FINAL REPORT
(Projekt záró beszámoló)
Labour supply of households with a disabled member
(Fogyatékos emberek háztartásában élők munkakínálata)
OTKA 101925
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Summary of main results

This research aimed to estimate the secondary labour market effects of disability via the reduced supply of household members, using the Hungarian Labour Force Survey. The existing empirical literature has identified unobserved heterogeneity and endogeneity to be relatively large. To mitigate these sources of bias, we chose to focus on two sub-questions where we could exploit certain features of the LFS data to identify the effect of a disabled household member.

The first sub-question focused on the impact of work impairment on the employment status of older couples (age 50-61), which we investigated using the Hungarian Labour Force Survey of 2011. Our estimation strategy relied on comparing couples with disabled members with households where a person suffers from similar long-term illness, but is not work impaired. We also account for the potential endogeneity of self-reported health status. Our results indicate that own disability reduces the probability of employment by around 30 percentage points, while spousal disability has a very small effect on employment, and this sign of this effect depends on the presence of other working age persons in the household.

The second sub-question focused on mothers with a disabled or ill child aged 4-9 years. We used propensity score matching and regression methods combined with inverse probability weighting. In the absence of direct data on child health, we identify children with a disability or long term illness by examining whether her parents receive maternity benefit or child care allowance. Our results suggest that the claiming of extended child care allowance for long-term ill children reduces their mothers' employment probability by around 40 percentage points.

In the third part of the project we provide a brief overview of the (i) costs of reduced employment to the public budget and (ii) a review of the potential public policy responses that aim to alleviate the burden of disabilities. Given the paucity of data about the type of services that are considered best practice by experts in the field, we could only provide some back-of-the-envelope calculations, which would require us to make some very strong behavioural assumptions. In our estimate, the potential budgetary revenue loss from taxes and contributions due to the lower propensity of employment is in the range of 347-368 thousand HUF/person/year.

The research process

Motivation

The employment of disabled workers has emerged as one of the priority issues in European employment strategy, as a target area of policies for social inclusion, population ageing and flexible and efficient labour markets. Ageing already creates considerable tension in pension systems and when disability pensions are used as a form of early retirement, this augments such tensions, since net tax payments usually turn negative after retirement. Early retirement also tends to entail social exclusion, which may take its toll in the long run in the form of increasing poverty and declining wellbeing in old age.

Along with most EU governments, Hungary has also introduced various policy measures to curb early retirement (OECD 2003, 2008), including incentives for employers and adjustments in the welfare system with an aim to reduce access to as well as the generosity of benefits. At the same time, the range and scope of rehabilitation services to facilitate the re-employment of disabled workers remained limited.

None of the above government measures have been supported by ex ante impact analysis and there is no monitoring system in place that would support ex post evaluation. In fact, very few studies have investigated the labour supply of disabled and older workers in Hungary. Yet, the underdevelopment of existing rehabilitation services is often explained by their extraordinary costs. This reasoning neglects the potential long term gains in the employment and earnings of both the disabled individual and of the members of their households.

The main motivation for this research project was to contribute to policy making in the area by assessing these long term gains, especially as regards the secondary labour market effects via the reduced supply of household members. Results may also be of interest to other developed countries with ageing populations as empirical work on the issue is relatively scarce.

Data and work plan

As originally planned, the research was based on several waves of the Hungarian Labour Force Survey (HLFS). We used the 2002 Q2, 2008 Q4, and 2011 Q2 waves of the HLFS, which included an extra set of questions on long term illness and disability, as well as other waves exploiting other, indirect indicators of poor health (as described below). An important advantage of the HLFS is that it allows the identification of household members and family links between them.

The first phase of the research explored existing empirical literature on household labour supply and disabled members with an aim to assess the viability of various modelling strategies and the importance of the various sources of estimation bias. The existing literature pointed to a number of potential problems that may yield to biased estimates. These include (1) unobserved heterogeneity in tastes for paid work, productivity and expected wages, which may explain why panel data estimates typically yield smaller effects than cross-section ones (e.g. Heitmuller (2007), Leigh (2009), Meng (2013), Ciani (2012)). The other main source of bias is (2) endogeneity of health status, assortative mating, labour supply preferences, expected wages, incomes and the choice of carer. The typical strategy to avoid this bias is to use instrumental variables.

The second phase focused on measuring *secondary labour supply effects* in Hungary, ie. the effect of a disabled member on the labour market participation and working hours of other household members using the HLFS.

In the last phase, we predicted the potential *welfare gain* from such secondary effects of a hypothetical reduction in the care needs of disabled individuals resulting either from rehabilitation or an offer of affordable formal care. The focus is on Hungary. The welfare gain is an estimate of the potential earnings of a non-disabled household member entering the labour market, conditional on the likelihood of reemployment. These will be imputed based on the demographic characteristics recorded in the HLFS and average earnings from the earnings survey of the National Labour Office. Results will be contrasted to earlier interview-based small sample research findings (e.g. Fónai et al 2007).

Participants

The lead researcher will explore the relevant literature, supervise data management (subcontracted) and conduct the estimations. Zsombor Cseres-Gergely and Péter Galasi contributed to the testing and selecting of the appropriate estimation framework. Katalin Bördős, Márton Csillag, and Ágota Scharle drafted the two research papers and the policy brief. Edit Nagy, Petra Lévay and Anna Adamecz contributed to the first stage of the project when we explored possible data sources and compiled and cleaned the data.

Costs

According to the original proposal we planned to purchase four HLFS waves (2002 Q2-Q3, 2008 Q4, 2009 Q1), contract out the data cleaning and a statistical software to be used in data management and the estimations (Stata SE). We requested and received permission to change the original plan as we obtained these data in another project and we decided to do the data cleaning ourselves. The final budget included three laptops (at a price of 187090, 199900 and 342 750 HUF) and STATA licence (711708 and 156 250 HUF). These changes had no effect on the implementation of the research plan.

Outcomes

The project yielded new evidence on the labour market implications of long term disability and illness with a focus on secondary effects that are especially under-researched. The results are summarised in two research papers (to be published in peer reviewed journals) and a policy brief (to be published at our website).

Empirical evidence on the secondary employment effects of long term illness or disability may help improve policy design in all countries facing population ageing. Though the results are based on Hungarian data, they may be applied to other countries where services supporting independent living are similarly limited, and also inform governments contemplating the introduction of employment incentives and long term care subsidies.

Outputs

Bördős Katalin és Scharle Ágota: Fogyatékos emberek háztartásában élők munkakínálata: szakirodalom áttekintése és értékelése Budapest Intézet, 2013 április (submitted to OTKA)

Bördős Katalin, Csillag Márton, Scharle Ágota: The effect of children's disability on the labour supply of mothers (submitted to the Czech Sociological Review)

Csillag Márton, Scharle Ágota: Through foul and fair? Labour supply of men and women with a disabled spouse (working paper of the Budapest Institute, to be submitted to a peer reviewed international journal in June 2014)

Csillag Márton, Scharle Ágota, Bördős Katalin: The costs of long-term ill household members, Budapest Institute, policy brief

Részletes kutatási beszámoló

Labour supply of households with a disabled member

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Summary of research strategy and results

1. Motivation and aims

The employment of disabled workers has emerged as one of the priority issues in European employment strategy, as a target area of policies for social inclusion, population ageing, and flexible and efficient labor markets. Hungary has introduced various policy measures in the area, ranging from a quota system for disabled persons employment in larger firms enacted in 1993, to more recent efforts of activating workers claiming disability benefits through registration with the local job centre, more stringent medical tests of work capacity and new rules limiting access to a disability pension. These incentives have so far not been supplemented with an increase in the range and scope of rehabilitation services to facilitate the re-employment of disabled workers, which is often explained by their extraordinary costs. This reasoning however neglects the potential long term gains in the employment and earnings of both the disabled individual and of the members of their households. This research project aimed to contribute to policy making in the area by assessing these long term gains, especially as regards the secondary labor market effects via the reduced supply of household members. Our research resulted in two research papers and a policy brief. In the first paper, we looked at the labor supply decisions of older couples with a disabled member; in the second one we examined how raising long-term ill children affect their mothers' labour market status. The policy brief assessed cost implications for the public budget.

2. Through foul and fair? Labour supply of men and women with a disabled spouse

In this paper we estimate the effect of work disability on impaired persons' and their spouses' labor market status, which was motivated not only by its policy relevance, but also since economic theory does not give clear-cut predictions, hence we considered and empirical investigation fruitful. The theory of labour supply points out several mechanisms that influence the reaction to work impairment. The work disabled person is likely to drop out of the labour market due to a drop in her productivity, an increase in the fixed costs of working and an increase in potential welfare income; while this might be counteracted by the drop in lifetime income of the work impaired individual, which would increase her labour supply. The reaction to spousal work impairment is determined by whether the positive income effect dominates the decrease in work incentives due to the additional care needs. There are several other factors that influence the magnitude of the effect of disability on household labour supply - including the nature of the health shock, the financial incentives provided by the disability benefit system – out of which we considered household structure. The presence of other working-age individuals in the household through the possibility of substitution of care responsibilities or a partial cushioning the negative income shock might alter how the household adapts to the onset of a work impairment.

To empirically evaluate the effect of work disability on labour supply, we used the 2011 Q2 wave of the Hungarian Labor Force Survey (HLFS), which included an extra set of questions on long term illness and disability. In the ad-hoc module on the 'Employment of disabled persons', respondents were queried about long-standing health conditions or diseases, as well about difficulties with performing some specific basic activities. Furthermore, we have data on whether the individual's health limits her in getting to work or constrains the amount or the kind of work she is able to perform. Based on the responses to these questions, we identified individuals who considered themselves as work impaired, as well as those suffering from long-term health problems (but not work impaired). In our paper, we focused on older couples

– where the male household head was aged at least 50 and younger than the retirement age (62) - since the prevalence of long-term health conditions is growing at an increasing pace with age. In our sample of active age older couples 43.5% of men and 39.2% of women had either a longstanding health condition or activity limitation, and about 54-55% of these persons were self-reported work disabled.

During the empirical modelling we had to face two econometric problems: (a) that spouses' labour market behaviour is simultaneously determined, and (b) that self-reported health might be endogeneous due "justification bias". The first issue stems from correlation between the unobserved determinants (tastes, health shocks etc.) of the two spouses, while the second is due to the possibility that persons with low tastes for work might tend to exaggerate their health problems. If one fails to account for these phenomena, the effect of work impairment on employment probability is overestimated and this is also transmitted the estimates of the effect on spousal labour supply. In our paper, we got around both problems by simultaneously modeling both partners' labour supply and their work disability status, allowing for a potential correlation between the unobserved determinants of all outcomes.

Our empirical strategy was essentially a comparison between the probability of being in work of those couples where (say) the husband was work impaired and his wife were unaffected, with the employment outcomes of couples where the male household head was suffering from long-term health problems (but did not report being work impaired) and his spouse was 'healthy'. Hence, this means that we estimate the impact of the gravity of health condition on labour market outcomes, and we are not concerned with the effect of the onset of a long-term health condition. The idea behind this approach - instead of comparing 'healthy' couples to couples with a work impaired member - is that we can model work disability using the information about specific health conditions and activity difficulties, hence allow work impairment status to be endogenous. More precisely, we instrument disability status with 'more objective' measures of health: specific health conditions, meaning that our "exclusion restriction" is that health conditions (controlling for activity limitations) do not affect employment probability directly, only through their influence on self-reported disability status.

In our basic, "naïve" estimates – where we allow for simultaneity between husbands' and wives' labour supply, but do not consider work disability to be endogeneous -, we found that own disability decreases own employment by about 35 percentage points, which is a very pronounced association, it is about twice as large as the difference between the employment probability of a man with tertiary education and one who only finished primary education. In contrast to this, we find little effect of spousal disability status on a person's employment probability. Our second interesting finding is that when we allow for the endogeneity of work impairment, we do not find any evidence of justification bias, our results suggest – as there is a small statistically significant positive correlation between the residuals of the disability equation and the own employment equation - that classical measurement error is more of a concern. These less restricted specifications not only confirm that work impaired individuals are much less likely to be employed than similar long-term ill persons (by about 40 percentage points), but also highlight that spousal disability also has a negative – albeit small, 5 percentage point – effect on employment. Our most interesting finding is that household structure – the presence of other active-age individuals – matters for the effect of work impairment: own work impairment decreases the likelihood of employment more, while spousal disability reduces own labour supply less when there are other potential breadwinners in the household. This is indicative of potential substitution in caregiving between household members leading to a larger "added worker effect" of spousal disability, however it also calls attention to the fact that household structure might itself be influenced by the health status of older individuals.

3. The effect of children's disability on the labour supply of mothers

Labour economists and sociologist have devoted considerable attention to disentangling the effect of the presence of children on maternal labour market status, but we know relatively little about how children's health influences their mother's employment. As the time commitment involved in caring for a child in poor health might inhibit the mother's ability to participate in the labour market, it is of primary importance to quantify the relationship between child disability and maternal labour supply to fully assess the economic consequences of raising health impaired children.

The formulation of a sensible child-disability policy critically hinges on identifying the obstacles to maternal work activity.

Since disability/chronic health problems among children are rare, we had to rely on surveys that contains detailed labour market information with a large sample size to be able obtain relatively precise estimates. Hence, we used the Hungarian Labour Force Survey, and – in absence of direct information on child health - built on the design of parental benefits to identify families raising children with a longstanding illness. The so-called 'Child Care Home Allowance', which is a universal and flat-rate benefit, is paid to one parent (or guardian) until the child reaches the age of 3 if the child is in good health, or until the age of 10 if the child is disabled or suffers from a long-term illness. Hence, in this paper, we estimated the impact of claiming a parental benefit (as an indicator of poor child health) on the employment probability of mothers of children between 4 and 9 years of age. Pooling data for the years 2008 – 2012, we obtained a sample of 9100 families, out which about 5 percent had a disabled/long-term ill child.

In our analysis, the objective is evaluating the burden imposed by raising long-term ill children on those with such children, hence we sought to estimate the average treatment effect on the treated. We rely on methods based on ignorability of treatment to estimate the impact of claiming extended parental benefits on mothers' labour market status. These methods hinge on two assumptions: the *unconfoundedness criterion* meaning that the potential outcomes of the treated and controls do not depend on treatment after conditioning on a set of observable covariates; and the *common support criterion* that is satisfied if for each value of our observable covariates, the probability of receiving treatment must be positive and less than one. Since the unconfoundedness criterion cannot be directly tested, let us briefly discuss it here. In our case this means that if the children of those mothers currently raising long-term ill children were healthy, then their employment outcomes would be similar to that of mothers with the same observable characteristics but currently raising healthy children. In other words, there are no unobservable variables that might influence both benefit take-up and mothers' employment probability.

There are two variables that are missing from our data and which might lead to the violation of the unconfoundedness criterion: "true" child health and family income.

We used three types of methods to estimate the effect of raising long-term ill children on their mothers' employment: propensity score matching, regression adjustment and regression adjustment combined with inverse probability weighting. We controlled for a large number of observable variables describing the families' education, age, household characteristics and the settlement of residence characteristics, estimating the models separately for single and married mothers. We first ensured that the common support criterion is satisfied using the estimated propensity scores. On the trimmed sample, using a variety of matching methods, we found consistently that non-single mothers who raise a child with a permanent sickness or disability work about 40 percentage points less likely than mothers with similar characteristics who have without serious health problems, and single mothers with disabled children are employed about 50 percentage points less likely than single mothers of healthy children. We also performed sensitivity analysis to ask whether inferences about the effect of raising long-term ill children may be altered by the presence of unobservables affecting both employment probability and claiming extended child care allowance, and found evidence that our results are robust deviations from the unconfoundedness assumption.

The results of regression-based estimates (which we only performed for married mothers due to sample size limitations) were in line with the findings of the matching estimates, the treatment effect of claiming extended parental benefits on mothers' employment probability is - 41 percentage points. To illustrate the magnitude, the estimated effect of claiming extended child care allowance for a long-term ill or disabled child on their mothers' employment probability is comparable in size to the difference in employment probability between mothers who only finished elementary education and those who attended college. Using this methodology, we also obtained treatment effects for various subgroups. We found that the treatment effect of raising a long-term ill child to be twice as large for mothers whose partners are employed than for mothers with a non-employed partner, which is consistent with the notion of specialisation in the market or the household. Our results also show that the reduction

in employment probability due to claiming extended care allowance is ten percentage smaller for mothers with only finished elementary education than for mothers with higher education levels, as the non-labour income of these families is likely lower, the relative costs of raising long-term ill children is higher, hence leading to a larger (positive) income effect on mothers' labour supply.

4. The cost implications of reduced maternal labour supply

Our final aim was to estimate the cost implications of the reduced employment of mothers with long-term ill children, in order to provide input for a cost-benefit analysis of possible policy responses. The approach we took was to suppose that if adequate child-care solutions would exist for long-term ill children, then the employment rate of mothers would be similar to comparable mothers raising healthy children. Hence, we imputed earnings for mothers in our sample from the Labour Force Survey based on wage regression results using data from the Wage Survey of the National Employment Agency. Then we calculated the potential budget revenue from the employment of these mothers by estimating the income tax, social security contributions and consumption tax paid based on the imputed earnings. Finally, the potential budgetary revenue loss from taxes and contributions due to the lower propensity of employment among mothers raising long-term ill children is the product of the estimated treatment effect of each treated mother (from the study above) and payments obtained above, which was in the order of magnitude of 600 thousand HUF/person/year.

Based on data from on the Labour Force Survey, we saw that mothers raising long-term ill children cite unsolved care responsibilities as the primary reason for the lack of job search effort, which is a clear indication that alleviating the day-care needs of long-term ill children could boost their mothers' employment. This finding is not surprising, given that while parents are distrustful of residential child care institutions, and the capital specialised day-care and home-based care - the types of services advocated by childhood development experts - are extremely limited. Our calculations explained above can be interpreted as the amount of public funds that

can be spent on care services for long-term ill children without incurring monetary losses. However, there are important caveats. First, these calculations are only valid insofar as the labour market behaviour of mothers with such children were similar to that of mothers of "healthy children", have they had access to specialised child care. It is difficult to corroborate this hypothesis in the absence of data on the take-up rate of such programmes, and the direct estimates of the effect of the offer of such services on the employment of mothers. Second, these calculations ignore some of the potential long-term benefits of home-based child care services. On the one hand, professional care-takers might be beneficial to the development of long-term ill children and a result might facilitate the integration of these children into the school system and later into the labour market. On the other hand, the increased employment chances of mothers, through an increase of their human capital might have positive effect on their long-term income.