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The Cost of Disability in China

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Abstract We describe the degree to which household income is negatively associated with the prevalence of different types of disability (i.e., medical impairments) in China using data from the 2006 Second National Survey of Disabled Persons. We then calculate the extra costs of disability across different types of households and show how these costs differ by the type and severity of disability in both urban and rural areas. Finally, we use nationally representative panel data on persons with disabilities from 2007 to 2009 to examine the degree to which social security is reaching persons with different types and severity of disabilities in both urban and rural areas. We conclude that although the amount and coverage of social security for households with disabilities is increasing rapidly, it is still not enough to offset the income differential between households with and without disabled persons, especially when we account for the extra costs of disability.

Keywords Disability · Poverty · Extra costs · China · Social security

Introduction

A two-way, negative relationship is believed to exist between income and disability (Elwan 1999). In one direction, poverty can lead to medical impairments. Low-income households may also have difficulty supporting family members with medical

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impairments to fully participate in the economy and society, thus exacerbating disability from the perspective of the "social" rather than simply the "medical" model of disability (WHO 2001). In the other direction, households with persons with disabilities tend to face greater economic challenges than households without persons with disabilities (Case and Paxson 2010). One significant challenge is that the employment rates and wages of disabled persons may be depressed because of unequal access to opportunities to develop knowledge, skills, and careers (O'Reilly 2007; Stern 1989). The wages of disabled persons or their family members may also be lower because of opportunity costs. Frequently, both the disabled person and his or her caregiver spend considerable time on tasks related to disability (e.g., seeking or providing medical care) rather than devoting the same time to earning income (Metts 2004).

Beyond the two-way negative relationship between income and disability, households with disabled persons also face a "conversion handicap" (Sen 2004). Given a fixed amount of income, households with disabled persons cannot achieve the same standard of living (SOL) as households without disabled persons. A small set of studies in developed countries have estimated these "extra costs of disability"—that is, the excess income that a household with a disabled person would require to have an equivalent SOL as a household without a disabled person (Berthoud et al. 1993; Cullinan et al. 2011; Saunders 2007; Zaidi and Burchardt 2005). Such research has been conducted in England, Australia, and Ireland. The studies concluded that that the extra costs of disability are substantial, at least over the short term. Research has also demonstrated that the extra costs of disability are higher for households with persons with serious disabilities.

Because of the unavailability of data, empirical research examining the relationship between income and disability in developing countries has been relatively scarce (Braithwaite and Mont 2009; Hoogeveen 2005; Metts 2000; Mont and Cuong 2011). Even fewer studies have measured the extra costs of disability in developing countries (Mont and Cuong 2011). Furthermore, the degree to which policy interventions, notably social security programs, cover persons with disabilities in low- and middle-income countries has been documented in only a few studies (e.g., O'Keefe 2007). The absence of information on the relationship between disability and income, the extra costs of disability, and the distribution of social security is surprising. Such information is essential in formulating policies that address the needs of the disabled population. Accounting for the extra costs of disability, for example, can be used to more accurately assess the number of households with persons with disabilities that are living in poverty as well as the rate of poverty in the population as a whole (Cullinan et al. 2011; Saunders 2007; Zaidi and Burchardt 2005).

The overall goal of this study is to contribute to the nascent literature on the economic situation of households with persons with disabilities in low-income and middle-income countries by presenting recent evidence from China. To achieve this goal, we have three specific objectives. First, we use data from China's 2006 Second National Survey of Disabled Persons, a survey of more than 2.5 million individuals, to illustrate the two-way negative relationship between income and disabilities. We do so by documenting the substantial differences in income between households with persons with different types and severity of disabilities and those without persons without disabilities. We illustrate the differences in urban and rural areas separately. Second, we use an SOL approach to estimate the extra costs of disabilities for households with

adults with disabilities as well as for households with children with disabilities (Berthoud et al. 1993; Zaidi and Burchardt 2005). We estimate the extra costs of disability across different types and levels of disability, by the size of the household, and between urban and rural areas. Third, we use another data set (of nationally representative panel data from China from 2007 to 2009) to track the extent to which urban and rural households with persons with different types and severity of disabilities are the beneficiaries of social security policies. Overall, we find that although the likelihood of receiving social assistance and different kinds of insurance have increased markedly in both urban and rural areas over the latter half of the 2000s for persons with disabilities, recent social security policies are not enough to offset existing income differences, much less cover the extra costs of disability.

Data

Under the guidance of the State Council, the Second National Survey of Disabled Persons was conducted in all provinces of China in 2006 by the Leading Group of the China National Sample Survey on Disability and the National Bureau of Statistics. The purpose of the survey was to estimate the distribution of persons with various types and levels of disability at the national and provincial levels; examine the demographics and socioeconomic situation of households with persons with disabilities; identify the causes, timing, and medical treatment of disability; and document the activities of disabled persons and their participation in social protection programs. Results from the survey have served as the basis for recent national and local policies and guidelines regarding persons with disabilities in China.

The implementation of the 2006 Second National Survey of Disabled Persons was characterized by a high level of technical expertise. Multistage, stratified random cluster sampling, with probability proportional to size, was used in each of 31 provinces of mainland China (see Zheng et al. 2011 for further details). This resulted in the selection of 771,797 households and 2,526,145 individuals. Tens of thousands of trained enumerators interviewed and screened all sampled household members for signs of visual, hearing, speech, physical, intellectual, and/or mental disabilities. Individuals who potentially had disabilities were later examined by one of more than 6,000 trained medical professionals. Diagnosed disabilities (i.e., medical impairments) were then ranked by severity. The total number of persons with disabilities in the sample was 161,479 (an estimated 84.6 million individuals, or 6.5 % of China's total population). The total number of households with at least one person with disabilities was 142,112 (an estimated 17.8 % of all households).

It is important to recognize that the 2006 National Survey of Disabled Persons classifies disabilities under the more traditional and narrow biomedical model of disability (as medical impairments) rather than according to a social model. There are advantages and disadvantages to defining disabilities in biomedical terms. The more narrow definition allows disabilities to be "objectively" diagnosed by medical professionals as impairments and thus is less subject to biases from self-reported data (Murray and Chen 1992). Assessing disability according to the biomedical model, however, is costly and difficult (or impossible) for some countries (especially poorer ones) to carry out. Carrying out a biomedical-based disability survey depends on a large number of

well-trained medical personnel. Therefore, countries with lower levels of development are often unable to conduct medical assessments of disability. On the other hand, defining disability according to the biomedical model (rather than a social-based model) generally results in a lower prevalence of disability (Mont 2007). The biomedical model further narrowly sees disability as residing within the individual rather than within the interaction of the individual's condition and the social environment in which he or she resides (WHO 2001).

China's policy of measuring disability according to the biomedical model instead of the social model lags behind the global policy of measuring disability. A wider view of disability would enable us to examine the costs and repercussions of disability for a broader and more heterogeneous population. Nonetheless, policy makers in China have enacted policies according to the medically based definition of disability used in the country's National Surveys of Disabled Persons. Examining the economic situation of persons with disability in China using the medically based definition of disability is, therefore, policy relevant.

We use several key socioeconomic variables from the 2006 survey data in our analyses. The first of these is self-reported total household income (from all sources, including social transfers) in the previous year, net of taxes. We also use household asset ownership indicators to construct SOL indices for analyses that estimate the extra costs of disability. These are dummy indicators for whether the household owns a color TV, refrigerator, washing machine, telephone, and computer, as well as variables that record homeownership (fully owned or not) and the size of the living space (in square meters). Finally, we make comparisons across urban and rural areas using information about each individual's residential status (*hukou*).

We track the receipt of social transfers and the coverage of various types of social insurance programs in recent years using 2007–2009 longitudinal data on selected persons with disabilities who originally participated in the 2006 national survey; henceforth, we call these the "longitudinal survey data." In 2006, 23,841 disabled individuals were randomly selected from the national survey sample. The design of the survey called for enumerators to track these individuals in each subsequent year. Attrition, however, reduced the final sample size. Each year, between 2 % and 4 % of the individuals in the sample moved out of the survey area. There was a mortality rate of about 4 % to 5 % per year. Therefore, at the end of the survey period in 2008, the number of surveyed individuals was reduced to 20,696. The 2009 sample was replenished by sampling again from the pool of 2006 respondents (leading to 38,444 individuals).

The longitudinal survey data contain more detailed information than the original 2006 National Survey of Disabled Persons on whether the randomly sampled individuals received governmental social security, such as the Minimum Life Allowance, as well as relief assistance (*jiuji*). The data were self-reported by respondents to enumeration staff. The enumeration staff asked whether disabled individuals were covered by pension, medical, unemployment, maternity, work accident insurance, or the new rural cooperative medical and pension insurance schemes. Each household further reported income from various sources including total income (regular wages plus bonuses, and so on) and total transfer income (aggregated income from multiple sources, such as social security, pension, insurance reimbursements, remittances, and gifts).

The data in our study are analyzed using Stata 11. In particular, all of our subsequent descriptive analyses and analyses of the extra costs of disability account for survey design considerations such as stratification, clustering, and weighting by using Stata 11's *svy* command suite. In constructing our SOL indices (see the next section for details), we use the user-written command in Stata called *polychoricpca* (Kolenikov and Angeles 2009).

Analysis and Results

The Relation Between Household Income and Disability in China

Findings from the few studies that have documented the association between the economic status (especially poverty) of households and disability in developing countries are not uniform or necessarily conclusive (Braithwaite and Mont 2009). A 2007 study by the World Bank, for example, showed that disability and household socioeconomic status (as measured by a consumption expenditures measure) in India are weakly correlated when an activities of daily living (ADL) measure is used, and are more highly correlated when a community identification measure is used (O'Keefe 2007). In select East European and Central Asian countries in the late 1990s, analyses showed little or no relation between income and "any" disability but a negative correlation between income and "significant" disabilities (Scott and Mete 2008). Hoogeveen (2005), by contrast, showed that in Uganda, urban households with a disabled person are more likely to be poor, even after controlling for demographic factors. Mont and Cuong (2011) also found a strong negative correlation between disability and income in Vietnam.

Although China is now the second largest economy in the world, it is a middle-income country with substantial disparities in household income across and within provinces. According to official statistics for 2008, for example, the average per capita annual disposable income in urban versus rural areas in the richest province (Zhejiang: excludes Shanghai, Beijing, and Tianjin) were 22,727 and 9,258 yuan ($3,275 and $1,334 U.S. dollars; 1 U.S. dollar = 6.94 Chinese yuan in June 2008) and 11,759 and 2,797 yuan ($1,694 and $403 U.S. dollars) in the poorest province of Guizhou (National Bureau of Statistics (NBS) 2009). Further, China had more than 40 million persons (more than 3 % of the population) living under the nation's official poverty line in 2008 (NBS 2009) and approximately 100 million persons (7.5 % of the population) living under the international poverty line. China's official poverty line is set at 1,100 yuan (about $160 U.S. dollars) per year; the international poverty line, based on 2005 purchasing power parity prices, is $1.25 U.S. dollars per day (Chen and Ravillion 2008). In fact, a more recent World Bank study took into account higher than previously estimated costs of living for the poor, finding that the total number of persons in poverty in China is actually closer to 200 million, or about 15 % of the population (Chen and Ravillion 2008).

Table 1 uses the 2006 National Survey of Disabled Persons data to show the disparities in average income between households with persons of various types and

Table 1 Average income (in yuan) of households with and without persons with disabilities, by type and level of disability as well as across rural/urban households and households with different numbers of adults[a]

	All Households		One-Adult Households		Two-Adult Households		Three+-Adult Households	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Disability in the Household	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
No Person With Disability	12,160	22,937	6,884	13,097	10,591	20,822	14,434	27,428
One Person With Disability (any)	10,010	19,582	3,153	6,638	6,507	14,083	11,954	22,871
Two or More People With Disability (any)	8,733	18,239	—	—	4,502	12,618	9,948	20,200
Visual Mild	10,195	18,978	2,859	6,273	6,249	13,635	12,218	22,268
Hearing Mild[b]	11,078	22,885	2,986	7,814	6,254	16,537	13,477	27,113
Speech Mild[b]	10,003	18,477	5,081[c]	3,936[c]	7,259	14,590[c]	11,809	21,583
Physical Mild[b]	9,981	17,870	3,217	6,584	6,663	12,791	11,891	21,761
Intellect Mild[b]	9,171	16,424	2,242	4,016[c]	5,656	9,533	10,919	19,191
Mental Mild[b]	9,906	17,472	3,405	5,646	7,070	12,100	11,997	21,691
Multiple Mild[b]	9,758	19,494	2,065	5,971	5,118	12,859	11,649	23,106
Visual Serious[b]	9,449	16,570	2,528	5,623	5,275	11,409	11,182	20,199
Hearing Serious[b]	9,906	19,431	2,578	5,793	5,689	14,015	11,911	23,114
Speech Serious[b]	8,308	19,733	2,093[c]	2,909[c]	5,784	14,202[c]	9,346	23,668
Physical Serious[b]	9,116	17,614	2,319	5,233	5,371	12,567	10,648	20,568
Intellect Serious[b]	8,315	14,582	1,590	2,559	4,868	8,519	9,391	16,994
Mental Serious[b]	8,488	15,830	2,202	4,289	5,188	9,662	10,283	19,215
Multiple Serious[b]	9,233	17,996	2,010	4,775	4,903	11,803	10,832	21,013

[a] Unadjusted household income. Amounts are rounded to the nearest yuan (in 2006 yuan).

[b] There is one adult with disability in the household.

[c] There are fewer than 100 observations by which to estimate the statistic.

Source: 2006 National Survey on Disabled Persons.

severity (mild = rank 3 or 4, or serious = rank 1 or 2) of disability and households without persons with disability for urban and rural areas. Unsurprisingly, Table 1 shows that households with persons with disabilities have lower incomes on average than households without persons with disabilities (for all types of households). Similarly, households with persons with serious disabilities tend to have lower incomes than households with persons with mild disabilities. In addition, households in urban (versus rural) areas and those with more (versus less) adult members have higher household incomes, on average, within each disability category (i.e., type and level of severity). Finally, households with persons with intellectual, mental, and speech disabilities have lower incomes on average than households with persons with other types of disability. Deviations from this trend may arise from a lack of enough observations in the specific category (e.g., speech disability) for which average household income is estimated.

The prevalence rate of impairments is negatively related to household income throughout the income distribution (Fig. 1). The relationship between income

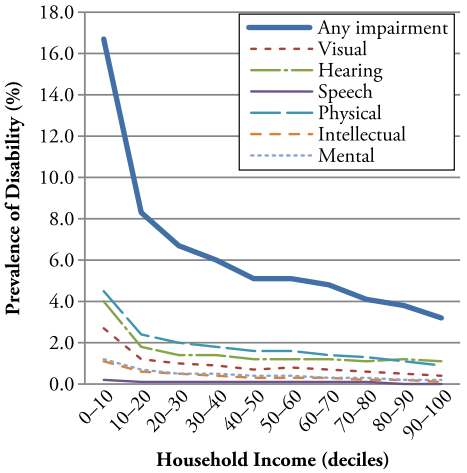

Fig. 1 The relation between household income (in deciles) and prevalence of disability in China (for any disability/impairment as well as different categories of disability; not accounting for the extra costs of disability). *Source:* 2006 Second National Survey on Disabled Persons

and disability is most stark at the lowest end of the income distribution, with a substantial drop in the prevalence rate of disability (more than 16 % to 8 %) from the first to the second decile. The overall downward trend and steeper decline from the first to second decile, in fact, exist for each main type of impairment. These empirical findings thus not only provide strong support for the notion that income and disability are negatively correlated but also underscore the importance of focusing on the poor disabled population.

We also examine the degree to which individual disability is associated with other socioeconomic indicators, such as education level, employment, and marriage status (which reflects social integration; Mitra 2005). From Table 2, we see that persons with disabilities in 2006 were much less likely to have attended high school, been employed, or been married compared with persons without disabilities across relevant age groups (ages 15–35 for education, 15–50 for employment, 15+ for marriage). Persons with serious disabilities fare even worse based on each of these indicators. Furthermore, persons with intellectual or multiple disabilities have especially low rates of high school education, employment, and marriage. To the extent that incomes in China are related to these indicators, we can see that there are indirect barriers to income for the disabled.

Estimating the Extra Costs of Disability

Having documented the disparity in income and other socioeconomic indicators between households with and without disabled persons in China, we turn to estimating the amount of income required on average to put a household with persons with disability (and of different types and severity) on equal footing as a household without persons with disability. We closely follow the SOL approach as exposited by Zaidi and Burchardt (2005) and Berthoud et al. (1993).

Table 2 Education levels, employment status, and marriage status of persons with and without disabilities in China (by type and level of disability)

Type of Impairment/Disability	% Went to High School (age 15–35) (1)	% Employed (age 15–50) (2)	% Married (age 15+) (3)
No Impairment	28.2	79.8	75.2
Any Impairment Mild	9.5	59.7	63.2
Any Impairment Serious	4.5	33.3	51.8
Visual Mild	13.6	76.5	63.4
Visual Serious	7.3	41.3	52.3
Hearing Mild	10.0	86.4	64.7
Hearing Serious	7.5	82.1	60.9
Speech Mild	9.3	77.6	69.1
Speech Serious	2.3	64.0	61.2
Physical Mild	13.6	63.2	70.7
Physical Serious	9.1	22.7	63.0
Intellectual Mild	1.1	48.4	47.3
Intellectual Serious	0.2	21.7	34.7
Mental Mild	14.8	51.5	66.9
Mental Serious	12.9	22.8	52.8
Multiple Mild	2.2	35.7	46.9
Multiple Serious	1.6	35.7	44.7
N	769,466	1,397,075	2,046,560

Source: 2006 National Survey on Disabled Persons.

The SOL Approach

The SOL approach indirectly measures the extra costs of disability without requiring detailed expenditure data or subjective assessments (Zaidi and Burchardt 2005). It relies on the assumption that households with disabled persons must reallocate scarce resources from goods and services that directly increase SOL to those expenses that are disability related. It also assumes that the same SOL is shared by all members of the household (Zaidi and Burchardt 2005). This approach thus seeks to identify the change in the relationship between SOL and income (the latter of which is assumed to be exogenous) from having a disabled person in the household. As such, it does not measure opportunity costs or losses in subjective well-being associated with disability (Zaidi and Burchardt 2005).

Figure 2 illustrates how the extra costs of disability are estimated using the SOL approach. Each line in the figure reflects the positive relationship between an SOL index and household income. For any given amount of income, households with disabled persons have a lower SOL than households without disabled persons (e.g., distance BC in Fig. 2). Furthermore, households with disabled persons require a greater amount of income to achieve the same SOL (e.g., distance AB in Fig. 2). This extra

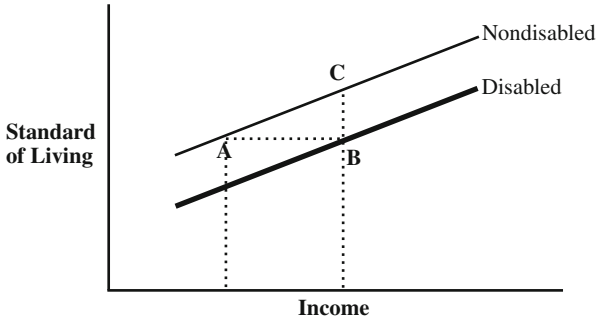

Fig. 2 Standard of living, income, and disability. Reprinted from Zaidi and Burchardt (2005)

amount of income can be estimated from information about the slope AC and the vertical distance CB, given that AB = BC / AC.

In practice, it is possible to estimate both the slope AC and the shift in SOL for households with disabled persons BC using standard regression techniques:

$$SOL_i = \beta_0 + \beta_1 I_i + \beta_2 D_i + \mathbf{X}_i \delta + \varepsilon_i, \quad (1)$$

where SOL_i represents the SOL index, I_i represents household income, D_i represents a dichotomous indicator indicating whether the person is disabled, $\mathbf{X}_i$ is a vector of observed baseline covariates, and ε_i is an error term representing unobserved covariates.

Under Eq. (1), the extra costs of disability are $\frac{\partial SOL_i / \partial D_i}{\partial SOL_i / \partial I_i} = \frac{\partial I_i}{\partial D_i} = \frac{\beta_2}{\beta_1}$. The model in Fig. 2 is an oversimplification in requiring the two curves to be linear and parallel (and thus assuming that the extra costs of disability are the same regardless of the level of income). The preceding regression equation can instead be fitted to reflect nonlinearities in the relationship among SOL, income, and disability.

Our analyses of the extra costs of disability are unable to account for the fact that disability, income, and SOL may be endogeneously related (for a detailed discussion, see Cullinan et al. 2011). Endogeneity is a problem if household income affects SOL, and SOL also simultaneously affects household income. The presence of unobservable time preferences or unobservable previous investments in human capital in Eq. (1) can also bias causal estimates of the extra costs of disability. Our analytical strategy may thus underestimate the extra costs of disability in general or may overstate the extra costs of disability of households with persons with serious disabilities relative to households with persons with mild disabilities (see Cullinan et al. 2011). Unfortunately, unlike Cullinan et al. (2011), we are unable to estimate causal effects using panel data because of the cross-sectional nature of our data set.

The SOL index for the preceding analysis is typically constructed using information on household asset ownership and should possess certain properties (see Berthoud et al. 1993; Cullinan et al. 2011; Saunders 2007; Zaidi and Burchardt 2005). First, net of disability-related expenses, the SOL index should be elastic with respect to income (Zaidi and Burchardt 2005). Second, the preferences of the household for the assets used to construct the index should not be related to disability in a systematic fashion; under the regression approach explained earlier, unsystematic variation in preferences for assets between households with and without persons with disabled persons will thus average out (Cullinan et al. 2011). A composite SOL measure using information on

several household assets may better meet the above two conditions, as it may be (1) more sensitive to changes in income at various parts of the income distribution and (2) systematically unrelated to disability, even if one or more household ownership variables are themselves systematically related to disability (Zaidi and Burchardt 2005). Finally, because SOL measures vary, depending on which household assets are used in their construction, it is advisable to examine the robustness of extra costs of disability estimates using alternative SOL measures.

Because most household asset ownership variables in our data set are dichotomous, we mainly construct SOL indices using principal components analysis (PCA) with polychoric adjustments (see Kolenikov and Angeles 2009). Recent studies from development economics and elsewhere suggest using household asset indicators and PCA to construct a continuous socioeconomic status (SES) measure as a more reliable measure of household wealth compared with self-reported income (see Kolenikov and Angeles 2009). To the best of our knowledge, this is the first study to use polychoric PCA in combination with the SOL approach.

Because of data limitations, we have a limited number of household asset indicators with which to construct the SOL measures. Most of our household asset indicators are similar in nature, however, to those used in other studies (e.g., Mont and Cuong 2011; Zaidi and Burchardt 2005). We also use basic regression techniques to verify that the household asset variables used to construct the SOL indices are responsive to changes in household income.

In fact, we use different combinations of household asset indicators to construct three different SOL indices. The first SOL index was based on ownership of computer, refrigerator, washing machine, phone, and color TV variables; the second (and preferred) SOL index added home size, homeownership, and an interaction of home size and homeownership to the list of variables. Specifically, polychoric PCA was run separately on the preceding two sets of variables (and also separately for rural and urban households), and the first principal component (which was approximately normally distributed) was used as an SOL index. We also constructed a third SOL index based on the number (count) of household assets in the home (similar to past studies, such as Zaidi and Burchardt 2005).

We ran several standard robustness checks on the SOL indices constructed using PCA (see McKenzie 2005). For instance, the first principal component of the SOL indices explains approximately 50 % of the variance in the variables, and the second principal component falls dramatically in the amount of variance it explains. This indicates that the SOL measure does well at capturing the common relationship (i.e., household SOL) underlying the household asset variables. Another indication of the validity of the SOL measure is that the scoring coefficients on the first principal component for each input variable all run in the anticipated directions. In other words, the possession of most assets (i.e., those that are normal goods) indicates a higher first principal component score (the SOL measure). Furthermore, a histogram and density plot of our main SOL measure does not reveal evidence of clumping or truncation at any part of the SOL distribution (results not shown).

In addition to the SOL indices, the household income variable is another critical variable in estimating the extra costs of disability. We use net disposable household income in the analysis; this variable reflects the resources available to the household to establish a certain SOL (Zaidi and Burchardt 2005). The household income measure

used in our estimations likely contains measurement error, introducing bias into our estimates of the extra costs of disability. Assuming that disability and SOL are measured without error, classical measurement error in the income measure would attenuate the coefficient on income and yet likely bias the coefficient on disability as well. Another possibility is that households have difficulty recalling their exact income, purposely misreport income, and/or do not account for in-kind transfers, informal markets, or household production—all of which results in reported income being less than actual income (Braithwaite and Mont 2009). Given the limitations of our data set, however, we do not address the measurement error issue in our calculations.

The functional specification that appropriately describes the relationship among income, SOL, and disability is usually determined empirically. Our focus is observing how the presence of a disabled person in a household potentially shifts a counterfactual SOL-income curve to the right: thus, we do not have to specify models that explain the overall variation in SOL, but rather specify how income is related to a component of SOL and how disability reduces SOL by shifting this curve to the right (Zaidi and Burchardt 2005). We closely follow Cullinan et al. (2008) and test various model specifications. We first run ordinary least squares (OLS) regressions when using the continuous SOL indices (that were constructed using polychoric PCA). As is standard in the literature, we also run ordered logit regressions when the SOL index is based on the number (count) of household assets in the home. The results from the ordered logit regressions are similar to those from the OLS regressions and thus are not reported for the sake of brevity. For both types of regression models, we test for different specifications with linear, squared, square root, and log income terms, along with interactions between the various income terms and the disability indicator(s). We eventually settle on the log income specification (in which log income replaces income on the right side of Eq. (1) because it generally has the best fit (as measured by adjusted R-squared values and the Akaike information criterion). Similar to Zaidi and Burchardt (2005), we also control for household size and composition directly (by including the number and ages of adults and kids in the models) rather than equivalize income for household size and composition. Throughout, we adjust our estimates and standard errors according to the particulars of the survey design.

We estimate the extra costs of disability for various subgroups. We first estimate the extra costs of disability separately for rural and urban households and for households with different numbers of adults. We also run separate analyses using either a binary indicator for disability (if an adult in the household has disability or not) or a series of dummy variable indicators for the type (visual, hearing, speech, physical, intellectual, or mental) and level (mild or serious) of disability. Finally, we run the analyses first removing households with children with disabilities (and thus measure the extra costs of disability for households with adults with disabilities) and then removing only those households with adults with disabilities (and thus measure the extra costs of disability for households with children with disabilities).

Results for Extra Cost of Disability

Table 3 presents estimates of the average extra costs of disability for households with adults with (any) disabilities. The third-to-last row of the table shows that the extra costs of disability as a percentage of income can be substantial (point

Table 3 The extra costs of "any" disability, for adults with disability, as a percentage of income[a]: OLS regressions of a continuous SOL index on household income, disability and by household type

	One-Adult Household		Two-Adult Household		Three+-Adult Household	
	Urban (1)	Rural (2)	Urban (3)	Rural (4)	Urban (5)	Rural (6)
Household Income (log)	.61**	.45**	.72**	.64**	.67**	0.79**
	(.02)	(.02)	(.01)	(.01)	(.02)	(0.02)
Impairment	–.26**	–.13**	–.21**	–.13**	–.13**	–0.06**
	(.03)	(.01)	(.01)	(.01)	(.01)	(0.01)
Age	.11**	–.03**	–.07**	–.05**	–.03**	–0.01*
	(.02)	(.01)	(.01)	(.00)	(.00)	(0.00)
No. of Children Aged 0–6	.31**	.11**	–.01	.01	.11**	.11**
	(.05)	(.02)	(.01)	(.01)	(.01)	(.01)
No. of Children Aged 7–12	.29**	.09**	.02	–.02	.05**	–.02**
	(.04)	(.02)	(.01)	(.01)	(.01)	(.01)
No. of Children Aged 13–18	.33**	.12**	.09**	.04**	.03*	–.08**
	(.03)	(.02)	(.01)	(.01)	(.01)	(.01)
Constant	–6.74**	–4.53**	–7.16**	–5.78**	–6.58**	–6.53**
	(.18)	(.20)	(.14)	(.19)	(.17)	(.18)
Extra Costs[b] (%)	43.2	28.2	28.8	19.6	18.8	8.0
95 % confidence interval	(33–53)	(22–34)	(25–32)	(17–22)	(16–22)	(7–10)
Observations	34,835	88,344	330,754	754,792	315,355	886,371
R^2	.22	.28	.27	.25	.25	.32

Note: Standard errors are in parentheses.

Source: 2006 National Survey on Disabled Persons.

[a] Province fixed effects included.

[b] Extra costs of disability as a percentage of income.

*$p < .05$; **$p < .01$

estimates of 8 % to 43 %). These costs appear larger for households with fewer adults, possibly indicating that these households rely more on outside care for the person with disability. This finding is consistent with that of Cullinan et al. (2013), who also used the SOL approach. Table 3 further shows that the extra costs of disability seem to be larger for urban households (columns 1, 3, 5) than for rural households (columns 2, 4, 6). Finally, we also estimate the extra costs of disability from having two or more disabled adults in a household and find that these extra costs are higher in absolute terms than those of households having one person with disability, but less per disabled person (results not shown).

There are several possible explanations for why the extra costs of disability may be larger for urban households compared to rural households. For example, rural households may have less access to services that are designed to help families care for disabled members than do urban households. Moreover, because rural households are generally poorer, they also have less ability to purchase such services. Both of these elements may lead to our observed result. Rural households could also have less information about how to adequately care for disabilities or place less emphasis on caring for persons with disabilities than urban households. Hence, even if they had equivalent incomes and access to equivalent services, the observed extra costs might be lower. On the other hand, the proportionally higher costs for urban households may reflect the lower prevalence of informal (family or community based) support in urban areas. Families have to purchase services (thus raising observed costs) rather than using unpaid (and often unobserved) services. Our SOL indices could also simply be more sensitive in capturing the extra costs of disability for urban rather than rural households.

Table 4 presents estimates of the average extra costs of disability for households with children with (any) disabilities. The third-to-last row of the table again shows that the extra costs of disability as a percentage of income can be substantial (point estimates of 18 % to 31 %). These costs appear larger for households with fewer adults, but not substantially so; this, combined with the related findings in Table 3, may indicate that households with children with disabilities as a whole rely less on outside care than households with adults with disabilities. The extra costs of disability here also seem to be greater for urban households (columns 1, 3, 5) than for rural households (columns 2, 4, 6), although the discrepancies are not as large as in Table 3. It could be that both types of households make similar economic sacrifices (proportionally speaking) to ensure their disabled children's welfare.

Table 5 presents estimates of the extra costs of disability as a percentage of income for households with adults with different types and levels of disability. For the most part, households with persons with serious disabilities have higher extra costs of disability than households with persons with mild disabilities. Deviations from this trend may again be due to sampling error (e.g., deviations usually occur in urban households or for households with persons with speech disabilities, which have lower prevalence rates of disability). Furthermore, the extra costs of disability for households with persons with intellectual or mental disabilities are generally higher than for households with persons with other types of disabilities. The patterns shown in Table 3 (in particular, that households with fewer adults and urban households have higher extra costs of disability as a percentage of income) also hold when we look at extra costs by specific types and levels of disability. We do not present estimates of the extra costs of different types and levels of disability for households with children with disability, however, because of the small number of children with disabilities in our sample.

Using the estimates in Tables 3 and 4, we approximate how adjusting household incomes by the extra costs of disability shifts the income distribution in general; we also examine how this changes the number of households with persons with disability living beneath the poverty line. To do this, we first subtract, based on the number of adults in the household, the extra costs of having an adult or child with any type of disability from household income. We then apply the modified OECD equivalence scale (where weights of 1, 0.05, and 0.03 are assigned to the first household member,

Table 4 The extra costs of "any" disability, for children with disability, as a percentage of income[a]: OLS regressions of a continuous SOL index on household income, disability and by household type

	One-Adult Household		Two-Adult Household		Three+-Adult Household	
	Urban (1)	Rural (2)	Urban (3)	Rural (4)	Urban (5)	Rural (6)
Household Income (log)	.59**	.47**	.71**	.64**	.65**	.78**
	(.02)	(.02)	(.01)	(.01)	(.02)	(.02)
Impairment	–.19	–.13**	–.20**	–.17**	–.18**	–.14**
	(.15)	(.05)	(.05)	(.02)	(.07)	(.02)
Age	.09**	–.03**	–.07**	–.05**	–.03**	–.01**
	(.02)	(.01)	(.01)	(.00)	(.01)	(.00)
No. of Children Aged 0–6	.31**	.11**	–.02	–.00	.10**	.11**
	(.05)	(.02)	(.01)	(.01)	(.01)	(.01)
No. of Children Aged 7–12	.29**	.09**	.02	–.02	.05**	–.02
	(.04)	(.02)	(.01)	(.01)	(.02)	(.01)
No. of Children Aged 13–18	.32**	.11**	.09***	.04***	.03	–.09**
	(.03)	(.02)	(.01)	(.01)	(.02)	(.01)
Constant	–6.56**	–4.76**	–7.03**	–5.79**	–6.37**	–6.43**
	(.19)	(.20)	(.14)	(.20)	(.18)	(.18)
Extra Costs[b] (%)	31.1	26.4	27.8	26.3	28.2	17.5
95% Confidence Interval	(18–80)	(11–45)	(15–40)	(21–32)	(7–50)	(11–24)
Observations	31,359	76,667	306,763	690,207	257,723	680,208
R^2	.19	.30	.26	.23	.24	.31

Note: Standard errors are in parentheses.

Source: 2006 National Survey on Disabled Persons.

[a] Province fixed effects included.

[b] Extra costs of disability as a percentage of income.

*$p < .05$; **$p < .01$

each additional adult older than age 15, and each child, respectively) to adjust this new household income variable for household size and composition. We find that after accounting for the extra costs of disability, the proportion of individuals under the poverty line, as defined by having less than an equivalized household income of 2,300 yuan per year ($1 U.S. dollar per day), increases from 12.5 % to 15.3 %. The proportion of individuals living with less than 4,600 yuan per year ($2 U.S. dollars per day) increases somewhat less, from 35.8 % to 37.8 %.

Altogether, our estimates of the extra costs of disability are similar to those from previous studies in a number of ways. First, our range of estimates for "any disability" (8 % to 43 % across urban and rural areas and for different size households) is similar to the range of estimates found in the United Kingdom (14 % to 50 % for disabilities of

Table 5 Extra costs of disability (adults with disability) as a percentage of income by type and level of disability: OLS regressions of a continuous SOL index on household income, disability type/level and by household type

	One-Adult Households		Two-Adult Households		Three+-Adult Households	
	Urban (1)	Rural (2)	Urban (3)	Rural (4)	Urban (5)	Rural (6)
Visual Mild	31	11	28	9	19	5
	(7–55)	(0–23)	(18–37)	(3–15)	(11–27)	(1–10)
Visual Serious	98	44	52	34	18	19
	(63–132)	(30–58)	(34–70)	(26–42)	(4–32)	(14–25)
Hearing Mild	20	12	15	11	9	–3
	(4–36)	(2–21)	(9–21)	(6–16)	(3–14)	(–7–1)
Hearing Serious	87	44	31	25	27	10
	(56–118)	(29–59)	(16–45)	(17–34)	(12–41)	(5–16)
Speech Mild	78	24	60	24	10	5
	(41–197)	(21–69)	(28–91)	(5–42)	(–25–45)	(–11–22)
Speech Serious	31	106	53	39	37	32
	(–78–138)	(68–144)	(8–98)	(14–64)	(8–65)	(14–51)
Physical Mild	12	20	24	8	16	5
	(–5–29)	(10–30)	(19–29)	(5–12)	(11–22)	(2–8)
Physical Serious	49	38	32	22	14	4
	(14–84)	(19–57)	(20–43)	(13–30)	(3–25)	(–2–10)
Intellectual Mild	116	73	80	50	28	26
	(69–164)	(53–92)	(55–104)	(40–61)	(13–44)	(19–33)
Intellectual Serious	158	77	90	86	50	31
	(73–242)	(38–116)	(47–133)	(72–100)	(25–74)	(21–40)
Mental Mild	71	34	43	27	37	23
	(45–97)	(18–51)	(30–55)	(19–36)	(26–49)	(16–29)
Mental Serious	114	40	65	49	51	32
	(77–150)	(22–59)	(45–85)	(39–60)	(34–67)	(24–39)
Multiple Mild	29	10	27	19	13	–2
	(4–53)	(–1–21)	(16–39)	(12–26)	(3–22)	(–7–2)
Multiple Serious	85	50	26	26	15	–14
	(56–114)	(38–61)	(13–40)	(20–33)	(5–26)	(9–18)

Source: 2006 National Survey on Disabled Persons.

medium severity; see Zaidi and Burchardt 2005), Ireland (approximately 20 % to 37 %; see Cullinan et al. 2011), and Australia (approximately 29 % to 37 %; see Saunders 2007). Second, although our estimates are, on average, higher than the estimates from Vietnam (approximately 9 % to 12 %; see Mont and Cuong 2011), the estimates for rural households in China and Vietnam are, in fact, not that far apart. As discussed earlier, the lower estimates for rural households (and perhaps for developing countries more generally) may indicate that rural households lack access to the same markets or

resources used to care for persons with disabilities as do urban households. Rural households may also access to stronger family-based or community-based supports (which do not show up as extra costs). Third, similar to Mont and Cuong (2011) and Zaidi and Burchardt (2005), our cross-sectional estimates (which also do not fully account for endogeneity) are larger for households with persons with serious disabilities. Finally, similar to previous studies, we find that the poverty rate increases substantially when we account for the extra costs of disability. Similar to Zaidi and Burchardt (2005), we demonstrate that accounting for the extra costs of disability increases the poverty rate by about 3 percentage points for the whole population.

Trends in Social Security Coverage for Households With Disabled Persons

The extent of the economic gap between households with and without persons with disability in 2006 leads us to ask how well social security benefits have been reaching households with persons with disabilities since that time. Since the early 2000s, China's central government has been rapidly reforming and expanding the coverage of its social security programs. The country now offers a gamut of social insurance programs (medical, unemployment, work injury, pension, and maternity) and several social assistance (transfer) programs. For instance, various types of government-inspired medical insurance programs expanded coverage from about 15 % of the population (approximately 189 million persons) in 2003 to 85.3 % of the population (approximately 1.13 billion persons) in 2008 (Zhu 2009). These medical insurance programs cover urban employees (through the Basic Medical Insurance System for Urban Employees), nonsalaried urban residents (through the Basic Medical Insurance System for Urban Residents), and all rural residents (through the New Rural Cooperative Medical Scheme).

China has also developed its social assistance programs. By 2009, the Minimum Life Allowance Scheme reportedly provided average benefits of approximately 170 and 65 yuan per month ($25 and $9.5 U.S. dollars per month, respectively) to 23.5 million urban and 47.6 million rural residents, respectively (Ministry of Civil Affairs (MCA) 2010). Also by 2009, the Five Guarantees (food, clothing, medical care, housing, and funeral expenses) program provided more than 3.86 million urban and 1.67 million rural elderly persons with benefits averaging 1,300 and 2,300 yuan, respectively (MCA 2010) ($190 and $337 U.S. dollars, respectively). Again by 2009, a national Medical Assistance Program provided more than 353 and 586 million yuan ($51.7 million and $85.8 million U.S. dollars, respectively) in social assistance to urban and rural residents with health problems (MCA 2010). Other programs, such as the Traditional or Temporary Relief Programs, furthermore provided assistance to rural, economically disadvantaged individuals in 2009, at a frequency of more than 5 million person-times (MCA 2010).

Despite these rapid reforms in social security policies, however, few policies in China are specially targeted at the disabled population. In fact, the only national-level policy targeted to people with disabilities is the State Council's 2007 Regulation on the Employment of People with Disabilities, which requires enterprises to employ disabled persons at a minimum of 1.5 % of the work force.

Although there is no national social assistance or insurance program especially targeting persons with disabilities, persons with disabilities are more likely to be poor

or from rural areas than persons without disabilities and are thus more likely to receive benefits from various types of social insurance and transfer policies (mandated at either the national or the local level). Agencies also directly consider disability as a qualifying factor for social security, but information about the degree to which disability plays a role in qualifying for these benefits is reported only in national statistics for some types of social security (e.g., the Minimum Life Allowance Scheme and the Five Guarantees).

We attempt to identify the degree to which persons with disabilities benefit from certain social security policies, at either the national or the local level, using data from the 2007–2009 longitudinal survey of disabled persons. Even the longitudinal data do not explicitly ask households about the total amount of social insurance transfers they received (from all public sources). Instead, we can examine only the likelihood of receiving the main types of social assistance and social insurance. The data also contain information about the amount of Minimum Life Allowance received as well as the extent to which medical insurance covers medical expenses.

The first set of rows in Table 6 compares the percentage of persons with disabilities (calculated using the 2007–2009 longitudinal data, columns 1–3) and the percentage of persons in the population (calculated from publically available national statistics, columns 4–6) that received the Minimum Life Allowance benefit from 2007–2009. Direct comparisons between the disabled and general population are rough, especially in the case of unemployment insurance, which is conditional on both age (which is greater for the disabled population) and on the likelihood of employment (which is lower for the disabled population) or pension insurance (which is conditional on age, which in turn is, on average, greater for the disabled population). Table 6 therefore mainly allows us to see the trend over time for the disabled population and to be aware of the national statistics as a rough benchmark in certain situations. These rows indicate that persons with disabilities are much more likely to obtain the Minimum Life Allowance than persons without disabilities in both urban and rural areas. However, beneficiaries with and without disabilities obtain approximately the same amount of the Minimum Life Allowance, on average (last three rows of Table 6).

The other rows of Table 6 indicate that the proportion of persons with disability receiving the three main types of social insurance (medical, employment, and pension) increased rather steeply from 2007 to 2009, especially compared with the national trend. As a result, the likelihood of receiving urban medical insurance was substantially higher than the national average by 2009; the likelihood of receiving rural cooperative medical insurance was greater than 90 % for both the population of disabled persons and the population as a whole. The likelihood of receiving unemployment insurance was also lower for persons with disabilities compared with persons without disabilities. This is due both to the differences in the age distributions between the disabled and nondisabled population and to the fact that persons with disabilities are employed less than persons without disabilities. Finally, by 2009, persons with disabilities were much more likely to receive pension insurance in urban areas. Much of this difference is an artifact of the older age distribution of persons with disabilities.

The longitudinal survey data also show that persons with disabilities in rural areas were about as likely (about 25 % to 30 %) to receive cash or in-kind relief (Traditional or Temporary Relief) in 2007 as in 2009. What is notable in terms of comparison is that

Table 6 Differences in the receipt of various types of social security between persons with disabilities and the total population (by urban/rural, 2007–2009)

		Persons With Disabilities			National Population		
% Receiving	Year	All (1)	Urban (2)	Rural (3)	All (4)	Urban (5)	Rural (6)
Minimum Life Allowance	2007	13.6	20.6	11.6	4.4	3.8	4.8
	2008	19.5	22.0	18.8	5.0	3.8	6.0
	2009	22.9	22.3	23.1	5.3	3.8	6.7
New Rural Cooperative Medical Insurance	2007	—	—	82.0	—	—	86.0
	2008	—	—	94.7	—	—	91.5
	2009	—	—	92.5	—	—	94.2
Urban Worker Medical Insurance	2007	—	35.5	—	—	30.3	—
	2008	—	68.9	—	—	33.0	—
	2009	—	89.9	—	—	35.3	—
Urban Resident Medical Insurance	2007	—	—	—	—	—	—
	2008	—	—	—	—	—	—
	2009	—	59.4	—	—	29.3	—
Unemployment Insurance (urban worker)	2007	—	3.3	—	—	24.6	—
	2008	—	8.0	—	—	28.4	—
	2009	—	8.6	—	—	28.9	—
Urban Worker Pension Insurance	2007	—	35.9	—	—	25.6	—
	2008	—	65.5	—	—	27.3	—
	2009	—	84.8	—	—	28.5	—
Urban Resident Pension Insurance	2007	—	—	—	—	—	—
	2008	—	—	—	—	—	—
	2009	—	13.3	—	—	37.9	—
Amount per Beneficiary (yuan, 6.94 yuan = $1 U.S. dollar in June 2008)							
Minimum Life Allowance (monthly)	2007	83	146	51	64	103	39
	2008	83	170	56	78	140	44
	2009	96	203	69	99	171	64

Notes: In estimating the national population statistics in the right half of the table, we divided the respective number of urban and rural social security beneficiaries in each category by the number of persons living in urban and rural areas of the population. By comparison, the urban-rural statistics in the left half of the table are estimated according to whether the individual had an urban or rural residential permit.

Sources: Statistics in the left half of the table (first three columns) were estimated using data from the 2007–2009 Longitudinal Data on Persons with Disabilities. Statistics in the right half of the table (second three columns) were estimated using information from the China Statistical Yearbook, China Civil Affairs Development Statistical Bulletins, China Labor Statistical Yearbooks, and the China Health Statistics Yearbooks (various years).

much less than 1 % of the total rural population received relief assistance in 2009 (MCA 2010). Unfortunately, we have little information about the average amount of these relief benefits in our sample of persons with disabilities. The survey also did not directly ask whether individuals had benefited from the Five Guarantees scheme,

although government statistics in the last quarter of 2009 state that roughly 920,000 or 1.1 % of disabled persons benefited from it.

There are some important issues in interpreting the aforementioned statistics. For example, our survey results show that households with persons with disabilities reported that only about 18 % of their medical expenses were covered by medical insurance (on average, 244.6 yuan out of 1,252 yuan) in 2009. Furthermore, the 2009 survey revealed that a high proportion of persons with disability claim they need social assistance in various areas such as life assistance (almost three-fifths of the sample), medical assistance (almost two-thirds of the sample), and rehabilitation (about one-third of the sample). Only about one-sixth of the sample stated they did not require any kind of assistance when asked.

Altogether, the findings clearly indicate that social security has been increasingly targeted toward the population of disabled persons. At the same time, using both the government statistics and survey data, we roughly estimate that the total average amount of social assistance received by urban and rural persons with disabilities per year are 570 and 650 yuan, respectively ($84 and $95 U.S. dollars, respectively). Regarding the latter estimate, we added the following amounts separately for persons in rural areas:

- 191 yuan ($28 U.S. dollars) *or* the average amount of Minimum Life Allowance received by a disabled person each year (69 yuan per month × 12 months × 23.1 %, or the proportion of rural disabled persons receiving Minimum Life Allowance);
- 396 yuan ($60 U.S. dollars), or the average amount of Traditional Relief assistance received by a disabled person each year on average (the average amount of Traditional Relief for rural recipients in 2009 was 1,320 yuan, and we assume that the 30 % of rural disabled persons who received relief also received 1,320 yuan each);
- 14.4 yuan ($2.10 U.S. dollars) or the average amount of "dispersed" Five Guarantees assistance among recipients in the entire rural population, multiplied by the proportion of rural disabled persons receiving this type of assistance;
- 9.9 yuan ($1.40 U.S. dollars) *or* the average amount of "concentrated" Five Guarantees assistance among recipients in the entire rural population, multiplied by the proportion of rural disabled persons receiving this type of assistance).

We also added 40 yuan ($5.90 U.S. dollars) per rural disabled person for Medical assistance payments (which is likely an overestimate, given that the average in the rural population is close to 8 yuan per person). We made similar calculations for urban disabled persons.

Our calculations indicate that by 2009, approximately 6.5 % and 3 % (respectively) of the total 2006 income of an urban or rural household with one person with disability comes from social assistance. These figures, in addition to the amount of medical expenses covered by medical insurance each year (about 245 yuan, or $35.80 U.S. dollars), are not enough to cover the extra costs of disability that we calculated for households in 2006, before many of the current social security policies became widespread.

Discussion and Conclusion

The strong negative relationship between household income and disability, in addition to the nontrivial extra costs of disability, indicate that there is ample room to address the economic disadvantages of disabled persons in China. This is especially true for households with persons with serious disabilities as well as for households with persons with intellectual, mental, and multiple disabilities, in both urban and rural areas. Given the conservative nature of our data (which has information on biomedical disabilities only) and the estimation methods (e.g., the extra costs of disability do not account for opportunity costs and may be biased downward because of issues of endogeneity), the disparity between households with persons with disability and those without may in reality be much bigger.

Our results further indicate that more attention can be given to households at the lower end of the income distribution. The prevalence of disability is strongly related to income at the lower end of the income distribution. Moreover, adjusting household income for the extra costs of disability significantly increases the number of disabled persons living in poverty. The log specification that we use to estimate the extra costs of disability further indicates that income makes a bigger difference to a poor household than to a less poor one in terms of achieving a given SOL (Zaidi and Burchardt 2005).

As we show in this article, although social security benefits for the population in general, and toward households with persons with disabilities in particular, have increased in recent years, the level of benefits appears to be inadequate to meet the needs of persons with disabilities. Although disability status may be used as an indicator in the allocation of social security benefits, policies specifically directed at persons with disabilities are needed. The aforementioned relatively low levels of education and employment—even for persons with mild disabilities but especially for persons with serious disabilities—further imply that China's long-standing policy to integrate students with disabilities into general education, or its more recent policy to employ disabled persons, fall short of providing opportunities for social advancement.

Given China's growing economic prominence and deep currency reserves, policy makers may be well situated to consider more support for the disabled. The government has plans to more than double social security expenditures in real terms from 2010 to 2020. Officials are also interested in promoting social stability through the expansion of social programs. Hence, there may be grounds to push for some allocations to be targeted to the disabled. The three general types of disability-related policies that could be considered are prevention, rehabilitation, and income transfers.

Policy makers in China can continue to promote efforts to raise health and safety and prevent disabilities from occurring wherever possible. Prevention has been and continues to be a primary concern for policy makers. In the last two decades, policy makers had made great strides in reducing the prevalence of visual, hearing, speech, and intellectual disabilities, partially through public health campaigns (e.g., polio vaccination; see Zheng et al. 2011). Despite these policy successes, however, the prevalence of physical and mental disabilities has increased in recent years (Zheng et al. 2011). Policy makers arguably face a long-term, uphill battle to stem the growth of physical and mental disabilities, in addition to chronic diseases, as the country continues to face challenges associated with rapid modernization, urbanization, and industrialization. Given the rapid changes in its economy, politics, and society, China does not have

the luxury to rely on prevention as a means of overcoming the socioeconomic inequalities created by disabilities.

Much can be done to improve the accessibility and quality of rehabilitation services in China. Like policies geared toward prevention, however, policies that seek to improve rehabilitation services are arguably a long-term prospect. Policy makers will need to focus on building the human and institutional capacity to provide such services. The high costs of disability, especially among the socioeconomically disadvantaged, also imply that there may be demand-side constraints to accessing these services as they gradually become more available.

The much higher rates of disability among the most socioeconomically disadvantaged and the high extra costs of disability indicate that targeted income transfers are needed, at least in the short term. Care, of course, must be taken to balance increases in welfare for households with persons with disabilities with the reductions in incentives to work or in the provision of private transfers (Haveman and Wolfe 2000; Mitra 2005). In thinking about how to target social transfers, our study shows that it is important for policy makers to take into account the social context (e.g., urban versus rural; the size of households) and the types and levels of disability.

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