Household Disability Costs and Living Standards in Turkey: Evidence from a Health Reform[1]

Oznur Ozdamar
Izmir University of Bakircay, Department of Economics, Gazi Mustafa Kemal, Kaynaklar Cd., 35665 Menemen/İzmir, Turkey
oznur.ozdamar@bakircay.edu.tr

Eleftherios Giovanis
Manchester Metropolitan University, Business School, Department of Economics, Policy and International Business (EPIB), All Saints, All Saints Campus, Manchester M15 6BH, UK
giovanis95@gmail.com L.Giovanis@mmu.ac.uk

Sahizer Samuk
The Institute of Geography and Spatial Planning, University of Luxembourg, Luxembourg,
sahsamuk@gmail.com

Abstract

In this study we attempt to estimate the disability costs of households employing the Standard of Livings (SoL) approach, and to evaluate the impact of the Universal health system reform implemented in Turkey in 2008. We apply a Structural Equation Modelling (SEM) which estimates simultaneously the disability and living standard equations, including unobserved latent variables. Moreover, we apply a difference-in-differences (DiD) framework to investigate the impact of the universal health insurance (UHI) system and the Green Card programme on living standards. The empirical analysis relies on data derived from the cross-sectional Household Budget Surveys (HBS) during the period 2002-2013. Our findings suggest a negative and significant impact of disability on SoL, where disability costs reach the 23 percent of the household income, which is equivalent almost to 2,600 US Dollars (USD). Furthermore, the disability costs are reduced from $4,450 to $2,260 due to the UHI and the Green Card programme. A major limitation of the study is the data structure, which is based on repeated cross sectional surveys. Using panel data, it is possible to follow the same individual across time and to implement panel data models to control for unobserved heterogeneity and omitted-variable bias. Disability has adverse effects on living standards. The estimation of the disability related costs may provide a useful guide on policy planning and design of social benefits. The contribution of this paper is that it is the first study estimating the disability related costs in Turkey. Furthermore, the contribution lies in the investigation of the 2008 health reform and the Green Card programme and its impact on disability costs.

Keywords: Costs of Disability; Programme and Reform Evaluation; Standard of Living Approach; Structural Equation Modelling

[1] **Funding** This work is sponsored by the Economic Research Forum (ERF) and the grant received under the call "ERF-GDN 16 RRC call on "Economics of Healthcare in the MENA Region". It has benefited from both financial and intellectual support. The contents and recommendations do not necessarily reflect ERF's views. The authors are grateful to ERF for the financial support received.
Acknowledgments: This work was based on data from the Household Budget Survey (HBS) cross-sectional during period 2002-2013 provided by the Turkish Statistical Institute (TURKSTAT). The data are the copyright of TURKSTAT. The use of the data in this work does not imply the endorsement of TURKSTAT in relation to the interpretation or analysis of the data.
This study is an update of an earlier version published as a discussion working paper from the Economic Research Forum (ERF), which funded this project, and it is available at https://ideas.repec.org/p/erg/wpaper/1060.html.

1. Introduction

Disability can be associated with significant adverse effects on an individual's productivity and well-being. The 50 percent of the differences in economic growth among underdeveloped, developing and developed countries is owned to health conditions (World Health Organization, 2005). The majority of the developed economies have recognised these negative effects of disability and they have invested efforts to protect the disabled citizens and their families through the design of social security systems and the provision of related social benefits. One major dilemma of policy makers is the lack of a common agreement about the cost scaling, which makes rather difficult to estimate the compensation for disabled people that these social benefits aim to cover.

There is evidence that malnutrition leads to disability in the developing countries (Maulik and Damstadt, 2007). Other potential mechanisms include diseases whose prevalence and occurrence are closely related to poor living conditions and exposure to the environment, such as lack of clean water and hazardous working environments, and lack of appropriate measures in public health interventions. The large differences between many developing countries' real health expenditure and the expenditure needed to provide a package of basic health services indicate that lack of availability and resources is the root of the problem in many instances (Trani et al., 2015; Mohapatra and Sengupta, 2016).

As in many other countries, disabled people in Turkey constitute a discriminated group with regard to labour market access. The low rate of employment increases the risk for disabled people and their families living in poverty, while it further limits their participation in social life. In 2002 there was a large gap in the unemployment rates between disabled people at 15.5 percent and the general population at 10.3 percent. In 2011 the employment inequalities between disabled and non-disabled people were still persistent, even though the unemployment rates of the disabled people were reduced at 12 percent compared to the 9.1 percent for the general population. Furthermore, the average household income of disabled households in 2006 was $9,300 compared to $11,400 of the non-disabled households, while the respective values in 2013 were $14,600 and $17,900. According to

the HBS statistics, in 2006 almost the 25.5 percent of the disabled households were living in poverty, where the poverty line is defined as the disposable household income that is lower than the 50 percent of the national median income. The percentage of the non-disabled households living in poverty was around 17 percent. The proportion of poor disabled households was slightly lower in 2014 at 22.7 percent, while the respective value of the non-disabled households reached 14.2 percent (Karadag, 2013).

Following the discussion so far, the aim of the study is to estimate the disability costs in households in Turkey, which is important for policy making and design of social benefits, because a failure of estimating these costs may lead to misleading contribution of the benefits in favour or not of the disabled people. Furthermore, we aim to evaluate the universal health insurance (UHI) system implemented in 2008 and the impact of this reform on living standards. In particular, the UHI has included in 2008 those eligible to the Green Card programme to enrol to the same benefits with those enrolled in the public health insurance system.

The underlying justification of exploring this reform is that people characterised by poor health conditions and disability issues face increased out-of-pocket expenditures (OOPEs), as well as, expenses of transportation and related equipment, such as wheelchairs (Makinen et al., 2000; Musgrove et al., 2002; Boutayeb and Helmert, 2011). Thus, the main assumption is that the 2008 health reform may have improved the living standards of Green Card holders and the households with disabled members, by reducing the OOPEs and other types of expenditures. Since before 2008 these groups were not having access to the same benefits as the enrollees in other public health insurance schemes, it is assumed that before the reform implementation, they were facing higher levels of OOPEs resulting to lower levels of standard of livings (SoL).

The organisation of the paper is as follows: Section 2 discusses earlier research studies, while in section 3 we describe the data and surveys used in the empirical work. In section 4 we present the methodology and the empirical model to be estimated and in section 5 we report the main results of

the study. In section 6 we discuss the main findings and policy implications of the study, and in the last section we present the main conclusions and drawbacks of the empirical analysis.

2. Literature Review

Earlier studies employed various methods in an effort to estimate the disability costs. This includes three main approaches. The first approach is the direct survey is the first approach, which is based on respondents' direct questions about their spending (NRB, 1995; Martin and White, 1998; Thompson, 1998). More specifically, this approach attempts to estimate and compare the spending of disabled people in their current situation with the case of the absence of disability. One limitation is the difficulty that respondents should provide an accurate estimate and report of spending on goods. The second issue, and perhaps the most problematic, is the fact that the respondents are asked about their consumption and spending behaviour in the hypothetical scenario of no disability. Answers relying on hypothetical assumption on spending without having any recent or previous experience in a non-disability environment, will lead to biased estimates. Studies using this approach, found that the wheelchair costs are £72.90 per week (Hyman, 1977), while shopping costs reach around £9 per week expressed in 2010 prices (Stowell and Day, 1983).

Another method is the expenditure diary approach (Matthews and Truscott, 1988; Jones and O'Donnell, 1995), which relies on detailed recording of expenditures diary and then the records are compared between disabled and non-disabled people. Even though this approach can be also attractive, is associated with major limitations. The first limitation is the measurement of expenditures at the household level and not individual, implying that the consumption by other household members may be reduced in order to cover the needs of the disabled members and meet the total household costs of living. Furthermore, this approach assumes that both disabled and non-disabled members experience the same set of prices. This is not a necessary condition, since extra OOPEs and transportation costs are associated with the needs of disabled people, as we mentioned earlier.

The third approach, which is used in this study is the standard of living (SoL) approach (Tibble, 2005; Zaidi and Burchardt, 2005) and we describe in the next sections in more details its

methodological framework. A number of studies has employed the SoL approach (Berthoud et al., 1993; Zaidi and Burchardt, 2005; Cullinan et al., 2011; Morciano et al., 2015); however, we attempt to contribute to the earlier literature by the following ways. First, we examine the case of Turkey and second we use this approach to evaluate the effect of the UHI implemented in 2008. In particular, the health reform of 2008 could have improved the SoL of the disabled Green Card holders, by reducing the OOPEs and the transportation related expenditures through investments in infrastructure, and transportation services, including emergency ambulance services, especially in the rural areas where the accessibility to health centers is more difficult. Third, we provide evidence using a graphical representation about the robustness of the SoL approach and our econometric estimations. Fourth, this study expands the analysis by employing the SoL approach using a structural equation modelling (SEM) since the standard of living and disability are latent and unobserved variables. Earlier studies found various results, as Morciano et al. (2015) evaluated the disability costs at £4,800 per annum, and the study by Cullinan et al. (2011) reveals that the annual costs range between £4,900 and £5,200. Zaidi and Burchardt (2005), estimated the disability costs in UK for low, middle and severe limitations respectively at 1,500; 3,800 and 6,400 per annum. The disability costs estimated in this study are lower compared to studies in developed countries, but higher than previous studies in developing countries have found. For instance, Braithwaite and Mont (2009) have estimated the disability costs at 9 percent of the household income in Vietnam and 14 percent in Bosnia. These findings imply that more studies estimating the disability costs using the SoL approach in developing countries will contribute to the development of the relevant literature.

3. Data

The empirical work relies on data derived by the cross-sectional Household Budget Surveys (HBS) and provided by the available from the Turkish Statistical Institute (TURKSTAT). The period of analysis is the years between 2002 and 2013. In panel A of table 1 we present the proportions of the

indicators used to build the indices of disability and SoL. In particular, in panel A1 we report the proportions of those who are limited in daily activities at 3.38 percent, and those who are limited in activities related to work due to health or mental problems at 4.52 percent. Thus, the variables take a value of 1 if the respondents report limitations due to health issues and 0 otherwise.

Similarly, in panel A2 of table 1 we report the proportions of the indicators employed to construct the SoL index. In this case, each indicator takes a value of 1 if the household has the item and 0 otherwise, similarly to the study by Morciano et al. (2015). The items included in the SoL index are: bathroom, kitchen, dishwasher, air conditioner, personal computer, internet connection, mobile phone, refrigerator, piped water, hot water, washing machine, television and car. The majority of the households in the sample own those items, except for computer at 58.89 percent, internet connection at 66.67 percent, and dishwasher at 54.59 percent of the sample who report that they do not own the specific items.

In panels B1 and B2 we report the summary statistics respectively for the continuous and categorical control variables. We should note that the household income and the deposits in banks are deflated using 2010 as the base year in order to compare our findings with previous studies. The household size may reach a maximum value of 23, which is especially the case of the households located in the Eastern regions of Turkey where the fertility rates are high, and several generations live together in the same dwelling (Yüceşahin and Özgür, 2008). We observe that the 48.2 percent are males, and the majority lives in urban areas at around 67 percent. Furthermore, we observe that the majority has completed the primary school at 39.34 percent, followed by a high school qualification 13 percent and those who are illiterate at 11.59 percent. The majority of the respondents have public or compulsory social security at 74.56 per cent, followed by those with no insurance and with green card at 14.11 per cent and 9.34 per cent respectively. On the contrary only the 2 per cent states that it has private insurance. As it was expected the majority of the sample are married at 67.88 percent followed by singles at 25.63 percent. Finally, the 68.73 of the sample own the house, while the 48.07 percent is employed. We should note that the remained 51.93 percent includes unemployed, and those

who do not participate in the labour force, such as housekeepers, students, and retired. We do not present the correlation matrix among those variables, due to space limitation, as well as, these associations can be better revealed within the SEM framework.

(Insert Table 1)

4. Methodology

4.1 Standard of Living (SoL) Approach

In this section we describe the SoL approach and the econometric model followed in the empirical work. This approach shows the reduction in the living standards households with disabled members attain from income. In other words, the SoL approach implies that the living standards of both the disabled person and the rest of the family members will note a reduction, because it is required to allocate related expenditures due to disability issues. In figure 1 we illustrate the theoretical framework proposed by Berthoud et al. (1993) and Zaidi and Burchardt (2005). The curve of the households with disabled members expressed by *D*, represents the disability SoL as S_0^D and at income level Y_0. The second part of the SoL approach is the deprivation level of households with disabled members, indicated by S_1^D, which is equal with the living standards of non-disabled households (*ND*) expressed by S_0^{ND}. The difference between those two curves show the income required to *equivilise* the living standards between disabled and non-disabled households. To put differently, the extra income required for the households with disabled members to reach the same living standards with non-disabled households is $Y_1 - Y_0$.

(Insert Figure 1)

4.2 Structural Equation Modelling (SEM)

We estimate a structural equation modelling (SEM) using the SoL and disability as latent variables. SEM is useful to model relationships in multivariate data (Goldberger, 1973; Bollen, 1980) and it consists of a two-step process including the measurement and the structural equations. Since, we have to construct two unobserved latent variables, we use two factor equations for observations i=1,…..,N as:

$$d_i = \Lambda_d D_i + e_i^d \tag{1}$$

$$s_i = \Lambda_s SoL_i + e_i^s \tag{2}$$

$$D_i = b'\mathbf{W} + v_i \tag{3}$$

$$SoL_i = \beta_1 D_i + \beta_2 \log(y)_i + \beta' Z + u_i \tag{4}$$

Whether the member has been limited in activities usually do because of a

(1)-(2) are the measurement equations which relate the d or $d_i=(d_{i1},\ldots\ldots,d_{iq})'$ to an n-vector of the *disability* latent variable with factor loadings in matrix Λ_d, and the SoL latent variable $SoL_i=(SoL_{i1},\ldots\ldots, SoL_{ip})'$ with loadings in matrix Λ_s. Vectors e_i^d and e_i^s indicate the measurement error terms. Functions (3)-(4) are the structural equations of the SEM system.

In figure 2 we illustrate the SEM framework for the system of equations (1)-(4). The unobserved latent variables *disability* and SoL are constructed using the indicators described in the previous section, while the control variables include gender, age, household income, and education level among others. The arrow of the control variables that point to *disability* and SoL correspond to the disability determinants respectively in the vectors **W** and **Z** of equations (3)-(4). Furthermore, we include the latent variable *disability*, expressed as D in equation (3), which is the outcome, and as a factor in equation (4), where an arrow pointing from disability to SoL is illustrated in figure 2. In equation (3) the income includes the total household income minus the disability benefits, because

benefits are effects of disability and not a determinant. Additionally, following Morciano et al. (2015), we include a homeownership dummy variable and a variable indicating financial wealth, proxied by deposits in banks.

(Insert Figure 2)

As we have mentioned in the previous section, the indicator variables used to construct the *disability* index in equation (1), take a value of 1 if the respondent face limitations to daily activities and 0 otherwise. Similarly, for the SoL index in equation (2), the indicator variables take a value of 1 if the respondents have reported that they own a particular item and 0 otherwise.

The first step of the SEM is to apply the confirmatory factor analysis (CFA) in the measurement equations (1)-(2), and using the factor loadings we obtain the predicted values derived from the CFA, and these are the SoL and *disability* indices. Furthermore, in each case there is an error *e* associated with the indicator. For instance, e_2 in figure 2, is the error in the relationship between SoL and the indicator *bathroom*, e_3 is the error for the indicator variable kitchen and so forth. The error shows that in each case the indicator is an imperfect approximation of the latent construct, implying that the correlation between the latent and observed is likely influenced by other factors. In the second step, we include the constructed SoL and *disability* indices to estimate simultaneously the structural equations (3)-(4) using the maximum likelihood method.

Various criteria have been developed to test the performance of SEM, including the comparative fit index (CFI) (Bentler, 1990), the Tucker-Lewis index (TLI) (Tucker and Lewis, 1973), the root mean square error of approximation (RMSEA) and the root mean square residual (RMSR). The values of CFI and TLI range between 0 and 1. A value higher than 0.90 (Hu and Bentler, 1999) show a very good fit to the data, while a good fit is indicated by values ranging between 0.8 and 0.9. The degree of model adequacy based on population discrepancy in relation to degrees of freedom is measured by the RMSEA. As a rule of thumb, values lower than 0.05 suggest a good fit of the model (Hu and Bentler, 1999). The RMSR is expected to take values less than 0.1 in order to conclude a good fit of the SEM model. The costs of disability can be found by the marginal rate of substitution (MRS):

$$MRS = -\frac{\partial SoL}{\partial D} / \frac{\partial SoL}{\partial \log y} \quad (5)$$

Thus, MRS is expressed as the ratio of the partial derivatives of SoL with respect to disability over the partial derivative of SoL with respect to income in equation (4). Following the SoL methodological framework described earlier, the MRS shows that an additional income of Y_1-Y_0 illustrated in figure 1 is required, in order for the disabled households to reach the levels of standard of living of the households with non-disabled members.

4.4 Difference-in-Differences (DiD)

For the evaluation of the health reform implemented in 2008 and the Green Card programme, we expand the SEM using a DiD framework. In this case the system of equations (1)-(3) remains the same, while equation (4) becomes:

$$SoL_i = \beta_1 D_i + \beta_2 \log(y)_i + \beta_4 treat_i + \beta_5 post_i + \beta_6 treat * post_i + \beta' Z + v_i \quad (6)$$

Equation (4) remains the same expect that we include the dummy variable *treat* that takes a value of 1 if the individual belongs to the treated group, which is comprised by the disabled people who participate in the Green Card programme and 0 for the non-disabled people who are enrolled in a public health insurance scheme. Dummy variable *post* takes a value of 0 for the years before the 2008 reform, which is 2002-2007 and 1 for the year 2008 and after. The DiD estimator, which is the main coefficient of interest is expressed by the interaction term *treat*post*, and it shows the causal effect of the Green Card programme on SoL. If the DiD estimator is found positive and significant, then we conclude a reduction of disability costs and an improvement in the standard of living of disabled people who are green card holders compared to non-disabled who do not participate in the Green card programme. One main assumption of the DiD framework is the parallel trend assumption, which shows that in the absence of the treatment or the policy, which in our case is the Green Card

programme and the health reform of 2008, would follow the same trend before and after the policy implementation. Vector **Z** includes the same control variables in equation (4); however, we should note that the health insurance is not included, since the treatment and control groups are defined based on whether the respondents are green card holders or are enrolled in a public health insurance scheme. Thus, the SEM- DiD in this study includes the measurement equations (1)-(2), the disability structural equation (3) and the SoL structural equation (6). We follow the same steps of the SEM that includes the CFA for the measurement equations (1)-(2) and the implementation of the full information maximum likelihood (FIML) method to estimate simultaneously the structural equations (3) and (6) (see for more details Bollen, 1989). The last step involves the estimation of disability costs using equation (5). In particular, we will estimate the disability costs for the whole period of the SEM-DiD analysis 2002-2011, and then we will estimate the costs of disability for the pre-reform period 2002-2007 and the post-reform period 2008-2011 to investigate whether they have been reduced. Furthermore, we should notice that for the SEM- DiD estimates, we exclude from the analysis the years of 2012 and 2013, because the government had replaced the Green Card Programme in 2012 with another programme, and with different eligibility criteria and benefits.

5. Empirical Results

In table 2 we report the estimates of the main SEM system of equations (1)-(4).The second column shows the estimated coefficient or factor loadings for the measurement equations of SoL and disability, and we conclude that they are all statistically significant. Following Morciano et al. (2015) we report in table 2 the standardised coefficients. Thus, the interpretation of the coefficients refers to changes in standard deviation. For instance, we observe that one standard deviation increase in disability leads to a 0.0605 standard deviation units reduction of SoL. We follow a similar interpretation for the other regression coefficients. We should note that we have also estimated the SEM using the linear term of household income. Based on the Akaike Information Criterion (AIC)

the log-liner specification in table 2 is preferred. Furthermore, we have tested for polynomial order including the income in squared term, but we found its estimated coefficient insignificant, and thus, we do not report the results.

We observe that the pre-benefit household income, males, educated and married people, household size and those living in urban areas are more likely to present lower probability of disability occurrence and higher levels of living standards. As it was expected green card holders are more likely to live in poorer households than those with a public social security. According to the CFI and TLI and also based on RMSEA and the RMSR the SEM model fits the data very well.

Following the SoL methodological framework discussed in the previous sections and using the estimates in table 2 and equation (5) we estimate the disability costs. Moreover, in figure 3 we illustrate the relationship SoL-income using the linear income specification for household with and without disabled members. According to the methodology and the SoL approach, we observe that disabled households require higher levels of income to reach the same levels of living standards of households with non-disabled members. We find disability costs equal roughly at 2,750 USD per year on average in 2010 prices, which is equivalent at the 25 percent of the household income.

(Insert Table 2)

(Insert Figure 3)

In table 3 we report the DiD estimates of the regression (6). We observe that the differences in living standards between the treated and control group are reduced, expressed by a positive DiD coefficient, indicating that the standard of livings of the treated households are improved. Thus, the results indicate that the disabled green card holders have improved their living standards due to the health reform of 2008. Additionally, it becomes clear in figure 4 that this reduction comes from the fact that the living standards of the control group remains similar before and after the implementation of the reform in 2008, while the treated group notes a rise in SoL during the the post-reform period 2008-2011. Another concluding remark of our findings and figure 4 is that the parallel trend assumption holds. We should notice that in the case of the DiD regression (6), we have excluded the

respondents with no health insurance, because the reform of 2008 targets those eligible to the Green Card programme.

In table 3 we report the costs of disability for the total period of analysis, 2002-2011, and for both pre-and post-reform periods, 2002-2007 and 2008-2011. We conclude that the disability costs vary significantly between the two periods, and in particular, are reduced from 51 percent in the pre-reform period, which is equivalent to 4,450 USD, to 17 percent in the post-reform period equivalent to 2,260 USD. The costs of disability during the whole period of analysis, 2002-2011, reach 2,750 USD corresponding almost to 25 percent of the household income[2].

(Insert Table 3)

(Insert Figure 4)

6. Discussions

The first part of the results show that the average disability costs over the period 2002-2013 were 2,600 USD. Therefore, on average a family with disabled members needs an additional amount of $2,600 per year, which is expressed by the difference of Y_1- Y_0 in figure 3, to *equivilise* their living standards with the non-disabled households. The main policy implication of these findings is that disabled households need an additional income to cover the expenses related with disability, such as transportation expenditures and OOPEs, including medication, rehabilitation services, and medical equipment. Hence, the main question is whether the benefits are enough to compensate for these additional costs. In 2010, the disability benefits were given at a maximum of 70 percent of the monthly minimum wage, which was $490. Thus, the monthly disability benefit was $343, and the annual maximum amount given could reach $4,116. Based on the disability costs estimated in this study, the disability benefits were significantly higher. However, the eligibility criteria of receiving the benefits require a loss of at least 60 percent of the working capacity with at least 1,800 days of

[2] The USD to Turkish Lira (TL) exchange rate was ranging around 1.55 in 2010.

contributions and at least 10 years of coverage. It should be noted that the years of coverage are waived in the case the individual does not meet the minimum days of contributions and requires constant attendance.

However, one of the limitations of the study, discussed in the next section, is the unavailability of information on the severity of the disability status. Thus, the disability costs can be significantly higher for those who are severe disabled compared to those with minor disabilities. Therefore, disability benefits may favour considerably those who meet the criteria, but are less severely disabled. Furthermore, in our sample a large number of the respondents may not have completed 1,800 days of contribution, since more than 50 percent of the sample are not employed, according to the summary statistics in table 1. Nevertheless, we cannot trace this information, since we use repeated cross-sectional data and not panel.

Regarding the health reform of 2008 and the introduction of new benefits enjoyed under the Green Card programme, we found that the disability costs reduced from $4,450 in the pre-reform period 2002-2007, to $2,260 in the post-reform period 2008-2011. The monthly minimum wage in 2007 was $440. As we mentioned earlier, the maximum amount of the benefit corresponds to the 70 percent of the minimum wage, which is $308 per month and $3,696 per year. In this case we observe that the benefits received were on average less by $754, but significantly more in the post-reform period. Hence, the findings show that the Green Card programme was successful at reducing significantly the disability costs, which is associated with conservable reduction in OOPEs, if not elimination, and other expenses related to disability. Nevertheless, as we mentioned earlier, disability benefits may disfavour more those who are more in need, and experience higher disability costs, varying by the type and severity of disability.

However, the inequalities between household with disabled and non-disabled member persist until today. In particular, unemployment and poverty still represent critical issues for persons with disabilities. Based on the latest data from the Income and Living Conditions Survey (ILCS), 12.35 percent of persons with disabilities were unemployed compared to the 10.23 percent for the non-

disabled people[3]. The relative poverty line, defined as the disposable household income lower than the 50 percent of the national median income reached in 2018 the 12.91 for the non-disabled households and 19.56 percent for the disabled households indicating persistent discrepancies in the economic conditions between those two groups. The Ministry of Education and the Ministry of Labor and Social Security in 2014 has vowed to develop vocational and rehabilitation training programmes for persons with disabilities according to work and occupational analysis and aimed to employ more than 30,000 civil servants and workers. While this seems to be a remarkable leap forward, the level of employment opportunities offered is very often poor and not suited to the abilities of disabled people (Evsen, 2015). Thus, other social inclusion policies are required to be implemented, including empowerment of people with disabilities, such as anti-discrimination policies in the labour market and workplaces, and increase in the attainment of higher education. Furthermore, training programmes, such as paid apprenticeships and vocational education that fit the needs of the labour market, will enhance the capabilities and skills of persons with disabilities.

Another important aspect is the large depreciation of the Turkish Lira over the USD which increased from 1.55 USD/TL in 2010 to 5.9-7.9 USD/TL in 2020. We highlight this large depreciation, as the minimum wage expressed in USD in 2020 at $490 is the same as it was 10 years ago. This has an additional adverse effect on disability costs, given that medication, medical equipment and assistive devices are imported or their production relies on imported intermediate goods that increase considerable their prices (World Health Organization, 2010). However, we have not explored the disability costs using the most recent data, since our aim was to examine the impact of the Green Card programme in 2008.

[3] https://www.tuik.gov.tr/en/

7. Conclusions

The findings of this study confirm the significant adverse effects of disability and poor health conditions on living standards of households in Turkey. However, as any other study, the empirical analysis followed in this paper is not without limitations and drawbacks. The first limitation is the data structure, which is based on repeated cross sectional surveys. Using panel data, it is possible to follow the same individual and its family across time and to implement panel data models to control for unobserved heterogeneity and the omitted-variable bias. Hence, panel data have an advantage as they facilitate the use of methodologies, such as the fixed and random effects models that separate the nuisance variation due to population-wide behaviour from the variation related to trends with time. Furthermore, the error term can be serially and contemporaneously correlated. This implies that since processes connecting dependent and independent variables tend to differ across sub-sets of units-individuals and period, errors tend to reflect some causal heterogeneity across space, time, or both (Hicks, 1994). Based on this limitation also the disability status of the individual, before the survey takes place, is unknown. Thus, by recognising this status it is possible to consider also transitions from disability to rehabilitation and transitions from excellent health conditions to a status of severe disability. Therefore, we suggest that future studies should rely on panel data for more accurate estimates.

Second and a very important limitation, is the definition of the disability latent variable. While we include questions related to physical and mental limitations of the respondent, these are not the most accurate to identify the actual and precise severity of the respondent's disability status. As we mentioned earlier, EQ-5D is a very popular disability measure. which assesses health in terms of mobility, self-care, usual activities, pain/discomfort, and anxiety/depression (The EuroQol Group, 1990; Rabin and de Charro, 2001). However, due to data unavailability we have not considered this measurement in our analysis. Therefore, future surveys around the globe should record this

information within a longitudinal data structure, that will allow researchers to explore the disability costs, and other aspects of disability in a dynamic framework.

Overall, future studies should explore the disability costs by gender, income, age an education groups. The study's findings could be useful for policy making and its degree of effectiveness if the policies aim to address economic issues and poverty related with disability, illnesses and poor health conditions in general. The results may provide helpful insights and implications about the poverty measurement, not only in Turkey and developing economies, but also to developed countries, since disability and poor health conditions have a negative and significant impact on households' living standards.

References

Berthoud, R., Lakey, J. and McKay, S. (1993), *The Economic Problems of Disabled People*. London: Policy Studies Institute.

Bollen, K.A. (1980), "Issues in the Comparative Measurement of Political Democracy", *American Sociological Review*, Vol. 45 No. 3, pp. 370-390.

Bollen, K.A. (1989), *Structural equations with latent variables*. New York, NY: Wiley.

Boutayeb, A. and Helmert, U. (2011), "Social inequalities, regional disparities and health inequity in North African countries", *International Journal* for *Equity* in *Health*, Vol. 10 No. 1, pp. 23.

Braithwaite, J. and Mont, D. (2009), "Disability and poverty: A survey of World Bank poverty assessments and implications", *ALTER-European Journal of Disability Research*, Vol. 3 No. 3, pp. 219-232.

Cullinan, J., Gannon, B. and Lyons, S. (2011), "Estimating the extra cost of living for people with disabilities", *Health Economics*, Vol. 20 No. 5, pp. 582-599.

Evsen, M. (2015), "Disability rights in Turkey: Time for change", *Turkish Policy Quarterly*, Vol. 13 No. 4, pp. 165-173.

Goldberger, A.S. (1973), Structural Equation Models: An Overview. In *Structural Equation Models in the Social Sciences*, Goldberger, A. S. and Duncan, O. D. (Eds.) New York: Seminar Press, pp. 1-18.

Hicks, A.M. (1994). Introduction to pooling. In *The comparative political economy of the welfare state*. Janoski, T. and Hicks, A. M. (Eds.) Cambridge University Press, Chapter 6, pp. 169-188.

Hu, L. and Bentler, P.M. (1999), "Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives", *Structural Equation Modeling: A Multidisciplinary Journal*, Vol. 6, No. 1, pp. 1-55.

Hyman, M. (1977), *The Extra Costs of Disabled Living*. National Fund for Research into Crippling Diseases. Disablement Income Group Charitable Trust, National Fund for Research into Crippling Diseases. Horsham, Surrey, England.

Jones, A. and O'Donnell, O. (1995), "Equivalence scales and the costs of disability", *Journal of Public Economics*, Vol. 56 No. 2, pp. 273-289.

Karadag, M.A. (2013). *Recent Developments in Poverty Measurement in Turkey*. United Nations Economic Commission for Europe Conference of European Statisticians. Prepared by the Turkish Statistical Institution, Geneva, Switzerland.

Makinen, M., Waters, H., Rauch, M., Almagambetova, N., Bitran, R., Gilson, L., McIntyre, D., Pannarunothai, S., Prieto, A.L., Ubilla, G. and Ram, S. (2000), "Inequalities in health care use and expenditures: empirical data from eight developing countries and countries in transition", *Bulletin* of the *World Health Organization*, Vol. 78 No. 1, pp. 55-65.

Martin, J. and White, A. (1998), *The Financial Circumstances of Disabled Adults Living in Private Households.* HMSO: London.

Matthews, A. and Truscott, P. (1988), *Disability, household income and expenditure: a follow-up survey of disabled adults in the family expenditure survey*. Department of Social Security Research Report No. 2. HMSO: London.

Maulik, P. K. and Darmstadt, G. L. (2007), "Childhood disability in low-and middle-income countries: overview of screening, prevention, services, legislation, and epidemiology", *Pediatrics*, Vol. 120 No. Supplement 1, pp. S1-S55.

Mohapatra, S. C. and Sengupta, P. (2016), "Health programs in a developing country-why do we fail", *Health Systems and Policy Research*, Vol. 3 No. 3, pp. 27.

Morciano, M., Hancock, R. and Pudney, S. (2015), "Disability Costs and Equivalence Scales in the Older Population in Great Britain", *Review of Income and Wealth*, Vol. 61, No. 3, pp. 494-514.

Musgrove, P., Zeramdini, R. and Carrin, G. (2002). "Basic patterns in national health expenditure", *Bulletin* of the *World Health Organization*, Vol. 80, No. 2, pp. 134-142.

NRB. (1995), *Cost of disability study 1*. National Rehabilitation Board Occasional Paper Series, National Rehabilitation Board (NRB) Ireland.

Rabin, R., and De Charro, F. (2001), "EQ-5D: a measure of health status from the EuroQol Group", *Annals of Medicine*, Vol. 33 No. 5, pp. 337-343.

Stowell, R. and Day, F. (1983), *Tell Me What you Want And I'll Get It For You – a study of shopping when disabled.* The Disablement Income Group Charitable Trust. London.

The EuroQol Group. (1990), "EuroQol-a new facility for the measurement of health-related quality of life", *Health Policy*, Vol. 16 No. 3, pp. 199-208.

Thompson, P., Buckle, J. and Lavery, M. (1998), *Being disabled costs more than they said*. Disablement Income Group Charitable Trust. London.

Tibble, M. (2005), *Review of existing research on the extra costs of disability*. Department for Work and Pensions Working Paper No. 21, London.

Trani, J. F., Bakhshi, P., Myers Tlapek, S., Lopez, D. and Gall, F. (2015), "Disability and poverty in Morocco and Tunisia: A multidimensional approach", *Journal of Human Development and Capabilities*, Vol. 16 No. 4, 518-548.

Tucker, L.R. and Lewis, C. (1973), "A reliability coefficient for maximum likelihood factor analysis", *Psychometrika*, Vol. 38 No. 1, pp. 1-10.

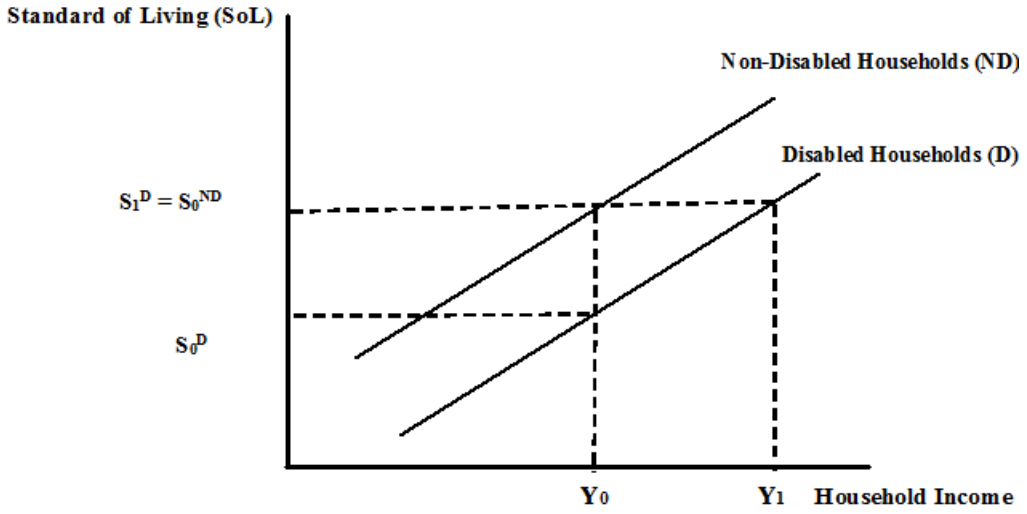
World Health Organization. (2005), *World Health Development Indicators*. Washington, DC.

World Health Organization. (2010). *Medical devices: managing the mismatch: an outcome of the priority medical devices project*. Washington, DC.

Yüceşahin, M. M. and Özgür, E. M. (2008), "Regional fertility differences in Turkey: persistent high fertility in the southeast", *Population, Space and Place*, Vol. 14 No. 2, pp. 135-158

Zaidi, A. and Burchardt, T. (2005), "Comparing incomes when needs differ: equivalization for the extra costs of disability", *Review of Income and Wealth*, Vol. 51 No. 1, pp. 89-114.

Figure 1. The standard of living approach



Source: Zaidi, A. and Burchardt (2005)

Figure 2. Illustration of the SEM (1)-(4)

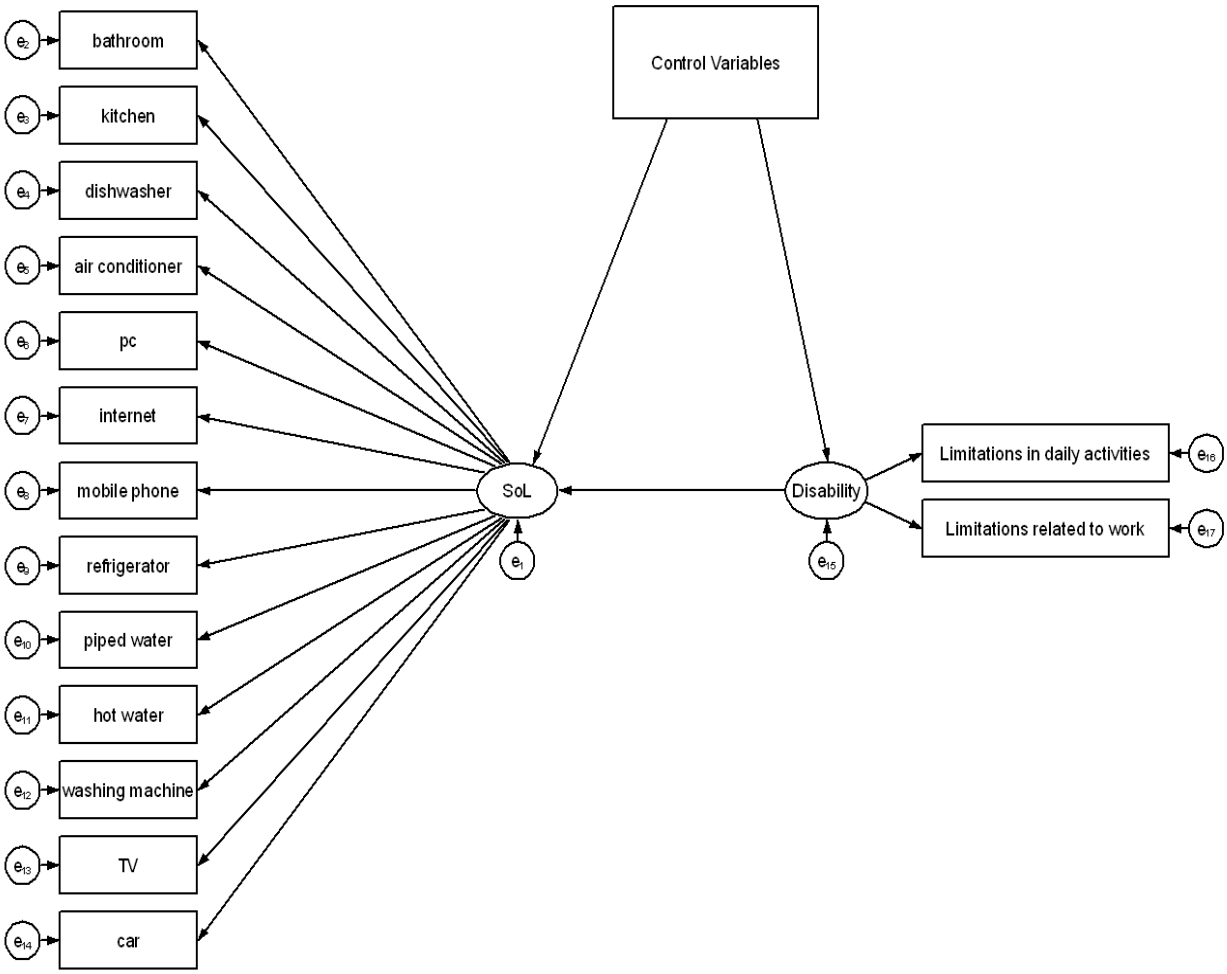


Figure 3. Estimated form of the SoL-Income Relationship using the Household Income in Linear Terms

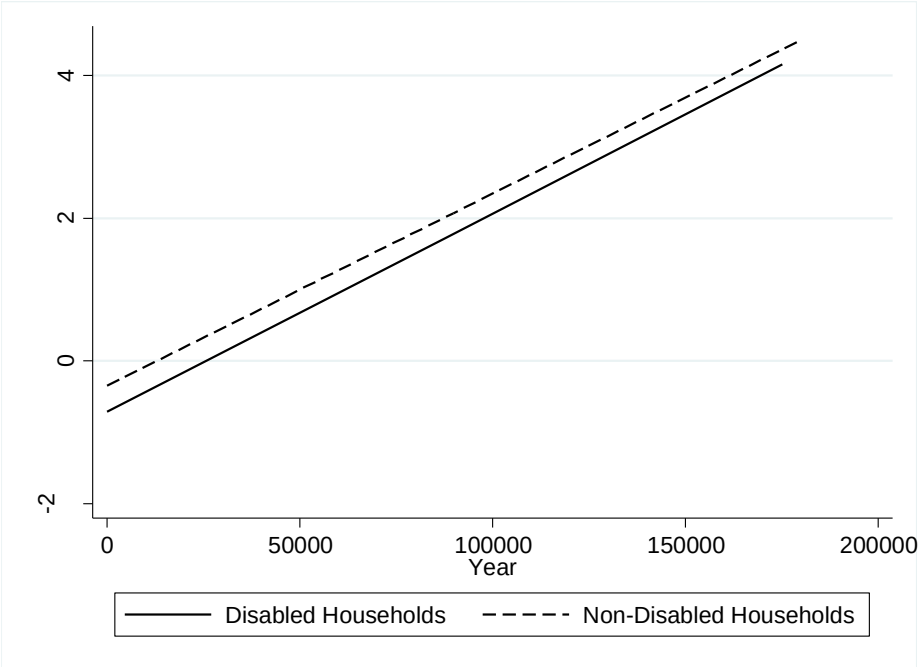


Figure 4. DID estimates and Health Reform of 2008

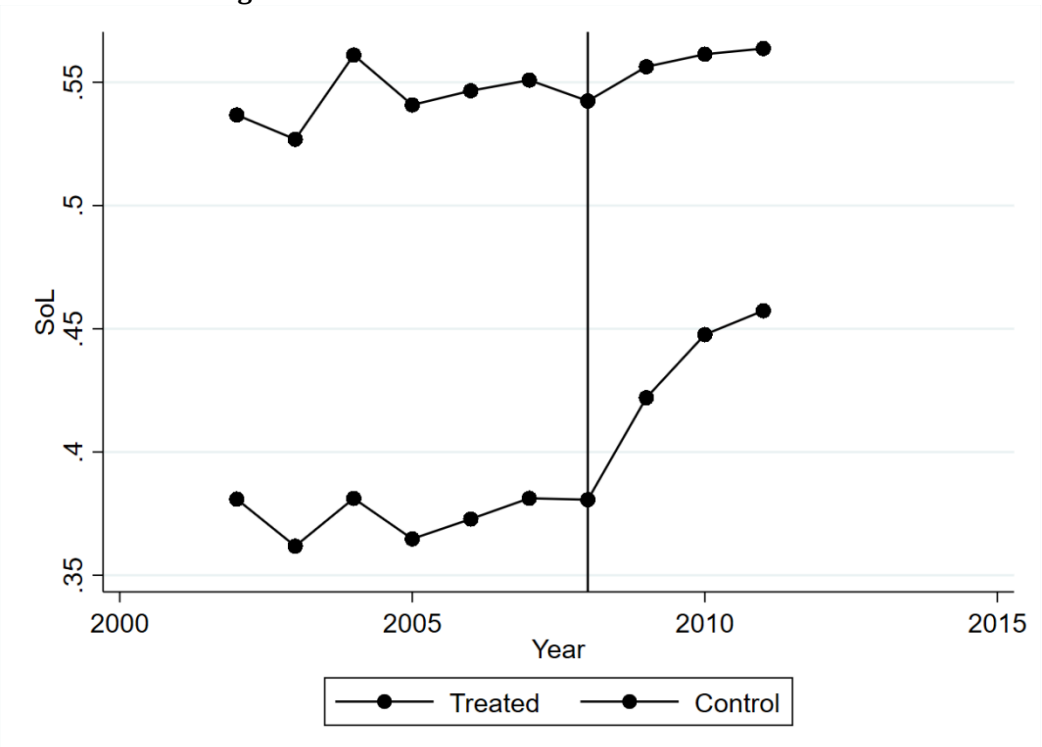


Table 1. Summary Statistics

Panel A: Indicators used in Latent Variables of Health-Disability and SoL				
Panel A1: Disability-Health				
Limited in daily activities due to mental or health problems	**Proportion**	**Limited in activities related to work due to mental or health problems**	**Proportion**	
Yes	3.38	*Yes*	4.52	
No	96.62	*No*	95.48	
Panel A2: SoL				
Bathroom	**Proportion**	**Refrigerator**	**Proportion**	
Yes	97.11	*Yes*	98.61	
No	2.89	*No*	1.39	
Kitchen	**Proportion**	**Piped Water**	**Proportion**	
Yes	94.72	*Yes*	94.85	
No	5.28	*No*	5.15	
Dishwasher	**Proportion**	**Hot Water**	**Proportion**	
Yes	45.41	*Yes*	70.10	
No	54.59	*No*	29.90	
Air Conditioner	**Proportion**	**Washing Machine**	**Proportion**	
Yes	27.27	*Yes*	89.63	
No	72.73	*No*	10.37	
PC Computer	**Proportion**	**TV**	**Proportion**	
Yes	41.11	*Yes*	89.95	
No	58.89	*No*	10.05	
Internet	**Proportion**	**Car**	**Proportion**	
Yes	33.33	*Yes*	92.44	
No	66.67	*No*	7.56	
Mobile Phone	**Proportion**			
Yes	84.92			
No	15.08			
Panel B: Control Variables				
Panel B1: Continuous variables				
	Average	**Standard Deviation**	**Minimum**	**Maximum**
Real Household Income in 2010 Prices	21,493.8	21,972.81	103	299,933
Age	36.875	16.372	15	99
Household Size	4.929	2.398	1	23
Real Deposits in Banks in 2010 Prices	43.936	1,411.05	0	450,000
Panel B2: Categorical variables				
Gender	**Proportion**	**Homeowner**	**Proportion**	
Male	48.2	*Yes*	68.37	
Female	51.8	*No*	31.63	
Education	**Proportion**	**Health Insurance**	**Proportion**	
Illiterate	11.59	*Compulsory-Public*	74.56	
Literate – not completed a school	6.60	*Private*	1.99	
Primary school	39.34	*Green Card*	9.34	
Primary education	9.39	*No Insurance*	14.11	
Secondary school	7.32	**Marital status**	**Proportion**	
High School	13.01	*Never married*	25.63	
Senior High School	4.87	*Married*	67.88	
college	2.46	*Widowed*	4.80	
University	5.42	*Divorced*	1.69	
Area	**Proportion**	**Employed**	**Proportion**	
Urban	66.43	*Yes*	48.07	
Rural	33.57	*No*	51.93	

Table 2. SEM Estimates for SOL

Measurement Equation for Disability	DV: Disability	Structural Equations	DV: Disability	DV: SoL
Limited in daily activities due to mental or health problem	0.8432*** (0.0032)	Disability (High)		-0.0605*** (0.0061)
Limited in activities related to work due to mental or health problem	0.9900*** (0.0041)	Log of Household Income		0.2610*** (0.0020)
Measurement Equation for SoL	DV: SoL	Log of Pre-benefit Household Income	-0.0057* (0.0031)	
Bathroom	0.4413*** (0.0021)	Gender (Male)	-0.0154*** (0.0066)	0.0290*** (0.0021)
Kitchen	0.3270*** (0.0023)	Age	0.00067*** (0.00001)	0.3168*** (0.0069)
Dishwasher	0.5841*** (0.0017)	Age squared		-0.2316*** (0.0070)
Air Conditioner	0.2585*** (0.0023)	Education (reference =Illiterate)		
PC computer	0.6129*** (0.0191)	Education -Literate – not completed a school	-0.0674*** (0.0015)	0.0474 *** (0.0045)
Internet	0.5537*** (0.0020)	Education -Primary School	-0.07709*** (0.0013)	0.0202*** (0.0008)
Mobile phone	0.3759*** (0.0021)	Education -Primary Education	-0.1000*** (0.0017)	0.0385*** (0.0007)
Refrigerator	0.2553*** (0.0023)	Education -Secondary School	-0.0867*** (0.0017)	0.0648*** (0.0009)
Piped water	0.4670*** (0.0021)	Education -High School	-0.0973*** (0.0164)	0.0585*** (0.0009)
Hot water	0.6223*** (0.0016)	Education -Senior High School	-0.0972*** (0.0018)	0.0706*** (0.0009)
Washing machine	0.5770*** (0.0019)	Education -College	-0.1026*** (0.0022)	0.0784*** (0.0010)
TV	0.0634** (0.0025)	Education -University	-0.1048*** (0.0019)	0.0886*** (0.0012)
Car	0.0714*** (0.0025)	Marital Status (reference=never married)		
No. Observations	196,983	Marital Status -Married	-0.0866*** (0.0138)	0.0027 (0.0004)
Log likelihood	-486,156.4	Marital Status -Divorced	0.0194 (0.0162)	0.0084*** (0.0009)
AIC	972,813.435	Marital Status -Widowed	0.0011 (0.0018)	-0.0075*** (0.0014)
BIC	973,944.187	Health Insurance (Reference=Public)		
Chi square/df	5.69	Health Insurance-Private	0.0217 (0.0149)	-0.0083*** (0.0013)
CFI	0.872	Health Insurance-Green Card	0.0192*** (0.0011)	-0.0676*** (0.0075)
TLI	0.815	Health Insurance-No Insurance	-0.0085*** (0.0009)	-0.0451*** (0.0056)
RMSEA	0.046	Household Size	-0.0336*** (0.0027)	-0.0053*** (0.0008)
RMSR	0.070	Deposits in bank	-0.0056 (0.0072)	
Disability Costs as percentage of income	23%	Homeowner	-0.0052*** (0.0008)	
Disability Costs in monetary values per annum	2,600 USD	Employed (No)		-0.0101*** (0.0004)
		Urban Area	-0.0020*** (0.0007)	0.0448*** (0.0006)

Standard Errors within brackets, ***, ** and * denote significance in 1%, 5% and 10%

Table 3. Standardized DID and SEM Estimates

Variables	Coefficients
	DV: SOL
Disability	-0.0727*** (0.0022)
Log of Household Income	0.2899*** (0.0022)
Treat	-0.4673*** (0.0033)
Post (1 for >2007)	0.3170*** (0.0026)
Treat*Post	0.1436*** (0.0031)
Disability Costs as percentage of income in 2002-2011	25%
Disability Costs in monetary values in 2002-2011	2,750 USD
Disability Costs as percentage of income before the health Reforms in 2008 (Period 2002-2007)	51%
Disability Costs in monetary values before the health Reforms in 2008	4,450 USD
Disability Costs as percentage of income after the health Reforms in 2008 (Period 2008-2011)	17.0%
Disability Costs in monetary values after the health Reforms in 2008	2,260 USD
No. Observations	164,774
Log likelihood	-471,108.9
AIC	860,304.520
BIC	862,522.953
Chi square/df	5.54
CFI	0.863
TLI	0.802
RMSEA	0.051
RMSR	0.066

Standard Errors within brackets, ***, denotes significance in 1% level.