median personal assets fell." But the general point remains, that digitization can only do so much to address deep seated norms and practices which reflect long standing power relations in society.

4. Conclusion

The object of this paper is to sound a note of caution. The large literature on targeting of anti-poverty transfers has identified significant tradeoffs in aiming for fine targeting of these transfers to the poor, and only to the poor. Ground level experience in implementation of these programs, as well as conventional empirical evidence, confirms and highlights these tradeoffs. Can the digital revolution help mitigate these tradeoffs?

(i) Clearly, new information technology can help mitigate some of the informational and administrative costs of targeting—for example by facilitating the maintenance and updating of local level data bases on individual characteristics on which targeting relies. But the system is only as good as the information put into it. Income information is problematic in countries with a significant informal sector, and the issues of ground level assessment and validation of the proxies used in proxy means tests is not overcome by new technology, which can only record and process the information once it has been generated.

(ii) To the extent that digitization can allow better use of observable and unalterable individual characteristics to segment the population into groups, across which there is a variation of

transfer but within each of which there is the universalism of an identical transfer, this can help to mitigate the tension between fine targeting and high implicit marginal tax rates.

(iii) The political economy of targeting relates to the relationship between the nature of the targeting (fine or not) and the resources which the political system will generate for poverty reduction. It is not clear that new technology will affect this tradeoff greatly. However, proxy means targeting and group based targeting can create new forms of tensions on the ground, and new forms of political economy based on the groups used for targeting. These unintended consequences will have to be taken on board in any assessment of the consequences of group based targeting being made easier because of the digital revolution.

Thus the hype around the digital revolution needs to be duly mitigated by the lessons of the conventional literature on targeting of anti-poverty transfers.

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