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**CARE FOR SICK CHILDREN AS A PROXY FOR GENDER EQUALITY
IN THE FAMILY**

by

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Abstract

Swedish parents are entitled to government paid benefits to take care of sick children. In this paper we show that the gender distribution of paid care for sick children is a good proxy for the gender division of household work. Using two examples we show that registry data on care for sick children is a useful data source for studies on gender equality. Our first example shows that increased effort at work by one spouse leads to a lower effort in household work for this spouse, and a higher effort at home for the other spouse. Our second example provides some evidence for a procyclical pattern in gender equality.

Key words: gender equality, time use, household work, unemployment, business cycles

JEL codes: E32,J12,J16,

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1. Introduction

In Sweden, the number of hours worked in home production is about half the number of the hours worked in the labour market. A substantial share of goods and services are thus produced and consumed within the household. Unfortunately these activities do not leave any trace in official statistics. Hours of work and implicit prices and wages in household production are not recorded in the same way as the production and consumption of market goods. Despite this lack of data, a great deal of interest from sociologists and economists is shown in household production and consumption. Much of this interest arises from the fact that both hours worked at home and in the labour market are part of the time constraint of workers. A change in hours worked in the household will therefore affect hours worked in the labour market, and vice versa. It is striking that women do more household work than men, and ever since Becker (1965) this is the driving force in most explanations for differences in labour market outcomes between men and women.

The traditional approach to retrieving data on household work is to conduct time use surveys. We have learnt a lot from these surveys, for example about the number of hours of household work, the gender distribution of household work, and the time that is spent on different types of household work. However, time use surveys have a number of drawbacks. The number of observations is usually fairly small. Many time use surveys only contain cross section or very low frequency panel data. The survey data are also self-reported and it is not possible to obtain retrospect time use data if a researcher is interested in studying the effects of past events on time use.

In Sweden, parents are entitled to government paid leave to take care of their sick children. In this paper we propose the use of registry data on the gender division of care for sick children as a proxy for the gender division of household work in general. There are four advantages of using registry data on care for sick children to obtain a proxy for the gender division of household work. The first one is the very large number of observations available. The second advantage is the panel structure of the registry data. Parents can be followed over time, and it is therefore possible to see how a change in a right hand side variable affects the gender division of care for sick children. Third, the data is not self-reported and, finally, it is possible to obtain data on past events, for example how the division of care for sick children was

affected by the large swings in unemployment that took place in Sweden in the 1990s. Thus, the purpose of this paper is twofold. Firstly, to show that the spouses' division of care for sick children is a good proxy for the division of household work in the family in general. Secondly, we provide two examples of questions where care for sick children data is useful as a proxy for the division of household work, i.e. examples where access to a large number of observations, panel structure or long time series is valuable. In the first example, we investigate how changes in earnings affect gender equality in the family. With care for sick children data it is easy to follow a very large number of individuals over time, and see how their share of care for sick children changes when their share of income changes. In the second example, we investigate how gender equality in the family is affected by the business cycle measured by the level of unemployment.

2. Data

Swedish parents are entitled to government paid leave to care for their sick children. Around two million days of care for sick children are used by parents each year, approximately one third by fathers and two thirds by mothers. Registry data of all care for sick children in Sweden from 1993 to 2003 is available for researchers.

We use two data sets, one survey containing interview and registry data, and one data set with national registry data covering the whole adult population.

2.1 Level of Living Data

The survey data used comes from the Swedish Level of Living Survey (LNU) for the year 2000. This survey is a random sample of 1/1000 of the Swedish population aged between 18-75. The non-response rate was about 23 percent. The data used here include the distribution of different types of household work, employment status, working hours, and stated attitudes to gender equality.¹ Further, the data set also contains registry data on for example earnings, total income and care for sick children. Below we describe the variables on care for sick children and household work in some detail.

Care for sick children:

¹ For more detailed information on the Level of Living survey, see Erikson and Åberg (1987); Gähler (2004).

Employed Swedish parents are entitled to care for sick children benefits, paid by the government, when a parent stays at home from work to care for a sick child. The reimbursement level is 80 percent of current income, up to a set ceiling. The pay levels of most parents fall below the ceiling, in for example 1994, the pay level of only four percent of mothers and twelve percent of fathers reached the ceiling. The benefit is available until the child turns twelve. One of the parents is usually on parental leave until the child is about one to two years old. When the parents return to work, the child usually starts pre-school. The number of care for sick children days peaks when the child is two years old, after that the number of days gradually falls. There is a marked seasonal pattern, with low levels of care for sick children during the summer and at Christmas (cf. Ekberg, Eriksson and Friebel 2005). This is because most parents are on vacation during these periods. The care for sick children data covers the period from January 1, 1993 to June 30, 2005.

The total number of observations in the Level of Living Survey is 5141. In our analysis, we include parents of children born between 1990-1998 where both the mother and the father were employed in 2000, and both parents answered all the questions included in our analysis. Further, we require that the couple have taken at least 10 care for sick children days. No single parents are included in the analysis. This leaves us with 648 observations. For more details on the construction of the sample, see Section 3.

Table 1 shows the division of care for sick children and household work.

[TABLE 1 ABOUT HERE]

Household work

One of the parents has answered the interview questions on hours of household work. There seems to be some bias in favour of the interviewed parent, in the sense that the father (mother) does a significantly higher share of household work when he (she) is the interviewed parent. Total household work is defined as the sum of work on food (preparing, shopping and dishes), washing clothes (including folding and ironing) and cleaning (vacuuming, dusting, and scrubbing).

Fathers do about one third of both work and care for sick children. There is considerable variation among the households. Figure 1 shows the division of household work and care for sick children for the 87 couples in the sample that have a child born in 1990. In the figure, there is a positive association between the two variables. We will analyze this relation statistically in Section 3.

[FIGURE 1 ABOUT HERE]

2.2 Registry data

All individuals residing in Sweden have a personal identification number, which makes it possible to link administrative registers covering different aspects of an individual's life, e.g. income, education, care for sick children, parental leave, and linking children/parents. Statistics Sweden has, on behalf of the Level of Living-Project at Stockholm University, constructed the STAR-database (Sweden over Time: Activity and Relations) using this information. We will use data on care for sick children, earnings and a number of demographic controls.

3. Care for sick children as a proxy for gender equality

It is not obvious how to measure gender equality. Comparing hourly wages for men and women is probably the most common approach. This is one important dimension of gender equality. One drawback with this measure is that there are aspects other than gender inequality that have an impact on the wage structure. Wages are more compressed in some countries and during some periods of time than others. There is also considerable gender segregation among occupations (Nermo 2000; Kumlin 2007). Therefore an increase in the supply of female labour, which is usually associated with an enhancement of gender equality, depresses women's wages at least in the short run.

Another way of measuring gender inequality is to study the division of household work. Besides being an important issue in itself, the unequal division of household work is one of the prime suspects for unequal outcomes in the labour market, such as gender differences in career possibilities and wage differences (cf. Kalleberg and Rosenfeld 1990; Shirley and Wallace 2004). Almost all data on household work are interview data, which is why the

sample sizes are usually fairly small. Furthermore, it is almost impossible to collect retrospective data on household work from interviews.

In this paper, we use registry data on care for sick children. One advantage of these data is that we have a huge sample size. Over one million Swedish families have used this benefit during the period for which we have data. A second advantage is that we can follow the development of care for sick children over time.

Before we use registry data on care for sick children as a proxy for gender equality, we have to establish that care for sick children is related to the gender division of household work. You can argue that the division of care for sick children is an important issue in itself. Being at home with a sick child often leads to certain costs for the employer and stress for the employee when he/she returns to work. An uneven distribution of care for sick children is therefore in itself of some interest from a gender equality perspective. However, the division of care for sick children is even more interesting if an uneven division of care for sick children is associated with an uneven division of household work in general. In this section we will provide evidence suggesting that the division of care for sick children is a useful proxy for household work in general.

Table 2 shows how household work and care for sick children are divided between the parents when the sample is stratified by the parents' level of education and their attitude to gender equality. Mothers with elementary or vocational education take a greater share of both care for sick children and household work compared to mothers with secondary or tertiary education. (Not really true for CSC for elementary education, but there are very few observations in that group.) The same pattern is present when the sample is stratified by the level of education of the father. The difference between the educational groups as regards household work is a result of both longer hours of household work for men and shorter for women when the mother has a high level of education. The same pattern with a positive correlation between education and gender equality is also indicated when the sample is stratified by the level of education of the father.

[TABLE 2 ABOUT HERE]

The variable on attitude towards gender equality is not common in time use survey data, and is of course missing in studies on wage data. There is a strong relationship in the expected direction between the father's share of household work and attitude of both the father and mother towards gender equality. The relationship between attitudes towards gender equality and the father's share of care for sick children also goes in the expected direction, although the share is relatively high when the father has a very negative attitude towards gender equality and when the mother has a negative attitude towards gender equality. These subgroups are very small. Therefore we can conclude that the division of both care for sick children and household work follow the expected pattern when the data is stratified by educational level and attitudes towards gender equality. This is a first piece of evidence on the usefulness of care for sick children data as a proxy for gender equality in general.

Now we turn to look directly at the relationship between the division of care for sick children and household work. In Table 3 we show simple OLS regressions of care for sick children on household work for different samples. In the first column we use the whole sample. The point estimate of care for sick children on household work is 0.10 and highly significant. In the second column we restrict the sample to respondents who had children born between 1990 and 1999. If the child was born after 1999 we observe the division of household work before the birth of the child and we want to estimate household work as a function of care for sick children. The reason for the restriction that children should not be born before 1990 is that the child should not be too old in 2000. The cut off date 1990 is somewhat arbitrary, but none of the results in this paper are sensitive to the exact year chosen. As can be seen when comparing columns 3:1 and 3:2 in Table 3, the point estimate falls somewhat, to 0.087, but is still highly significant. Column 3:3 introduces the restriction that the total number of care for sick children days should be higher than 10 over the period for which we have care for sick children data (1993-2005). A very low number of CSC days makes the observation of some kind of sharing rule for CSC between the parents rather uncertain. The point estimate for the father's share of CSC increases to 0.114 in column 3:3, which can be interpreted as a reduction in the noise in the independent variable.

[TABLE 3 ABOUT HERE]

The next restriction is that both parents were working in 2000. Total loss of observations amounts to 317, of which 127 are due to missing interview data on employment status. The point estimate changes very little when this restriction is introduced. Finally, in the sample used in column 3:5 we must also have data on both parents' view on gender equality. The point estimate falls marginally to 0.108. To sum up the findings of Table 3, we find that the relationship between the father's share of care for sick children and share of household work is not very sensitive to the choice of sample. In the analysis below we use the most restricted sample from column 3:5. For this sample, there is no missing data for any of the variables we use in our analysis below. Therefore we can use the exact same sample when estimating regressions for models using different independent variables.

[TABLE 4 ABOUT HERE]

In Table 4 we first regress the father's share of care for sick children on the father's share of household work, thereafter we introduce additional explanatory variables step-by-step. We use data for children born in 1990 to 1999. If there is a common time trend in the division of household work and care for sick children for parents of children born during this period, this would be captured by the care for sick children variable in the regression shown in 4:1. We therefore use the birth date of the child as a control variable in 4:2. This results in a marginal decrease in the point estimate for the father's share of care for sick children, giving some indication of a common time trend. However, the estimate only falls from 0.108 to 0.103, so the relationship between the division of care for sick children and household work remains almost as strong after controlling for the child's date of birth.

In column 4:3 we control for the sex of the respondent. We can see that this variable has an impact. When the mother is interviewed, the father's share of household work falls drastically compared to when the father is interviewed. However, controlling for the sex of the respondent only affects the care for sick children variable marginally.

Next, we introduce the father's attitude to gender equality. This variable has a very significant effect. Its introduction also lowers the point estimate for care for sick children. It thus seems that the father's attitude to gender equality affects both the division of household work and care for sick children. This seems sensible. In most data sets we do not have any measure of

the father's view on gender equality. In the absence of any measure of views on gender equality, it is therefore good that the care for sick children variable is able to pick up some of this effect. A father's stated view on gender equality has a strong impact on the division of household work (see Table 2). Still, the real effect may be even greater if some fathers claim to have a more positive view on gender equality than they actually hold. These fathers may have a low share of both household work and care for sick children, and therefore lower the estimated effect of attitudes and increase the estimated effect of care for sick children. We have no way of verifying whether this is the case, but it may be one explanation for why there is still a strong relationship between the division of care for sick children and household work after controlling for attitudes. In column 3:4 the mother's attitude to gender equality is also included among the explanatory variables. This variable is also strongly significant and of the expected sign, although with a somewhat lower magnitude than the attitude variable for the father. The estimate of the CSC variable decreases but is still significant. The estimate of the fathers' attitude also decrease somewhat, which is explained by a positive correlation between the attitudes of the mother and the father. Finally, we control for the educational level of the mother and the father. Doing this lowers the estimates for the other explanatory variables, but not by very much.

To sum up, evidence from Table 3 indicates that there is a highly significant relationship between the division of household work and care for sick children. This can in part be explained by the parents' attitude towards gender equality, and to some degree by their level of education. However, to a large extent, there seems to be an independent effect of CSC on household work. This may be explained by other independent variables and by the imperfect measurement of the gender equality attitude variables. The division of care for sick children seems to be a useful proxy for the division of household work, especially when parents' attitudes to gender equality are unavailable. However, also in those cases, the division of care for sick children adds information on the division of housework.

We conclude this section by mentioning some results from alternative estimation methods. One alternative to using the fathers' share of household work would be to use their hours of household work. The results would be very similar. The point estimate of the effect of the father going from taking no to all care for sick children days would be an increase in the fathers' household work by two hours.

The share of household work is constrained between zero and one. In our sample of 648 couples, the father does all the household work in one case, and the mother in 32 cases. Table 5 shows the results from Tobit regressions.

[TABLE 5 ABOUT HERE]

Comparing Table 4 and Table 5 we find that the results are very similar. The point estimates for the independent variables are in general somewhat higher for the Tobit regressions.

4. Examples of analyses using care for sick children data

In the previous section we argued that the gender division of care for sick children is a useful proxy for the gender division of household work, which in turn is important for gender equality in general. Below we give two examples of how data on care for sick children can be used to study gender equality. We argue that these examples show the usefulness of registry data on care for sick children as a valuable complement to time use survey data.

4.1 The effect of effort at labour market work on the share of household work

The uneven distribution of household work plays an important role in most theories trying to explain the unequal outcomes between men and women in the labour market. Becker (1965, 1991) has suggested that the specialization by one spouse in the labour market and the other in household work is the simultaneous result of the decision to reap the economic gains from specialization in order to maximize household utility. A simple discrimination story would suggest that if women are discriminated against in the labour market, it is rational for women to do less labour market and more household work. In that case the causality runs from the division of work in the labour market to the division of work in the household. Bargaining theories of different types, e.g. Blood and Wolfe 1960, England and Kilbourne 1990, Chiappori (1992) and Lundberg and Pollak (1993) predicts that a higher wage leads to a stronger bargaining position, which reduces hours of household work. In an economics of identity story (Akerlof and Kranton, 2000) causality could run both ways. For identity reasons it might be more important for men to do labour market work in which case the causality runs from labour market to household work. Alternatively, if women do more household work for

identity reasons the causality runs in the other direction. The causality issue also receives some attention in popular debate. In the double burden or second shift debate it is often claimed that the increasing working hours of women has not led to a corresponding equalization in the number of household working hours (e.g. Hochschild 1989). This can be viewed as a lack of causality from the division of labour market work to household work.

A series of empirical papers by Hersch, and Hersch and Stratton, (Hersh, 1991a, 1991b, Hersch and Stratton 1994, 1997) study the impact of household work on wages. The former two papers use cross section data and the later two panel data from PSID, although only Hersch and Stratton (1997) perform panel data estimations. They find that the effect of household work on wages is significantly negative for women, but find no significant effect for men. From a methodological point of view it is interesting that the point estimates fall in a fixed effects specification, compared to an OLS specification, suggesting that individual specific effects account for part of the negative effect found in the OLS regressions.

Below we will instead investigate the causal relationship *from* changes in wages *to* changes in household work, a question that to our knowledge has not been studied using panel data techniques. We will do this in an as simple way as possible to maximize transparency. The aim of the exercise is not so much to obtain results as to show the possibilities for research offered by care for sick children data. Our simple approach is as follows. We only look at household work, measured by care for sick children, at two points in time, in order to keep the econometrics as simple as possible. We distinguish between individuals that have increased their effort at work substantially, and those that have not. Our measure of increased effort at work is whether earned income increased by 20 percent or more between 1998 and 2000. We argue that such a big increase is normally caused by either an increase in working hours or increased efforts of other types, for example taking on a more demanding task. We then compare changes in the share of household work for people that have and have not increased their efforts at work

4.1.1 Data and sample selection

Our data contain earnings and care for sick children, as well as a large number of economic and demographic variables for the Swedish population for the period 1993-2003.² Only

² For many variables we have data over a longer time span.

parents with children are eligible for care for sick children. We look at couples that had their last child in 1993. We do not include parents that had additional children after 1993, since an additional child would mean that the parents would spend a considerable amount of time on parental leave. In Sweden, parents are on parental leave for on average over a year.³ This would add noise to the earnings data. Further, we select couples that have only common children, since it is not self-evident, in terms of the division of housework, how to interpret care for a sick child not common to both parents. This leaves us with a sample of 43459 couples, see column 6:1. In order to compare care for sick children in 1996-1997 and 2001-2002 the child has to be sick at least once in each period, which reduces the sample to 28140, see column 6:2.

[TABLE 6 ABOUT HERE]

For low income earners a relatively small absolute wage increase can result in a large relative wage increase. We therefore exclude all families where one or both of the partners earns less than 75 percent of the median income, i.e. less than SEK 150 000, in 1998. This leaves us with 11213 observations in column 6:3. The mean income increases between columns 6:2 and 6:3, but change in the care for sick children variables are small. For children with very few days of sickness the division of care for sick children will by necessity be very uneven, especially if the child is only sick for one day during the observation period. In column 6:4 we report our preferred sample in which the child is sick at least five days both in the 1996-1997 and the 2001-2002 periods, resulting in 7696 observations. The mean number of days of care for sick children increases in column 6:4, but the other variables do not change very much.

4.1.2 Results

Now we turn to the question of whether increased effort at work decreased the effort at home. We assume that effort at work has increased if the wage is increased by more than 20 percent between 1998 and 2000. During this period the inflation rate was very low, below one percent per year, and the average monthly wage increased by nine percent.⁴ Workers who have increased their earnings by more than 20 percent have arguably increased either their working hours or in other ways increased their work effort, for example by taking on more demanding tasks. Table 7 shows the fathers' share of care for sick children in families where none, one,

³ See Ekberg et al (2005).

⁴ Source: Statistics Sweden.

or both of the parents have increased their work effort. We see that on average the fathers' share of care for sick children decreased from 0.325 in 1996-1997 to 0.312 in 2001-2002. This is in line with previous research that shows a slight decrease in the fathers' share of care for sick children as the child grows older, see e.g. Ekberg et al (2005).

[TABLE 7 ABOUT HERE]

If we look at the different sub-groups, we see that among couples where only the father increased his work effort between 1998 and 2000, the fathers take a somewhat smaller share of care for sick children than average, 0.295, already in 1996-1997. In the period 2001-2002 their share drops to 0.255. This decrease is much greater than the average decrease between the 1996-1997 and the 2001-2002 periods. In couples where only the mother increased her effort at work between 1998 and 2000, the fathers' share of care for sick children, 0.353, is higher than average already in 1996-1997 and increases to 0.358 in 2001-2002. This may seem like a very modest increase, but should be compared with the average decrease of 0.013.

In Table 8 we statistically test the effects of increased effort at work on the division of household work. We begin by only estimating the effects of increased effort at work, and then gradually introducing control variables. Since the dependent variable, the fathers' share of care for sick children in 2001-2002, is restricted between zero and one, and this restriction is binding for one third of the observations, we estimate Tobit regressions. As a robustness check we also report results from an OLS regression.

[TABLE 8 ABOUT HERE]

When the father increases his effort at work his share of household work decreases, and when the mother increases her effort at work the father's share of household work increases. When both increase their effort at work, the point estimate on the father's share of household work is negative, but not statistically significant. In 8:2 we control for the fathers' share of care for sick children in 1996-1997. As might be expect the variable is highly significant both in the economic and the statistical sense. The absolute values of the variables measuring increased effort at work fall somewhat for both mothers and fathers, but remain highly significant. In 8:3 and 8:4 the effects of income in 1998 is controlled for, first by introducing the share of income earned by the father, then by introducing the logged income for fathers and mothers.

The results are very similar for either choice. The overall fit, measured by pseudo R^2 , is marginally better when using the fathers' share of income. As may be expected, increased earnings lead to a decreased share of care for sick children. Finally, in 8:5 a number of demographic controls are included. The only significant result is that older mothers take a smaller share of care for sick children. The introduction of the demographic control variables only marginally affects the estimates of the other variables. Finally in 8:6 an OLS regression is estimated as a robustness check. The point estimates decrease in magnitude, but the qualitative results are very similar for the OLS and Tobit estimates.

4.1.3 Possibilities for future research

In the previous subsection we saw that with registry data on care for sick children it was easy to construct a fairly homogenous sample, parents who had their last child in 1993, that still contains a fairly large number of observations. If we had used a less homogenous sample we could have obtained a much larger number of observations. However, it would be more complicated to perform an analysis with a less homogenous sample, for example with parents that had their last child at different points in time. This is doable but would require more control variables. It would also be easy to increase the time dimension and in that way increase the number of observations.

The analysis could be extended by disentangling wage increases due to increased number of working hours and increased hourly wage. There are also registry data readily available for positions at work, for example managers, and for occupations and educational levels. So effects on gender equality in household work of changes in all these dimensions can be investigated. Amilon (2007) analyzes care for sick children using cross section data for some variables, including education, which can give an indication of what to expect from a panel data analysis. However, we leave this for future research since digging deep into these questions would require at least a paper in itself. Our main point is that care for sick children registry data opens up the possibility of studying these questions with non self-reported panel data, with a large number of observations.

4.2 How is gender equality related to unemployment?

In this section we investigate how gender equality is affected by the business cycle. We admit that this question has not received much attention in the economics literature. Still, two

reasons can be given for expecting gender equality to be procyclical. First, men still invest on average more time in paid work than women, and when faced with increased risks of layoffs during economic downturns, men may be more likely than women to avoid being away from work to take care of their sick children. Second, using an economics of identity argument (Akerlof and Kranton, 2000) it might be more important for men than women to avoid becoming unemployed if being employed is on average more important for the identity for men. An economic downturn with increased risks of being laid off would then have a greater effect on men's care for sick children.

The division of household work can be modelled as a decision made by the family as a unit, or as an outcome of bargaining between the spouses, see Lundberg and Pollak (1993) and (1996), Bergstrom (1996), and Chiappori (1992). In bargaining models the division of household work is determined by wages and preferences for labour market work and household work for the man and the woman. There is evidence of men having a higher relative revealed preference for labour market work over household work than women. See Evertsson and Neramo (2007) for evidence from Swedish time use data of women *ceteris paribus* doing more household work than men.⁵ In an economic downturn both men and women face a higher risk of being laid off. The trade-off between doing household work and labour market work will tilt towards doing labour market work when the employer can demand more, due to the risk of unemployment. This will decrease the willingness to do household work for both men and women. The question is whether this will have a stronger impact on men than on women?

Before estimating the relationship between unemployment and gender equality we have to discuss if there are any other likely channels from unemployment to the division of care for sick children. The most obvious question is whether the business cycle also affects wages in a way that could affect the trade off between labour market work and household work in different ways for men and women. Solon et al (1994) found that men's wages were much more procyclical than women's in the United States for the period 1967 - 1987. A one-percent decrease in unemployment led to a 1.4 percent wage increase for men, but only 0.4 for women.

⁵ A revealed preference does not say anything of why this difference exists, be it due to social constraints like gender roles, or something else. The important thing here is that regardless of the cause of this gender difference in preferences, the bargaining outcome will be affected by it.

Using U.S. data for 1978-1999, Park and Shin (2005) decompose this gender difference into a) difference in wage cyclicality between men and women within each occupation b) occupational differences between men and women. They find that the whole gender difference in wage cyclicality is explained by men being employed to a greater extent in occupations with cyclical wages. Hart (2006) investigates wage cyclicality in the U.K. 1975-2001 and in contrast to the U.S. studies finds that the cyclical changes of wages in the U.K. are remarkably alike for men and women. There are to our knowledge no studies of the cyclical behaviour of wages for men and women in Sweden. If wages were more procyclical for men, there would be a countercyclical effect on the fathers' share of household work, since the alternative cost for household work by the father would decrease compared to the alternative cost for household work by the mother. The main hypothesis of this section is, however, that the fathers' share of household work should be procyclical. If we find a procyclical effect below, it can be viewed as a lower bound on this effect, since the wage effect, if there is one, goes in the opposite direction.

4.2.1 Evidence from national data time series data

Figure 2 shows the development of unemployment and the fathers' share of care for sick children from 1989 to 2005. Unemployment was very low at the beginning of the period. There was a sharp increase in unemployment in 1991-1993. Thereafter the unemployment level was flat until 1998 when it started decreasing until 2001. At the end of the period unemployment increased somewhat again. The fathers' share of care for sick children follows an inverse pattern. It is lower during the period of high unemployment. Eyeballing the figure, you might suspect that the fathers' share of care for sick children can easily be described as being a function consisting of a negative relationship with unemployment plus a positive linear trend.

[FIGURE 2 ABOUT HERE]

Figure 3 shows the relationship between changes in unemployment and changes in the fathers' share of care for sick children.

[FIGURE 3 ABOUT HERE]

For the simple OLS reported in Figure 3, the point estimate of the relationship between the change in unemployment and the fathers' share of CSC is 0.426 for the period 1989-2005. The point estimate is significantly negative at the one-percent level. This is very high, given that we have only 17 observations. Using bootstrapped standard errors still yields significance at the one-percent level, so it is not a single observation driving the result. The point estimate for the trend, 0.229, is not statistically significant.

To sum up this section, we find some indication of the fathers' share of care for sick children being negatively related to unemployment, i.e. procyclical. Given the small number of observations one should not draw too strong conclusions from this. For the purpose of illustrating the usefulness of care for sick children as a proxy for household work, we think that the simple analysis above suffices. However, for a researcher interested in the question itself, it should be possible to do a more thorough analysis, by for example using regional variation in unemployment to obtain more observations.

5. Conclusions

The purpose of this paper was first to show that the gender division of care for sick children is useful as a proxy for the gender division of household work in general. The analysis presented showed that the two variables are positively correlated and that they are related in a similar way to the parents' educational level and their attitudes towards gender equality. The second purpose was to provide two examples on how to use this proxy in empirical studies based on registry data. The first example was to investigate how changes in earnings affect gender equality in the family. The analysis showed that increased effort at work by one spouse leads to a decrease in the share of his or her household work. In the second example, we investigated how gender equality in the family is affected by the business cycle measured as the level of unemployment. The analysis showed some evidence of gender equality being, in this sense, procyclical. Admittedly, these analyses are fairly superficial and should be interpreted as preliminary. The value of them lies instead in that they are good illustrations of how to use data on care for sick children as a valuable source of information for researchers interested in aspects related to gender inequality in the family.

In all, this paper provides evidence that data on care of sick children is a valuable complement to time use surveys. The most obvious advantages, compared to time use studies, is as mentioned earlier that this measure provides the researcher with both a longer time series as well as panel data on non self-reported gender inequality in the family. The fact that time use data and care for sick children data are correlated in similar ways with other variables can also be viewed as validation of time use data. However, the measure has some drawbacks compared to time use studies. The most obvious one is that the measure is only available for couples with children under twelve.

Finally, registry data on care for sick children are to our knowledge only available in Sweden. This does not necessarily mean that it is impossible to find other data sources with similar properties in other countries. For instance, the division of care for sick children is strongly correlated with the division of parental leave (see Ekberg et al, 2005). Registry data on parental leave may therefore provide an alternative as a proxy for gender inequality. One piece of evidence pointing in that direction is that Duvander and Sundström (2002) find that higher education is associated with a more equal division of parental leave, i.e. the same pattern that is found for both the division of care for sick children and for household work in general (cf. Evertsson and Neramo 2004; 2007). One drawback of parental leave data is, however, that most parental leave is used over a fairly short period of time so the panel structure of the data disappears. Another possibility is scanner data from stores, which could for example be used to investigate who is doing the grocery shopping. This is a measure that seems likely to be related to gender equality in general. Combining scanner data with time use data in a similar fashion as presented here when combining care for sick children data with time use data could validate this hypothesis.

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Figure 1. Scatter diagram for parents of children born 1990, sample used in regressions.

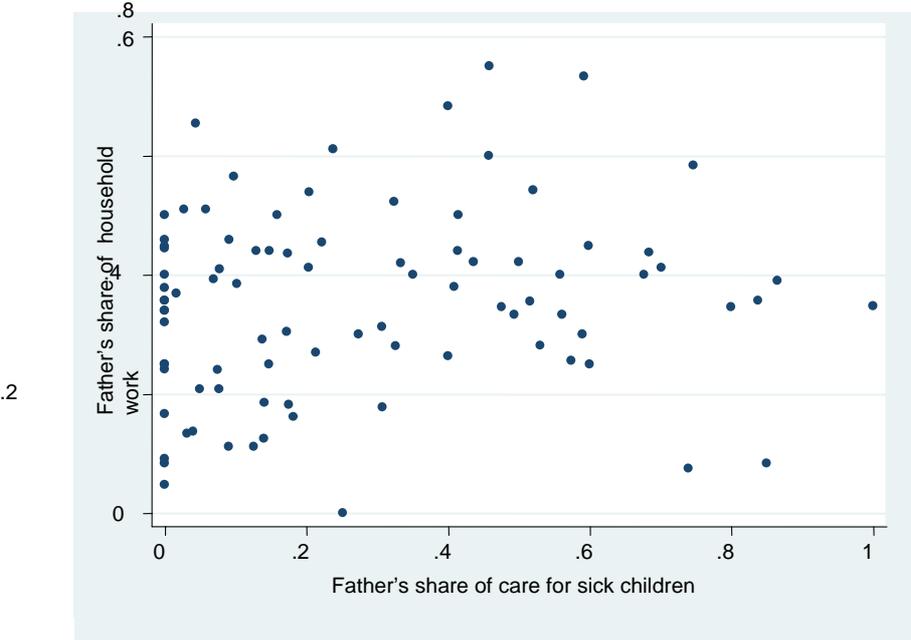


Figure 2. Fathers' share of CSC on left axis, unemployment on right axis.

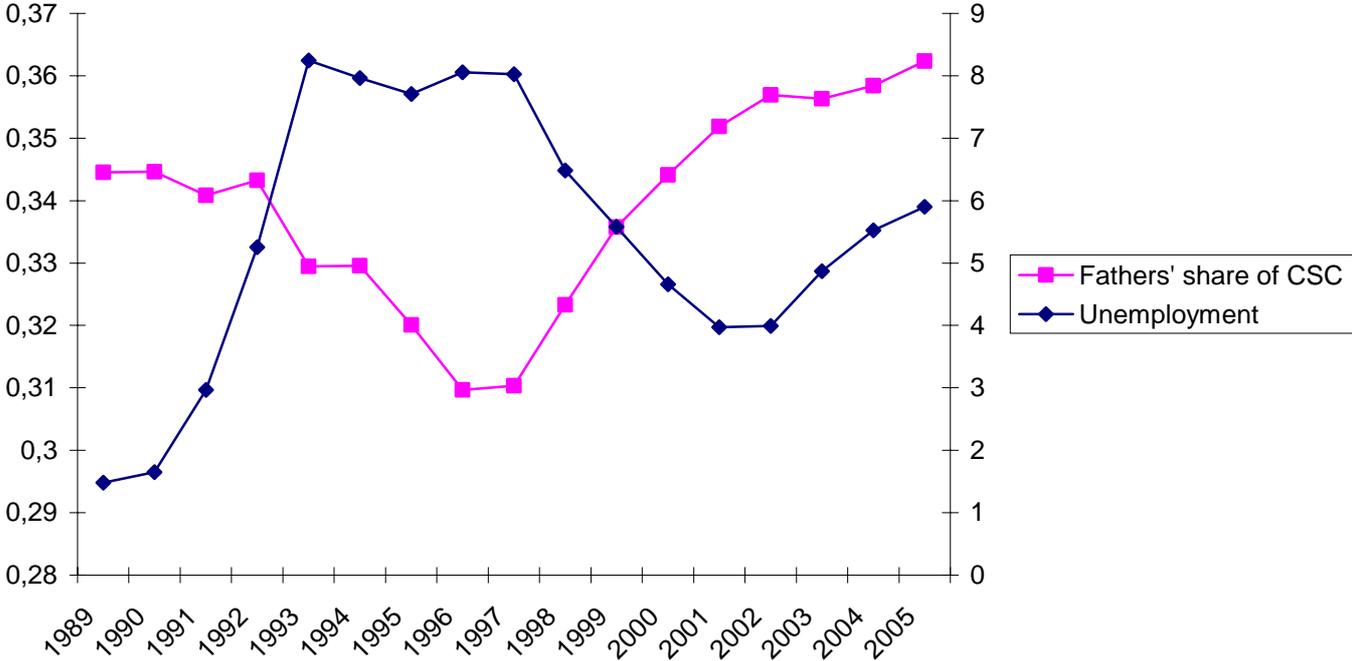


Figure 3. Change unemployment and change fathers' share of CSC.

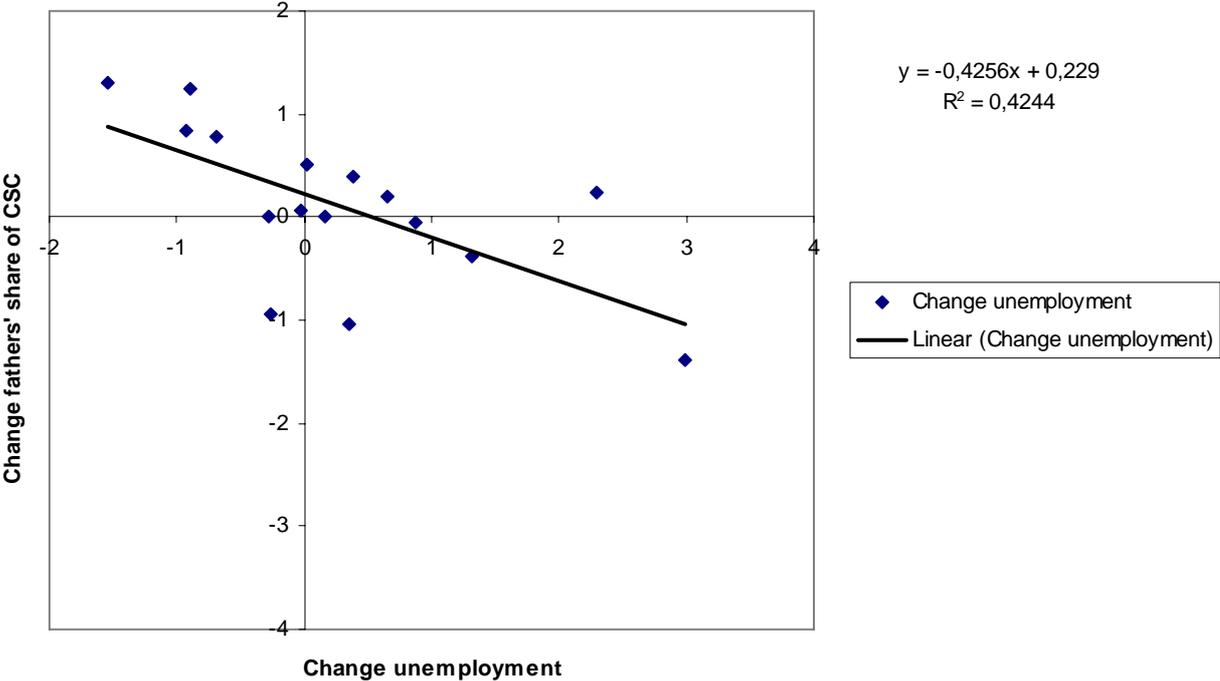


Table 1. Descriptive statistics Level of Living data.

	Mean	Median	Share of zeros	Share of ones	Number of obs.
Fathers' share of care for sick children	0.340 (0.011)	0.308	0.159	0.034	648
Fathers' days of care for sick children	16.77 (0.92)	10.5			648
Mothers' days of care for sick children	30.94 (1.14)	23.0			648
Fathers share of household work	0.311 (0.007)	0.3125	0.049	0.002	648
Fathers hours of house work/week	7.03 (0.20)	6			648
Mothers hours of household work/week	16.05 (0.30)	14			648

Note. Standard deviations in parentheses.

Table 2. Division of care for sick children and of household work.

	N of obs	Male share CSC	Male share household work	Father's hours household work	Mother's hours household work
Mother's education					
Elementary	34	0.3820	0.3157	7.00	16.71
Vocational	289	0.3055	0.2751	5.76	16.20
Secondary	84	0.3682	0.3577	8.77	15.45
Tertiary	273	0.3618	0.3263	7.57	15.77
Father's education					
Elementary	49	0.2846	0.2765	5.96	18.29
Vocational	299	0.3350	0.2797	6.26	16.64
Secondary	76	0.3684	0.3147	7.38	15.55
Tertiary	256	0.3471	0.3447	7.75	14.84
Father's Attitude to gender equality					
Level 1 (most negative)	18	0.3311	0.1947	3.83	19.83
Level 2	30	0.2186	0.1603	3.70	18.57
Level 3	78	0.2907	0.2423	5.39	17.76
Level 4	249	0.3402	0.3080	6.82	15.92
Level 5 (most positive)	273	0.3679	0.3579	8.27	15.15
Mother's Attitude to gender equality					
Level 1 (most negative)	10	0.3049	0.1564	3.50	19.60
Level 2	14	0.3947	0.2228	4.50	16.86
Level 3	92	0.2481	0.2847	6.38	16.83
Level 4	200	0.3230	0.2908	6.75	16.81
Level 5 (most positive)	332	0.3744	0.3391	7.60	15.23

Table 3. OLS regressions different samples, dependent variable fathers' share of household work

	<i>3:1 All interviewed</i>	<i>3:2 Children born 1990- 1999</i>	<i>3:3 Children born 1990-1999 and >10 days CSC</i>	<i>3:4 Children born 1990-1999 and >10 days CSC and both parents working 2000</i>	<i>3:5 Children born 1990-1999 and >10 days CSC and both parents working 2000 and data on both parents view on gender equality</i>
Male share of CSC	0.1021** (0.0103)	0.0866** (0.0158)	0.1136** (0.0208)	0.1122** (0.0157)	0.1080** (0.0238)
Constant	0.2737** (0.00502)	0.2708** (0.0079)	0.2594** (0.0094)	0.2636** (0.0093)	0.2745** (0.0106)
R ²	0.031	0.021	0.028	0.034	0.032
N. obs	3194	1494	1161	844	648

Heteroskedasticity robust standard errors in parentheses. * indicates significance at the five-percent level and ** on the one-percent level.

Table 4. OLS regression. Dependent variable fathers share of household work

	<i>4:1</i>	<i>4:2</i>	<i>4:3</i>	<i>4:4</i>	<i>4:5</i>	<i>4:6</i>
Male share of CSC	0.1080** (0.0238)	0.1032** (0.0238)	0.1011** (0.0229)	0.0850** (0.0222)	0.0791** (0.0224)	0.0745** (0.0219)
Child's date of birth		0.0063* (0.0026)	0.0053* (0.0026)	0.0041 (0.0025)	0.0038 (0.0024)	0.0033 (0.0024)
Female respondent			-0.0694** (0.0132)	-0.0588** (0.0128)	-0.0607** (0.0127)	-0.0586** (0.0128)
Fathers' gender equality attitude				0.0466** (0.0067)	0.0415** (0.0069)	0.0398** (0.0067)
Mothers' gender equality attitude					0.0206** (0.0066)	0.0184** (0.0066)
Education dummies						Included
Constant	0.2745** (0.0106)	0.0625 (0.0886)	0.1267 (0.0898)	-0.0212 (0.0869)	-0.0789 (0.0901)	-0.0682 (0.0932)
R ²	0.032	0.041	0.082	0.1522	0.1556	0.1913
N. obs	648	648	648	648	648	648

Heteroskedasticity robust standard errors in parenthesis. * indicates significance at the five-percent level and ** on the one-percent level.

Table 5. Tobit regressions. Dependent variable fathers share of household work.

	<i>5:1</i>	<i>5:2</i>	<i>5:3</i>	<i>5:4</i>	<i>5:5</i>	<i>5:6</i>
Male share of CSC	0.1115** (0.0216)	0.1066** (0.0256)	0.1004** (0.0246)	0.0872** (0.0222)	0.0808** (0.0215)	0.0761** (0.0232)
Child's date of birth		0.0065* (0.0027)	0.0054* (0.0024)	0.0041 (0.0026)	0.0038 (0.0026)	0.0033 (0.0021)
Female respondent			-0.0772** (0.0155)	-0.0661** (0.0131)	-0.0680** (0.0135)	-0.0655** (0.0144)
Fathers' gender equality attitude				0.0491** (0.0085)	0.0439** (0.0072)	0.0421** (0.0069)
Mothers' gender equality attitude					0.0216** (0.0065)	0.0191** (0.0068)
Education dummies						Included
Constant	0.2697** (0.00947)	0.0505 (0.0898)	0.1218 (0.0883)	-0.0342 (0.0963)	-0.0945 (0.0925)	-0.0798 (0.0882)
N. obs	648	648	648	648	648	648

Bootstrapped standard errors in parenthesis. * indicates significance at the five-percent level and ** on the one-percent level.

Table 6. Descriptive statistics different samples

	<i>6:1 Full sample</i>	<i>6:2 At least some care for sick children both in 1996-1997 and in 2001-2002</i>	<i>6:3 Both parents earn at least 75% of median income 1998 (SEK 150 000)</i>	<i>6:4 At least 5 days of care for sick children both in 1996-1997 and in 2001-2002</i>
Male share of CSC before	0,324 (0,334)	0,327 (0,324)	0,318 (0,282)	0,325 (0,261)
Male share of CSC after	0,309 (0,357)	0,313 (0,352)	0,312 (0,337)	0,312 (0,304)
Father's CSC days before	5,404 (9,806)	7,036 (10,303)	7,405 (9,274)	8,848 (9,785)
Mother's CSC days before	11,898 (15,045)	15,236 (15,474)	15,009 (13,471)	17,794 (14,120)
Father's CSC days after	3,047 (6,513)	4,155 (7,254)	4,026 (6,456)	5,323 (7,290)
Mother's CSC days after	6,847 (10,108)	9,148 (10,731)	8,554 (9,401)	11,220 (10,023)
Father's income 1998	221026 (184256)	234659 (148819)	289002 (140066)	280790 (121252)
Mother's income 1998	124341 (92339)	141437 (80151)	204589 (58930)	201935 (55695)
Father's income 2000	252228 (250035)	265003 (197504)	320073 (226294)	310271 (213128)
Mother's income 2000	147438 (109175)	165684 (92669)	222193 (89102)	219510 (82234)
Father increases wage>20%	0,234 (0,423)	0,246 (0,431)	0,233 (0,423)	0,227 (0,419)
Father increases wage>20%	0,308 (0,462)	0,338 (0,473)	0,250 (0,433)	0,244 (0,429)
Father's age	33,26 (5,44)	32,85 (5,09)	33,34 (4,89)	33,07 (4,84)
Mother's age	30,65 (4,66)	30,49 (4,39)	31,15 (4,26)	30,93 (4,23)
Gender of child	1,488 (0,500)	1,491 (0,500)	1,491 (0,500)	1,495 (0,500)
Number of children	2,361 (0,973)	2,279 (0,808)	2,215 (0,743)	2,185 (0,711)
N obs	43459	28140	11213	7696

Table 7. Descriptive statistics. Father's share of care for sick children.

		Mean	Median	Share of zeros	Share of ones	N obs
Neither wage increase >20 percent	1996-97	0.325	0.302	0.177	0.019	4517
	2001-02	0.316	0.261	0.285	0.044	
Only father's wage increase >20%	1996-97	0.295	0.266	0.213	0.019	1303
	2001-02	0.255	0.162	0.377	0.045	
Only mother's wage increase >20%	1996-97	0.353	0.333	0.146	0.022	1432
	2001-02	0.358	0.333	0.238	0.053	
Both wage increase >20 percent	1996-97	0.326	0.310	0.194	0.043	444
	2001-02	0.297	0.190	0.342	0.052	
All	1996-97	0.325	0.303	0.178	0.021	7696
	2001-02	0.312	0.250	0.295	0.046	

Table 8. Tobit regressions;.Dependent variable fathers share of household work.

	8:1	8:2	8:3	8:4	8:5	8:6 OLS
Only father's wage increase >20%	-0,095** (0,014)	-0,071** (0,013)	-0,079** (0,012)	-0,076** (0,012)	-0,077** (0,012)	-0,047** (0,008)
Only mother's wage increase >20%	0,061** (0,014)	0,038** (0,012)	0,054** (0,012)	0,056** (0,012)	0,055** (0,0012)	0,037** (0,008)
Both wage increase >20 percent	-0,036 (0,022)	-0,038 (0,020)	-0,035 (0,020)	-0,030 (0,020)	-0,029 (0,020)	-0,014 (0,013)
Father's CSC share 1996-97		0,784** (0,018)	0,690** (0,018)	0,689** (0,018)	0,688** (0,018)	0,472** (0,013)
Log (Father's income 1998)				-0,243** (0,015)	-0,234** (0,016)	-0,136** (0,009)
Log (Mother's income 1998)				0,189** (0,021)	0,201** (0,021)	0,146** (0,015)
Father's share of income 1998			-0,954** (0,059)			
Father's age					0,0015 (0,0013)	0,0014 (0,0009)
Mother's age					-0,0056** (0,0016)	-0,0035** (0,0011)
Gender of child					-0,008 (0,009)	-0,008 (0,006)
Number of children					0,004 (0,007)	0,003 (0,005)
Constant	0,247** (0,014)	-0,007** (0,008)	0,567 (0,036)	0,508 (0,172)	0,464** (0,174)	0,195** (0,117)
Pseudo R ²	0.007	0.177	0.202	0.203	0.204	0.244 ^a
N. obs	7696	7696	7696	7696	7696	7696

a: Adjusted R²

Standard errors in parenthesis. * indicates significance at the five-percent level and ** on the one-percent level.

