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Benefit incidence with incentive effects, measurement errors and latent heterogeneity: A case study for China

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ABSTRACT

In what is probably the largest cash transfer program in the world today China's *Dibao* program aims to fill all poverty gaps. In theory, the program creates a poverty trap, with 100% benefit withdrawal rate (BWR). But is that what we see in practice? The paper proposes an econometric method of estimating the mean BWR allowing for incentive effects, measurement errors and correlated latent heterogeneity. Under the method's identifying assumptions, a feasible instrumental variables estimator corrects for incentive effects and measurement errors, and provides a bound for the true value when there is correlated incidence heterogeneity. The results suggest that past methods of assessing benefit incidence using either nominal official rates or raw tabulations from survey data are deceptive. The actual BWR appears to be much lower than the formal rate and is likely to be too low in the light of the literature on optimal income taxation. The paper discusses likely reasons based on qualitative observations from field work. The program's local implementation appears to matter far more than incentives implied by its formal rules.

1. Introduction

Most rich countries today have extensive welfare systems for which poverty reduction is an important objective and most emerging middle-income countries are embarking on new social policies with explicit anti-poverty objectives. Concerns about incentive effects have long been prominent. Famously, such concerns were central to the early nineteenth century debates on England's Poor Laws, which provided targeted relief to the poor. The Poor Laws went back to around 1600, but their pinnacle was clearly the *Speenhamland System* of 1795, which aimed to guarantee a minimum income through a sliding scale of wage supplements (Himmelfarb, 1984). The view that such policies created poverty was endorsed by prominent classical economists, including Malthus (1806) and Ricardo (1817).[2] Significant reforms to the Poor Laws were implemented in 1834, including the repeal of *Speenhamland*.

While the Poor Laws debate was hugely influential on social policy, the evidence appears to have been largely based on easily manipulated anecdotes and characterizations, with flimsy claims of attribution.[3] The arguments were somewhat one-sided, and many potential economic benefits were ignored.[4] Nonetheless, the policy debate soon spread widely and has echoed over the last 200 years. Motivated by the debates on England's Poor Laws in the early 19th century, and influenced by the writings of prominent British economists, similar debates were going on in the US, with calls for reforms to cut the rising cost of relief efforts largely motivated by claims about incentive effects (Klebaner, 1964). In modern times, Murray (1984) and others mounted an influential critique of US welfare policies in which similar concerns about adverse incentive effects loomed large. And, while modern debates on social policy have certainly had more evidence to draw on than was the case

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[2] For further discussion of this debate in Ravallion (2014b).
[3] The ale-house figured prominently in the anecdotes about behavioral responses; see Furniss (1920, Ch.6).
[4] For further discussion see Solar (1995).

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in the 19th century debates on the Poor Laws, strong policy positions have persisted independently of the evidence.[5]

This long-standing debate about the incentive effects of targeted social policies is relevant to a major new antipoverty program in China. In an effort to address new concerns about unemployed and vulnerable workers, and the social instability that they might create, the central government introduced the *Minimum Livelihood Guarantee* program, popularly known as the *Dibao* (DB) program, in 1999.[6] The program's design is outlined in various documents of the State Council and it is administered by the Ministry of Civil Affairs (MOCA). By 2009 the program had expanded to cover 23 million people, stabilizing after that.[7]

This is China's version of *Speenhamland*.[8] The DB program aims to provide locally-registered urban households with an income per person below predetermined local DB "poverty lines" (*Dibao xian*) with a transfer payment sufficient to bring their incomes up to that line.[9] So this is a program for which one's prior, based on the scheme's deign, would be that there are large incentive effects. Indeed, taken literally, the program's design implies that participants face a 100% benefit withdrawal rate (BWR) (or marginal tax rate) in that a small increase in non-program income will result in an equal reduction in program receipts. Incentives to escape poverty will be weak or absent. However, there are many reasons why the actual BWRs on an antipoverty program may differ from the nominal rate.[10] While the State Council's proclamations imply a BWR on DB of 100% there is scope for local discretion and innovation.[11]

This paper studies the *Dibao* program with the aim of assessing whether it has created a poverty trap—whether it operates in practice the ways its formal rules suggest, implying a 100% BWR. The bulk of the paper focuses on the problem of estimating the mean BWR, given by the average rate at which transfer receipts respond to differences in household income. As is recognized in the literature, the BWR is a key parameter for any social policy.[12] This can be interpreted as a measure of targeting performance, telling us how much transfer receipts decline with higher pre-transfer income. Focusing on the BWR also allows us to draw on simulation results from the literature on optimal income taxation.

Most methods of calculating the BWR found in practice have either: (i) calculated the transfers/taxes implied by the formal rules, or (ii) calculated conditional means of actual transfers/taxes at each level of net income, i.e., treating net income as fixed.[13] It is well-recognized that behavioral responses can invalidate either method. This is obvious for method (i). In method (ii), when net income, defined as gross income less transfers received or taxes paid, is taken to be income in the absence of the program one is ignoring behavioral responses. Measurement errors also come into play, such as due to miss-reporting of incomes.[14] We study the bias in statistical estimates of the BWR induced by latent incentive effects and income measurement errors.

The paper also identifies a third source of bias (not previously discussed in the literature to our knowledge), which we call correlated incidence heterogeneity. This arises when there are idiosyncratic differences in the BWR, correlated with income. For example, on moral grounds, program administrators in practice may resist cutting benefit levels of the poorest family when its income rises slightly. The extent of this problem will naturally vary with the amount of local administrative discretion in implementation.

The paper proposes an econometric estimator for the mean BWR for the *Dibao* program based on specially-designed surveys for the purpose of this paper.[15] To assure that our proposed method is operational, we constrain it to use essentially the same data as the popular statistical accounting method using income net of transfers—assuming that income is fixed. Our key identifying assumption can be thought of as a more general, and more plausible, version of the fixed income assumption. Instead we allow only certain income components to be fixed, which become the instrumental variables for total income net of transfers/taxes. While less restrictive than the fixed-income assumption, our identification strategy is not beyond question. Correlated incidence heterogeneity can still leave a bias in our estimator, by creating correlations between the instrumental variables and the error term. We argue that this extra bias can be signed under the assumption that if the data we have are consistent with the program's aim of reducing poverty then the unobserved differences in incidence (stemming from heterogeneity in BWRs) will also be consistent with that objective. In other words, if what we observe indicates that the program reduces poverty then it is assumed that this is also true of the things we do not observe.

We argue that our identifying assumptions are plausible in this setting. Our results suggest that the way the DB program operates in practice through its local-level implementation greatly attenuates the incentive effects implied by its formal design. Thus the official nominal rules appear to be highly deceptive about actual incidence. While in theory, DB imposes a 100% marginal tax rate on participants, the reality on the ground is a much lower rate. Using our data on DB participants and a matched comparison group of non-participants, we estimate that the BWR is only about 12–14% per annum. We find a higher BWR in richer cities, peaking at 27% for Beijing. It appears that (even in Beijing) the incentives built into the program as it works in practice are unlikely to create a poverty trap. Indeed, when viewed in the light of the literature on the optimal design of targeted programs, the program's BWR would appear to be too low.

The following section examines the problems of estimating the BWR and describes our solution. Section 3 describes the *Dibao* program and our data. Section 4 presents our results, also comparing our estimate of the BWR with the non-behavioral method. We offer some observations on the implications of our findings in Section 5. Section 6 concludes.

2. Theory and methods of estimating the benefit withdrawal rate

One can define the "benefit incidence" of a specific set of transfers (or taxes) as the mapping from incomes in the absence to those transfers to the transfer payments received. With little loss of generality we can think of this mapping as some unknown smooth function giving the transfer to household i, denoted T_i, with income in the absence of transfers Y_i^*; let this function be $\phi_i(Y_i^*)$. Note that the function varies,

[5] In the context of the 1980s debates on US welfare policy see Ellwood and Summers (1986). Moffitt (1992, 2002) and others noted the paucity of good evidence on incentive effects.

[6] *Dibao* started in Shanghai in 1993, spread to other cities, and became a national policy in 1997, with formal State Council regulations issued in 1999. On the history and politics of the program see Hammond (2009, 2011).

[7] In 2007 a new rural version of the *Dibao* program emerged. World Bank (2010) studies this program in its early stages in four provinces.

[8] It is also reminiscent of Britain's Supplementary Benefit introduced after the Second World War, whereby income top-ups aimed to assure that all incomes reached the poverty line.

[9] Obtaining permanent registration in a new location is generally a difficult and lengthy process in China (not least for the poor), so in practice DB eligibility is confined to well-established local residents.

[10] Moffitt (2002) makes this point in the context of welfare policies in the US.

[11] This has been noted by Hammond (2009, 2011) and Duckett and Carrillo (2011).

[12] See, for example, Moffitt (2002), Holt and Romich (2007) and Maag et al. (2012). The BWR is the key parameter of interest in this context, although other parameters are of interest more broadly, such as labor supply elasticities.

[13] This method (or some variation on it) is what Bourguignon and Pereira Da Silva (2003, p.9) term the "accounting method." Examples include Kakwani (1986), Atkinson and Sutherland (1989), Sahn and Younger, 2003 and Lustig et al. (2014). The method has the attraction of simplicity, in that the calculations are straightforward. However, net income (so calculated) need not accord well with income in the absence of intervention given behavioral responses. The potential for bias in assessments of benefit incidence is well recognized. See the discussion in van de Walle (1998).

[14] As Ravallion (2008) argues, what is identified as "imperfect targeting" in social programs could simply reflect such errors.

[15] While we apply the method here to a single program it could also be readily adapted to a collection of programs or even the complete tax-benefit system.