Decision-Making in the Household and Material Deprivation

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Abstract

This study examines how household living conditions are related to alternative allocations of control over decision-making in the household. The degree of control exerted by a particular individual over different decisions and household living conditions are taken from responses to an extensive multi-national household questionnaire. This study has three main findings. First, more equally shared decision-making in a household is closely connected to better household living conditions. Second, while predominant decision-control accrued to any of partners is correlated with worse living conditions, this is more pronounced for women rather than men. Finally, the distribution of the mode of decision-making in households does not strongly predict the regime of family finances. These findings support the notion that effects of social assistance targeted at women might actually not be driven primarily by female empowerment.

JEL codes: **D13,D12,J16**
Keywords: **material deprivation; intra-household; gender; empowerment**

1   Introduction

The problem of optimal organization of households has been considered since antiquity (Spiegel, 2013) and much modern research attempts to establish links between the allocation of control in the family and households' economic situation (Pollak, 1985). Specifically, recent work focuses on the nexus between the extent of women's control and household living conditions (Duflo, 2012). Most of the evidence suggests that, compared to income or assets in the hands of men, income or assets in the hands of women are associated with improvements in child health and with higher household expenditure shares on nutrition, health, and housing (Bobonis, 2009; Duflo, 2003; Lee and Pocock, 2007; Lundberg et al., 1997; Lundberg and Ward-Batts, 2000; Hoddinott and Haddad, 1995) [1] The mechanisms underlying these associations remain an active research area (Lundberg and Pollak, 2007). Women's income is often interpreted as a proxy for women's control over decision-making, but the nature and extent of measurement error remains unclear (Cameron and Trivedi, 2005).

In this paper, I employ direct measures of household decision control, instead of income-based proxies. Further, unlike the existing work on household living conditions, which focuses on shares of specific goods on total household expenditures, I study direct measures of material deprivation and ask about their relationship to the nature of household decision making. The analysis is based on EU-SILC data from 2010, covering 18 EU member countries. The ability to measure both household control structure and relevant household outcomes directly affects the results qualitatively. As in most existing studies, women's relative income is strongly associated with better household outcomes and this association turns out to be robust to controlling for direct measures of decision-making control in the household. However, predominant male control over decisions and, even more so, predominant

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[1]There are also several studies that do not find a strong positive association between women's income and household living conditions; e.g., Braido et al. (2012); Haushofer and Shapiro (2016); Thomas (1990).

female control is associated with worse material condition of the household compared to balanced control of household decision making [2].

These findings are important for the interpretation of the effects of windfall income transfers [3] directed to women on household outcomes. These effects are often attributed to increased female control [4] (Bobonis, 2009). However, such interpretation would be correct if the windfall income was a suitable proxy variable for the female control. It is true if the windfall income is correlated only with the female control and not with other, potentially omitted, determinants of household outcomes. But, Ashraf (2009) suggests that windfall income transfers also impact men's behavior: men negotiate the use of transfers (more or less intensively depending on who receives the transfer and on the allocation of control in the household before transfers [5]) and men may adjust their contributions to the household budget depending on how the transfer is spent. Moreover, Natali et al. (2016) find that a cash transfer increases balanced control over a number of household decisions, but does not increase solely female control [6]. Windfall income may thus be correlated with two unobserved variables influencing household outcomes: female control and male control. Further, the present study implies that both predominantly female control and predominantly male control predict negative household outcomes. This underlies a need to measure both the male and female control separately. Most of the existing work implicitly assumes that changes in female control are necessar-

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[2]In Section 4, I indirectly test for the possibility that this association is a consequence of reverse causality and reject this notion.

[3]Windfall income mainly refers to cash transfer programs (e.g., Bolsa Alimentação or PROGRESA), but also to transfers during field experiments or incomes brought by price shocks in markets of female-specific crops (cultivated only by women).

[4]Some studies, however, attribute this finding to the "labelling effect" or "spending inertia" (Lundberg and Pollak, 2007).

[5]The author assumes that the allocation of control is determined before the marriage and does not change thereafter.

[6]Another study (Haushofer and Shapiro, 2016) finds that cash transfers do not effect female empowerment in households, but their measure of female empowerment is based on reported instances and attitudes to home domestic violence.

ily accompanied by equivalent and opposite changes in male control [7]. However, the EU-SILC data suggest that female and male control can increase simultaneously when both partners start deciding on more items, i.e., when the overlap of their spheres of responsibility expands. Hence, without further evidence, effects of women's windfall income on household outcomes should not be interpreted as corresponding only to female control, which is crucial from a policy perspective.

The EU-SILC data does not allow me to study the association of windfall income and female and male control. Moreover, my OLS results could be affected by measurement error or reverse causality [8]. Thus, to shed more light on the negative association of unbalanced control and household income, I instrument for the observed mode of decision-making using the share of 4-year-olds in formal childcare, the gender-gap in unemployment, and the gender-gap in weekly work-hours. All three variables are measured at the NUTS 2 regional level. These are region-based instrumental variables that affect the women's position in the household, but are arguably unrelated to household-specific outcomes. The results of the IV estimation are in accord with the baseline OLS results supporting the notion that the mode of decision-making affects material status of households.

Further, I present evidence on the association between decision-making in the household and income pooling. The concept of household income pooling arises in two strands of empirical literature: the literature that tests the unitary model of the household, and in the socio-economic literature that explores management of finances in families. In the context of the unitary model, the concept of income pooling is used in two different senses (Lundberg and Pollak, 2007, 2008). First, it

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[7]This is the case in the framework of collective models; see, e.g., Almås et al. (2015).

[8]For example, when one of spouses "screws up", another takes full control over household matters. In this case the predominant individual control is the outcome of deteriorating household condition. And the coefficient on balanced decision making will be positively biased. But, the reverse causality can also go in opposite direction. For instance, when a partner having predominant control "screws up", another one steps in the decision making rather than completely retakes it. In this case the balanced control is the outcome of worsening household condition. And the coefficient on balanced decision making will be negatively biased.

means that the budget constraint of the household contains the sum of individual incomes of partners, i.e. the entire income of partners is "pooled". In other words, all income is spent on maximization of a single household utility function. In the second sense, income pooling means that the person of income recipient is irrelevant to the allocation of family resources. This is true if and only if income pooling in the first sense holds and individual incomes of partners do not enter the household utility function. Turning to the literature on family finances, it understands income pooling in its first meaning, i.e. as partners contributing individual incomes to a "common pot", "kitty", etc (Pahl, 2005) and drawing it down at their individual discretion. If such income pooling takes place, individuals who do not make decisions on important household matters are still insulated from being much poorer than other household members. That is because they can satisfy their needs by taking money from the common pool if the predominantly deciding household member does not care about them. When incomes are not pooled, individuals who do not make decisions may be more deprived than other household members as they do not have access to pooled resources. To evaluate how likely such situation is to arise, I check if individualized decision making is also accompanied by individualized family finances (i.e. no income pooling).

The EU-SILC 2010 data contains responses about the shares of partners' individual incomes contributed to a common pool. I find households that pool income are more likely to use a more balanced decision-making mode. This finding is important to both previously mentioned strands of literature. Namely, it underlies concerns expressed in the family finances literature that households with no income pooling are likely to end up in a situation in which there is significant inequality between household members (Elizabeth, 2001; Pahl, 2005). Moreover, it is clear that not all households pool incomes, thus violating the assumption of the unitary model. Those who pool incomes are also more likely to decide together. Therefore, they

resemble households in the unitary model [9]. It may be that the recurrent rejections of income pooling in the literature could be driven by households that do not pool incomes.

2 Data

The data is obtained from the 2010 round of the European Union Survey of Income and Living Conditions (EU-SILC). The EU-SILC is based on a national representative probability samples. It collects a comprehensive dataset containing information on income, poverty, social exclusion, and living conditions. The reference population includes all households and their current members residing in the countries at the time of data collection. Bases of sampling differ from country to country. In most cases, it is either the population register or the population census. In 2010, EU-SILC was implemented in the EU-27, Croatia, Montenegro, Iceland, Turkey, Norway, and Switzerland. The data used in this research covers only the EU-27 countries, and excepts Austria, Cyprus, Belgium, Denmark, Finland, Hungary, the Netherlands, Slovenia, and Sweden, because these countries use a sample of individuals and all persons in a household are not interviewed. In the rest of the EU-27 countries, all household members aged 16 and up are surveyed.

The survey collects primary and secondary variables. The primary variables are collected annually. They characterize a household as a whole or as its individual members. The household-level variables are divided into four domains: basic data, housing, material deprivation, and income. The individual-level variables are divided in five domains: basic/demographic data, education, health, labour, and income. The material deprivation variables from the household-level domain are of particular

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[9]The fact that partners pool income implies that they behave as if they have common arguments in their utility functions or even a common utility function. If they did not, none would pool individual income because a partner could take it all for personal use.

interest for our research. Its primary focus is the relationship between these variables and the mode of decision-making

Secondary variables are collected in the so-called ad-hoc modules every five years or less frequently. In year an ad-hoc module on intra-household sharing of resources was implemented. Its objective was to look into the decision-making process and the allocation of resources within the household. The 2010 ad-hoc module supplements primary poverty risk indicators by providing information on differences in living standards between household members. The questionnaire includes questions on participation of household members in important financial decisions. Specifically, each adult household member is asked to evaluate the degree of his/her participation in decisions about common savings, borrowing money, everyday spending, spending on durables, and important purchases for children. In the questionnaire, for all the above questions there are offered three possible answers about the degree of participation: "More me", "Balanced", "More my partner". The reference period is three months preceding an interview.

All except three countries (the United Kingdom, Cyprus, and Ireland) achieved the minimum effective sample size (the sample size stipulated by the EU). The difference between the actual sample size (the number of actually selected households) and the achieved sample size (the number of actually completed interviews) lies between 5.43 % (Bulgaria) and 37.61 % (Belgium) of the actual sample size. The first most common reason for interview non-completion is refusal of a household to cooperate. The second is a household not contacted. The achieved sample size varies from 2,148 households for Cyprus to 8,768 for France, 8,962 for Germany, and 13,318 for Italy. Individual non-response rates vary for different questions. Usually they are low. For most of questions on decision control in most countries, non-response rates do not exceed 1 % (Eurostat, 2012). There are, however, constently high non-response rates in France (between 17.5% and 18%) and Poland (always 25.1%). In

addition there are high non-response rates in Belgium for the question about decisions on durables (26.8%) and in Ireland for questions about decsions on everyday shopping (25.2%) and decsions on purchases for children (33.4%). Non-response rate for the primary variables is about 1% (see also Eurostat, 2016).

3   Empirical Specification

This study explores the correspondence between material deprivation conditions and the mode of decision-making in households. Measures of material deprivation and the mode of decision-making are constructed from responses of household members to the EU-SILC-2010 questionnaire. The household-level responses to questions on material conditions are used to construct the measure of household material deprivation. At the same time, individual-level responses about involvement in making decisions are used to construct an indicator of the mode of decision-making in the household.

I construct one composite measure of material deprivation. This measure is similar but not identical to the Eurostat material deprivation criterion, according to which a household is materially deprived if it fits 3 of 11 material deprivation criteria (Fusco et al., 2010). I do not use all 11 criteria, but only 6. My measure is equal to the sum of six binary variables taking a value of 1 if a household satisfies the corresponding criterion and 0 otherwise. The conditions are: arrears on mortgage payment, arrears on utility bills, arrears on hire installments, inability to afford one-week holiday away from home, inability to face unexpected financial expenses, inability to make ends meet, and inability to afford a meal with meat, fish, or chicken every second day [10]. The distribution of households by the sum of dummies

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[10]There are also questions about five more material deprivation conditions. They are disregarded in the analysis because of a very small variation in responses (only 7% of households don't have access to a car because they cannot afford it and literally all have the other three items). They are about the ability to afford the following items: keeping the home adequately warm, having a

is shown in Figure 5. If the sum of these dummies for a given household exceeds 2, the composite measure of material deprivation takes value 1 [11].

Regarding the indicator of the mode of decision-making, it is constructed from individual responses about how much a given person is involved in making specific decisions. The approach is based on the one adopted by Li and Wu (2011). Each spouse is offered three alternative options to characterize their involvement in making decisions: "More me", "Balanced", and "More my partner" [12]. In my analysis I consider only households in which partners give consistent answers to most of questions; when one partner answers to a given question "More me" and other answers "More my partner" or both answer "Balanced". I consider only households with mostly consistent responses because it is necessary for constructing my indicator of the mode of decision-making described below. Consistent responses constitute more than 90% of all responses to any considered question. I focus on responses about the following five decisions [13] : 'decision-making on everyday shopping', 'decision-making on expensive purchases of consumer durables and furniture', 'decision-making on borrowing money', 'decision-making on use of savings', 'decision-making – general'. Based on these responses I, distinguish five different modes of household decision-making: 'man-led', 'primarily man-led', 'woman-led', 'primarily woman-led', and 'balanced'. Specifically, if a man makes four or five decisions, the household is labeled "man-led". If a man makes three decisions, the household is labeled "primarily man led". Similarly, if women make three decisions or more than three decisions, households are labeled "primarily women-led"

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washing machine, having a colour TV, having a telephone, having a personal car.

[11] The results do not change much qualitatively nor quantitatively if the threshold for the sum of component dummies is equal to 3

[12] When the question is about deciding on common savings, there are also other alternatives including "Never arisen" or "No common savings".

[13] Two other decisions are excluded from analysis because they are not pertinent to the condition of the entire household. Namely, 'ability to decide about expenses for your own personal consumption, your leisure activities and hobbies', 'ability to decide about purchases for children's needs (including giving them pocket money)'. Also, not all households have children, so the 'decision-making on important expenses for the child(-ren)' is also excluded.

or "women-led" correspondingly. The rest of the households are labeled "Balanced" and constitute the reference group. Table A1 illustrates how the indicator of the mode of decision-making is constructed.

It is worthwhile to discuss the intuition behind my measure of the mode of decision-making in more detail. In the literature, indicators similar to the one constructed in the current study are called "bargaining power" (Li and Wu, 2011), "measures of empowerment" (Almås et al., 2015), "decision-making index" (Natali et al., 2016). These indicators are meant to show how much influence a woman has in the household. Almås et al. (2015), however, assume that the female empowerment measure should be proportional to the share of household income that is spent as if a woman were the sole decision-maker. In the current study I shall stick to the above mentioned terms labelling allocation of control. However, it should be understood that the time and effort committed by either spouse to working out the best possible allocation of household resources underlies the notion of 'control.' [14].

Turning to the empirical specification, let $\mathbf{Dec}_i$ be a vector of four dummy variables for the modes of decision-making (the reference category is "balanced"). The outcome of interest is a value of a material deprivation indicator j for a household i, y_{ij}. I estimate the following empirical model:

$$y_{ij} = \beta_{\mathbf{j}}\mathbf{Dec}_i + \alpha_{\mathbf{j}}\mathbf{X}_i + \epsilon_{ij} \tag{1}$$

where $\mathbf{X}_i$ is a vector of respondent, spousesal, and household characteristics,

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[14]Such understanding allows for simultaneous increase in the control of both partners. In other words, both partners can become more involved in working out a specific decision. At the same time, the income sharing-rule interpretation of intra-household control mentioned above (Almås et al., 2015) is based on the collective household model. This model implies that an increase in one partner's control is necessary accompanied by a decrease in another partner's control. That is why our proposed understanding of intra-household control is better captured by the bargaining household model (Lundberg and Pollak, 1993). This model features cooperative and non-cooperative equilibria.In our framework, more balanced decision-making corresponds to the theoretical concept of cooperative equilibrium. Non-cooperative equilibria might be not Pareto-optimal. This is in line with later empirical findings (Udry, 1996).

and ϵ_{ij} is the error term. The null-hypothesis is $H_0 : \beta_j = 0$. The methods used for estimation are OLS and 2SLS. Concerning the covariates $\mathbf{X}_i$, the main ones included are: family income, number of children of specified age, number of daughters of specified age, length of cohabitation of spouses, living in a rural area, being unemployed, employment status, hours spent on job market work, hours spent on housework, hours spent on leisure, education level, and occupation (a more detailed list appears in the next part). Besides being intuitively relevant, these controls are among those most frequently encountered in the literature. A possible theoretical reasoning behind use of specification 1 is contained in Appendix B.

The Equation 1 incorporates three specifications. The baseline specification contains RHS dummies for modes of decision-making along with the controls listed above. The second includes, in addition to all previously used regressors, interaction variables in between the decision controls and household characteristics. These characteristics are: educational attainment of each partner, unemployment during the preceding six months, length of cohabitation of partners, and pooling or non-pooling of individual incomes. The third specification has four regional characteristics on the RHS in addition to controls in the first specification, and uses instrumental variables for the mode of decision-making.

4 Results

The analysis sub sample includes only households composed of one couple of cohabiting partners with or without children. Most households report balanced decision-making (Table A2). The sample includes only households in which couples give consistent responses, i.e., if a man responds about his role in some decision "More me", then the woman responds "More my partner". From Table A2 it is clear that about 90% of responses are consistent. Table A3 shows absolute frequencies of

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households in the sample by response consistency.

When households are divided into two groups by share of consistent responses being 66% [15], the means of selected household characteristics tend to differ very little between the two groups. This could be seen in Table A4. There are only minor differences in mean household disposable income and earnings: those responding inconsistently tend to earn a little more, despite literally no difference in the hours worked. It might mean that people who give inconsistent responses are more likely to have higher earnings and to be more focused on work-related rather than home-centered activities. Also, partners more frequently report primary decision-making in households with more inconsistent responses. This is a mechanical relationship: an inconsistent response can happen only if one partner reports primary decision-making. The described similarities between the two groups make it possible to focus on households which gave predominantly consistent responses[16].

4.1 Baseline results

The results of estimating the baseline specification of equation 1 are presented in column 1 of Table 1 [17]. Higher reported personal control by either spouse is associated with more frequent instances of any material deprivation measure. Analysis by separate countries yields qualitatively similar results, which, however, are not always statistically significant and not uniform in scale. Therefore, we analyze a pooled data sample while controlling for country specific effects (this approach is quite common in the literature (Mills and Begall, 2010; Voicu et al., 2007; Aguero

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[15]Despite the vast majority of households give consistent responses to all five questions, the analysis incorporates households why reply at least three questions and give at most one inconsistent response. This reduces the sample selection problem.

[16]Several variables statistically significantly predict consistent responses: employment of a man, ownership of accommodation, living in an urban area, and a woman doing more housework. But, the largest associated change in the likelihood of a consistent response is 0.05 for ownership of accommodation and around 0.01 for remaining three variables.

[17]Results for six constituent indicators are presented in Table A5

and Marks, 2011)).

The baseline results exhibit three noticeable features. First, the share of women's income is negatively associated with material deprivation[18]. This result is in line with the findings of other studies [19]. Second, the higher the degree of individualization in household decision-making, the higher the frequency of any kind of material deprivation. Third, predominant control by women is connected to higher frequencies of all kinds of material deprivation than individual control by men (these differences are also statistically significant at 10% level for all outcomes except hire purchase installments and mortgage payments). Therefore, the direct measure of female control corresponds to better household material conditions only when women are in control of household decisions together with men. When women are sole decision-makers in the households, household material conditions are worse. The use of women's income share as proxy variable for women's control, however, would suggest that more women's control unconditionally corresponds to better material conditions.

Thus, the interpretation of the share of female income as the female empowerment might be misleading. Moreover, the fact that men's control is also related to household material conditions, combined with the finding that windfall incomes accrued to women change control of both men and women is important in two ways for interpreting the effects of windfall incomes handed to women on household outcomes.

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[18]Also, replacement of women's income share by women's relative earnings yields similar results, but woman's relative earnings are available only for about half of observations. Both woman's income share and relative earnings are used in the literature as a proxy variable for female control.

[19]This is result is not driven by the presence of unemployed women in the sample. It also holds for the subsample of employed women

Table 1 Mode of Decision-making and Composite Material Deprivation

Explanatory vars.	Dep. var.: Material Deprivation		
	(1) OLS	(2) OLS	(3) IV
Woman takes control over 4-5[20] decisions	0.068	0.085	
	(0.010)***	(0.035)**	
Man takes control over 4-5 decisions	0.025	0.132	
	(0.012)**	(0.038)***	
Woman takes control over 2-3 decisions	0.026	0.003	
	(0.005)***	(0.018)	
Man takes control over 2-3 decisions	0.006	-0.005	
	(0.008)	(0.022)	
Control balanced between partners			-0.311
			(0.176)*
Woman takes control over 4-5 decisions*Men's unemployment		0.255	
		(0.036)***	
Regional gender gap in unemployment			0.003
			(0.029)
Regional share of employment in hi-tech industries			-0.143
			(0.019)***
Share of population having access to broadband internet connection in a region			-0.003
			(0.001)***

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[20]Out of 5 or 4 decisions consistently reported by a household

Table 1 (continued)

Explanatory vars.	Dep. var.: Material Deprivation		
	(1) OLS	(2) OLS	IV (3)
Regional rate of long-term unemployment			0.019
			(0.002)***
Share of woman's income in total household income	-0.024	-0.028	-0.037
	(0.014)*	(0.014)**	(0.016)**
Woman responds the questionnaire	0.034	0.034	0.022
	(0.004)***	(0.004)***	(0.008)***
Number of children	0.044	0.043	0.044
	(0.002)***	(0.002)***	(0.002)***
Woman's age	-0.003	-0.003	-0.002
	(0.000)***	(0.000)***	(0.000)***
Man's age	-0.002	-0.002	-0.003
	(0.000)***	(0.000)***	(0.000)***
Woman has tertiary education	-0.156	-0.159	-0.157
	(0.006)***	(0.007)***	(0.008)***
Man has tertiary education	-0.162	-0.165	-0.150
	(0.006)***	(0.006)***	(0.014)***
Woman has secondary education	-0.064	-0.065	-0.060
	(0.005)***	(0.005)***	(0.005)***
Man has secondary education	-0.075	-0.077	-0.056
	(0.005)***	(0.005)***	(0.009)***
Woman is employed full-time	-0.108	-0.107	-0.096

Table 1 (continued)

Explanatory vars.	Dep. var.: Material Deprivation		
	(1) OLS	(2) OLS	IV (3)
	(0.007)***	(0.007)***	(0.008)***
Man is employed full-time	-0.102	-0.095	-0.096
	(0.005)***	(0.006)***	(0.008)***
Woman is employed part-time	-0.057	-0.060	-0.033
	(0.008)***	(0.008)***	(0.009)***
Man is employed part-time	0.006	0.011	0.007
	(0.015)	(0.015)	(0.016)
Woman is self-employed	-0.064	-0.066	-0.056
	(0.007)***	(0.007)***	(0.009)***
Man is self-employed	-0.119	-0.114	-0.129
	(0.006)***	(0.006)***	(0.008)***
Woman's earnings	0.000	0.000	0.000
	(0.000)***	(0.000)***	(0.000)***
Man's earnings	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Household disposable income	-0.000	-0.000	-0.000
	(0.000)***	(0.000)***	(0.000)***
Own accomodation	-0.133	-0.129	-0.128
	(0.005)***	(0.005)***	(0.005)***
Densely populated area	-0.011	-0.010	-0.018
	(0.004)***	(0.004)***	(0.005)***
Country dummies	Yes	Yes	Yes

Table 1 (continued)

Explanatory vars.	Dep. var.: Material Deprivation		
	(1) OLS	(2) OLS	IV (3)
R^2	0.22	0.22	0.16
N	64,082	62,358	64,660

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Note: Robust standard errors are in parentheses. The sample contains households consisting of a couple with or without children. Households with inconsistent responses and with female income higher than total household income were excluded. The dependent variable is the *Material deprivation index.* It is a binary variable taking value 1 if more than 2 of 7 considered material deprivation conditions occur in an observed household. Numbers in the first two columns represent estimations of two specifications of equation 1. The second specification differs from the first in the presence of interactions between the modes of decision-making on several household characteristics. The RHS in specifications (1) and (2) contains 4 decision-making dummies with the balanced mode being a reference category. The third column contains results of IV estimation explained in Subsection 4.3. In specification (3) the RHS contains only one decision-making dummy which is for the balanced mode, while other modes constitute the reference category. The two instruments used for the balanced mode of decision-making are: the rate of involvement of 4-year-olds in formal childcare and the gender gap in weekly work hours.

First, a conventional interpretation assigns these effects to increased female control. Still, if men's control changes simultaneously and is related to household outcomes, the effects in question cannot be assigned only to female control. To reinforce this claim we conduct a series of estimates to check whether the correlations obtained are driven by some confounders. Second, it is quite possible that the increased balanced control partly drives those positive effects reported in the

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literature. If causation from balanced control to better material conditions were established, it would support this notion. That is why I also conduct instrumental variables estimation of a modified equation 1. The results of controlling for potential confounders as well as of 2SLS estimation are reported next.

4.2 Controlling for potential confounders

There are several variables that could confound the baseline results and are present in the data set. These are: educational attainment of spouses, hours of job market work and of housework, man's long-term unemployment, length of cohabitation of partners, and the regime of family finances. These variables and interactions between them and the mode-of-control dummies are included in the RHS of equation 1. The results of the estimations are shown in column 2 of Table 1. The main conclusion is that the established relationship between the household mode of decision-making and material deprivation still holds and is not driven by the suggested confounders.

Among the confounders considered, the regime of family finances deserves special attention. If the mode of decision-making is closely related to the regime of family finances, it will support the concerns in the literature about within-family consumption inequality due to individualization of family finances (Pahl, 2008; Vogler and Pahl, 1994). Figure 1 shows distributions of households by mode of decision-making conditional on the regime of family finances. The share of households reporting balanced decision-making decreases when individual incomes are treated autonomously.

The character of the relationship between decision-making and material deprivation, however, does not change compared to the baseline case. This can be seen from column 2 of Table 1. Thus, the concerns in the literature about possible intra-familial consumption inequality are partially warranted due to the fact that families with pooled incomes more frequently make decisions in a balanced way. Nevertheless, the allocation rules probably do not change since the relationship between
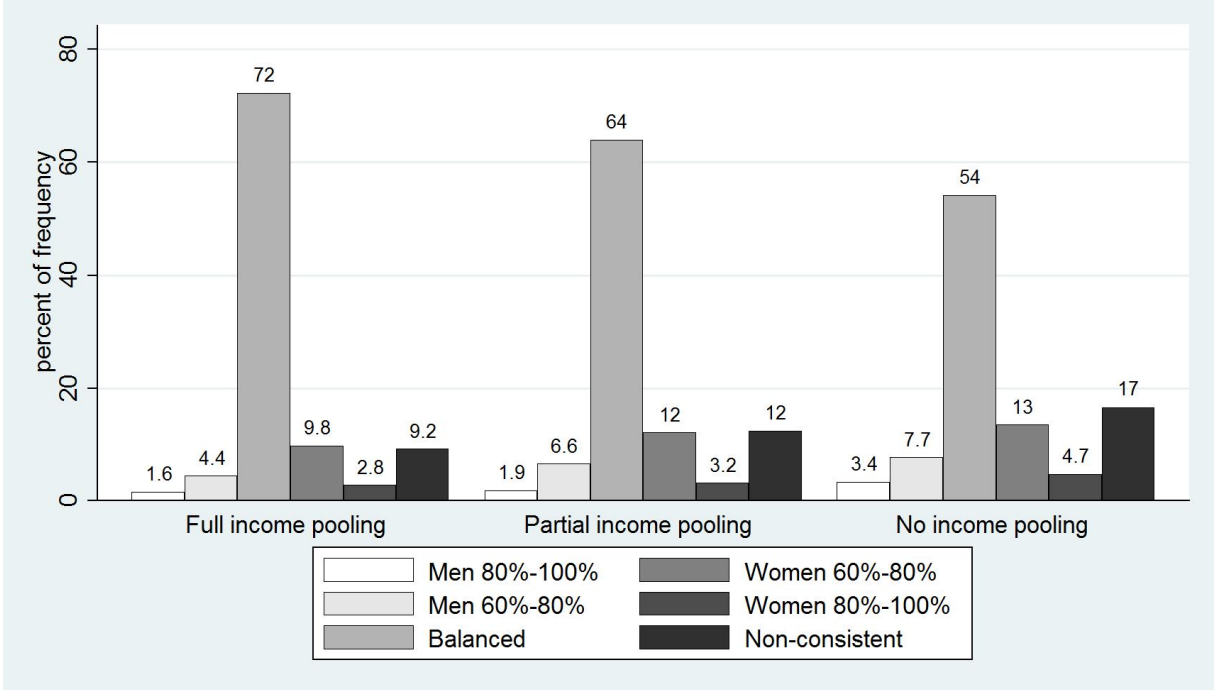
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Figure 1: Shares of families by decision-making mode across the regimes of family finances

decision-making and deprivation is similar for both income pooling and non-pooling regimes.

4.3 Instrumental variable estimation

The robustness of the established correlations might indicate that the established relationship between the household mode of decision-making and material deprivation is actually causal. Accordingly, to make this claim with more certainty, a more refined estimation technique is needed. The ideal way to proceed would be using data from randomized control trial when treatment changes the mode of decision-making. The sample that I analyze, however, does not contain such data. One possibility in this case is to use regional-level variables as instruments for the balanced mode of decision-making. Despite the fact that this requires strong identification assumptions, it is widely used in the literature (Moffit, 2005). To conduct

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the instrumental variables estimation, I modify Equation 1 so that the RHS contains only one dummy for balanced decision-making rather than four dummies for remaining modes. The OLS estimation has at least two potential problems. First, the estimate can be biased towards zero due to errors in reporting the control allocation. Second, the estimate can be biased due to reverse causality. The direction of the bias depends on the specific mechanism of the reverse causality. For example, if one spouse takes predominant control when the other partner has made a decision with negative consequences, the OLS estimation would yield too a large coefficient in absolute value. If, however, one of spouses joins the decision-making process when the partner makes an error of judgment so that they start deciding in a more balanced way, the OLS estimation would yield too small a coefficient in absolute value. Regarding the instrumental variables, I use two: the rate of involvement of 4-year-olds in formal childcare and the gender differences in weekly work hours.

These instruments can be warranted by previous findings in the literature. First, accessibility of institutional pre-school childcare has been found to have significant consequences for female activity status. A couple of recent studies mention this (Bičáková, 2016; Kalíšková et al., 2016; Bičáková and Kalíšková, 2016).In turn, the activity statuses of household members are related to the allocation of control in households. This is confirmed empirically (Schneebaum and Mader, 2013; Yusof and Duasa, 2010) and is a departure point in theoretical research(Lundberg and Pollak, 1993). Specifically, when a woman is not employed outside the household, her contribution to the family income is not likely to be high. That is why she does not have enough control over family finances, in particular, over decisions on use of savings and borrowing money. At the same time, she often has more control over purchases for children and everyday shopping (Schneebaum and Mader, 2013). This resembles a theoretical separate spheres equilibrium demonstrated by Lundberg and Pollak (1993). Further, the longer a woman stays on maternity leave due to

inaccessible childcare the more likely such allocation of control is to arise, and once established, it tends to carry on (Basu, 2006). Therefore, the accessibility of pre-school childcare (which does not appear to change quickly) should influence the intra-household allocation of decision-making. It is hard to see any other channel through which it could influence household material deprivation measures once activity status and incomes of household members are controlled for [21].

Second, besides the activity status, employment opportunities also matter for allocation of control in family. For example, Morrill and Pabilonia (2015) show that increasing national unemployment rates reduce time spent together also in households with both partners working due to rearrangement of working schedules (workers accept less convenient hours to preserve the job). In turn, less time spent together leads to greater specialization of partners (Mansour and McKinnish, 2013) so that they do not decide together, but rather individually on matters of their responsibility. In this case, gender difference in weekly workhours will reflect the difference in spouses' ability to arrange their schedules in order to participate in home-focused activity. The one for whom it is more difficult is likely to be more preoccupied with his or her job and to be less able to participate in household deci-sions. Moreover, employment perspectives influence spouses' expectation of income in the case of divorce. This is an important factor in intra-household bargaining

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[21]It might also happen that accessibility of childcare influences women's employment which, in turn, influences household material deprivation. This fact could threaten identification if either the correlation between childcare accessibility and women's employment is too high or when the women's employment is itself endogenous. The former situation is not the case while the latter is likely to attenuate the estimates and not undermine the conclusions. Specifically, the most likely unobservable household-level variable affecting women's employment is women's household productivity. That is, women who are more productive at home are less likely be employed. When there are more employment opportunities due to accessible childcare, more such women become employed. That is why the negative effect of employment on household material deprivation for a subsample of women having access to childcare will be lower than for the entire population (because when they become employed their household loses more in terms of the household production). This difference will translate into smaller estimated effect of balanced decision making under the proposed IV estimation. In other words, the IV estimated coefficient on balanced control will be a lower bound estimate. Therefore, the identification assumption about exogeneity of childcare accessibility comes at no cost for the conclusions of this study.

(Lundberg and Pollak, 1993). Those who have worse employment perspectives will be less likely to resort to divorce in the case of household conflict and, thus, more likely to concede more control to their spouses. The gender gap in weekly work hours will reflect the difference in spouses' outside-marriage options and willingness to concede control.

Both variables are measured across NUTS 2 regions. The results of 2SLS estimation are shown in column 3 of Table 1. The 2SLS coefficient is statistically significant and has the same sign as the OLS coefficient, but its absolute value is much larger. This is consistent with correcting for the attenuation bias and the reverse causality from worse outcomes to more balanced control, as in the second of the two mechanisms explained above. The two instruments used stood up to several tests. First, the value of F-statistic for a test of their joint significance in the first-stage equation is 20. Second, the Hausman test shows that the balanced-control variable is not exogenous at a 10% confidence level. Third, the overidentifying restriction test statistic is not significant (p-value is 0.97). Fourth, when the reduced form model is estimated on the sub-sample of households with balanced decision-making only, the proposed instruments lose their statistical significance as expected. Fifth, when the reduced form model is estimated on the subsample of single-headed households, the instruments also lose statistical significance. Thus, the 2SLS estimation result supports the claim that balanced decision-making in households reduces material deprivation.

5   Conclusions

In this paper, we establish strong and robust correlations between direct measures of each adult household member's control over specific decisions and household-level measures of material deprivation. More individualized control by either partner is

closely related to more frequently reported material deprivation if other conditions remain constant. This result holds for primary control by both men and women. This fact questions the interpretation of a positive impact of increases in female income as outcomes of increase in female control, because increases in female incomes change male control as well. In such cases, effects of windfall incomes handed to women documented in the literature could be actually driven by increases in balanced decision-making. This notion is supported by several studies which report increases in balanced decision making as a result of windfall incomes going to women. The negative relationship persists when we control for a number of possible confounders and use IV estimation, suggesting that it is likely to be causal. Possible detailed mechanisms at work behind the observed pattern are partially accounted for by an autonomous regime of family finance management when one partner cannot afford to cover an agreed upon part of common expenditures. However, more research is needed to understand precisely how this relationship works. Detailed information on the routines of managing household finances would be helpful in this case. It is possible that joint expenditures are akin to joint projects (Evertsson and Nyman, 2014). In this case, a lack of cooperation on household decisions could be interpreted as a lack of cooperation on a joint project, which is known to be a very common cause of projects failure. As for the policy implications of the established results, it turns out that individual-specific (usually female-specific) targeting of social assistance, which is frequently highlighted in the literature (Attanasio and Lechene, 2010; Schady and Rosero, 2007; De la Briére and Rawlings, 2006), perhaps should not be unambiguously preferred to household-specific targeting.

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Appendix A

Table A1 Construction of decision-making dummies

Number of decisions made by men	Number of decisions made by women	The mode of decision-making
5	0	Man-led
4	0	Man-led
4	1	Man-led
3	0	Primarily man-led
3	1	Primarily man-led
3	2	Primarily man-led
2	0	Balanced
2	1	Balanced
2	2	Balanced
2	3	Primarily woman-led
1	0	Balanced
1	1	Balanced
1	2	Balanced
1	3	Primarily woman-led
1	4	Woman-led
0	0	Balanced
0	1	Balanced
0	2	Balanced
0	3	Primarily woman-led
0	4	Woman-led
0	5	Woman-led

Table A2 Percentages of responses of different types

	Type of response		Decision-making measure					
A woman's response	A man's response	Agreement of responses	Decision-making in general	Decision-making on use of savings	Decision-making on borrowing	Decision-making on purchases of durables	Decision-making on everyday shopping	Decision-making on important purchases for children
More me	More me	Disagree	0.7	0.4	0.4	0.4	1.4	0.7
More me	Balanced	Disagree	2.0	1.1	1.4	0.8	3.6	4.7
More me	More my partner	Agree	7.1	4.8	7.6	3.6	47.0	21.3
Balanced	More me	Disagree	2.0	1.3	1.3	1.5	0.8	0.8
Balanced	Balanced	Agree	77.5	84.3	81.6	84.0	39.2	66.6
Balanced	More my partner	Disagree	1.5	1.2	1.7	0.8	2.1	3.3
More my partner	More me	Agree	7.4	5.3	4.7	7.4	4.5	1.5
More my partner	Balanced	Disagree	1.4	1.3	1.1	1.3	0.5	0.6
More my partner	More my partner	Disagree	0.4	0.2	0.3	0.3	0.8	0.4
Total percentage			100	100	100	100	100	100
N of households (non-weighted)			82,459	68,016	77,677	60,518	82,626	27,155

Source: 2010 European Union Survey of Income and Living Conditions and author's calculations.

Table A3 Frequencies of responses by consistency when at least one question is answered by both partners

Number of consistent responses	Number of households	Percentages
0	287	0.4
1	717	0.9
2	1,879	2.3
3	4,963	6.0
4	14,364	17.4
5	60,516	73.2
Total	82,726	100

Source: 2010 European Union Survey of Income and Living Conditions.

Table A4 Sub-sample weighted means of selected household characteristics by response consistency

Household characteristics	More than 66% of responses are consistent	Less than 66% of responses are consistent
	Means	Means
Number of persons in a household	3.02	3.06
Age of a woman	50.31	49.51
Age of a man	53.12	52.43
A number of children	0.65	0.70
A woman having tertiary education	0.24	0.25
A man having tertiary education	0.27	0.27
A woman having secondary education	0.42	0.40
A man having secondary education	0.41	0.40
A woman being full-time employed	0.30	0.29
A man being full-time employed	0.48	0.46
A woman being part-time employed	0.14	0.16
A man being part-time employed	0.02	0.03
Yearly earnings of a woman (gross), euros	8,289.43	9,335.15
Yearly earnings of a man (gross), euros	15,284.62	16,599.72
Hours worked per week by a woman	16.75	16.45
Hours worked per week by a man	25.91	25.99
Household disposable income	32,416.57	35,913.32
Ownership of a dwelling	0.33	0.28
Living in highly urbanized area	0.46	0.48
Lowest monthly income to make ends meet, euros	2,706.95	1,992.91
Having arrears on mortgage payments during the previous month	0.18	0.11
Having arrears on utility bills during the previous month	0.20	0.13
Having arrears on hire purchase installments during the previous month	0.12	0.13
Inability to afford a two-week holiday once in a year	0.33	0.34
Inability to afford meat-containing diet every second day	0.06	0.07
Inability to face unexpected financial expenditures	0.30	0.32
Inability to make ends meet	0.52	0.54
A woman responds the household questionnaire	0.42	0.39
Incomes are pooled	0.78	0.69
A woman reports primary decision-making in general	0.09	0.21
A man reports primary decision-making in general	0.09	0.23
A woman reports primary decision-making on savings	0.05	0.14
A man reports primary decision-making on savings	0.06	0.21
A woman reports primary decision-making on durables and furniture	0.07	0.20
A man reports primary decision-making on durables and furniture	0.05	0.18
N of households (weighted)	75,102	7,624

Source: 2010 European Union Survey of Income and Living Conditions.

Table A5 The Mode of Decision-making and Household Economic Outcomes

Modes of decision-making relative to balanced	Household outcomes						
	Arrears on mortgage payments	Arrears on utility bills	Arrears on hire purchase install-ments	Inability to afford one week annual holiday	Inability to afford a proper diet	Inability to face un-expected financial expenses	Inability to make ends meet
A woman takes con-trol over 4-5 decisions	0.056 (0.012)***	0.046 (0.007)***	0.053 (0.017)***	0.066 (0.010)***	0.034 (0.007)***	0.070 (0.010)***	0.049 (0.009)***
A man takes control over 4-5 decisions	0.026 (0.014)**	0.031 (0.008)***	0.029 (0.022)	0.039 (0.012)***	0.013 (0.008)*	0.021 (0.012)*	-0.002 (0.012)
A woman takes con-trol over 2-3 decisions	0.011 (0.005)***	0.024 (0.003)***	0.024 (0.008)***	0.023 (0.005)***	0.012 (0.003)***	0.024 (0.005)***	0.011 (0.005)**
A man takes control over 2-3 decisions	0.014 (0.007)**	0.025 (0.005)***	0.030 (0.012)***	0.005 (0.007)	0.005 (0.005)	-0.007 (0.007)	-0.037 (0.007)***
A woman responds the house-hold ques-tionnaire	-0.003 (0.003)	0.006 (0.002)***	-0.002 (0.005)	0.041 (0.003)***	0.002 (0.002)	0.041 (0.003)***	0.029 (0.003)***
Woman's income share	-.004 (0.007)	-.006 (0.004)	-.015 (0.008)*	-.006 (0.007)	.000 (0.004)	.000 (0.007)	.010 (0.006)*
N of hhs.	27,987	74,733	16,379	75,073	75,089	75,063	75,059
$R^2 adj.$	0.67	0.58	0.14	0.26	0.14	0.20	0.30

Notes: Each column corresponds to one regression. Each of the four decision-control variables takes value 1 or 0. A decision-control variable takes value 1 if both partners report one of them having a dominant role in making a corresponding decision. A decision-control variable takes value 0 if both partners report balanced participation in making a corresponding decision. Robust standard errors are in parentheses. * denotes statistical significance at 10 percent, ** at 5 percent, and *** at 1 percent.
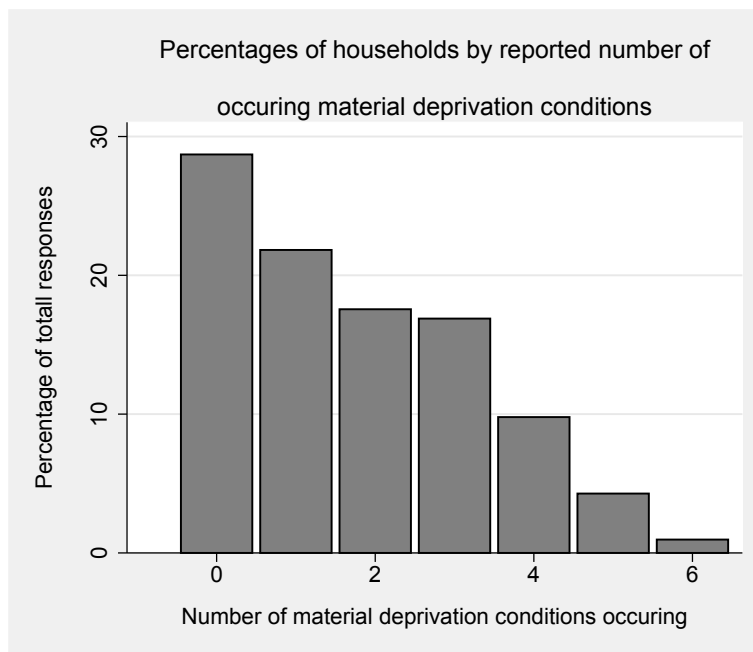
Fig.A2

Appendix B

This appendix presents a simple stylized model borrowed with few changes from one related study (Andaluz Molina, 2007). The model has two purposes. First, it answers the research question in a simplified stylized framework. Second, it justifies the use of empirical specification 1 for data analysis. I shall explain why exactly this model was chosen. Then, I present the model.

Broadly, there are distinguished three general models of the household. Detailed presentation of these models and further references can be found, e.g., in Lundberg and Pollak (2008). The unitary model is the least suitable to answer my research question since it assumes only one decision-maker in a family. In the sample analyzed, observations in which only one spouse takes all the decision control happen very rarely. As for the collective model, it allows for more than one decision-maker, but it imposes the restrictive assumption of Pareto efficiency [22] on

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[22]More precisely, this model requires that the household utility function has the so-called "Pareto property". It means that the function is strictly increasing in individual household utility. That is why to avoid confusion the household utility function is often called "welfare function" (analogous

equilibrium household allocation. In this way, the collective model makes derivation of testable restrictions on the response of household demands to 'distribution factors' that affect the household allocation possible. Since this study does not aim to derive testable restrictions on household demands, it seems reasonable to place the intended empirical estimation into the framework of the cooperative bargaining model. This model relies on weaker assumptions than the collective model.

This particular specification can produce demand equations to be estimated using the available data under some additional common assumptions. In the cooperative bargaining model, there are two possible equilibrium states of a household. The first is a non-cooperative one [23]. Formally it is represented as the equilibrium in the Cournot game. This equilibrium is not necessarily Pareto-efficient. The second possible equilibrium state is a cooperative one which is determined through the bargaining between partners. Formally it represents a solution to the Nash-bargaining problem, characterized by Pareto-efficiency. The bargaining outcome completely determines intra-household allocation including consumption structure, work-leisure choice, and assignment of home tasks (Lundberg and Pollak, 2008). The partners are referred to as the husband ($j = h$) and the wife ($j = w$) The objective of a partner j is to maximize a utility function $W^j(U^j, U^{-j})$. The utility function W itself depends on the own utility from consumption U^j and on that of another partner U^{-j}. Each partner has a utility function of the form $W^j = U^j + U^{-j}$, with $s \in [0, 1]$ denoting the degree of altruism of the partners, which is the same for both of them. Let U^j be the direct utility of individual consumption of a family member j consuming an amount c^j of the private good and amounts q^h and q^w of the public good provided by the husband and the wife respectively. The utility of individual

to Bergson-Samuelson social welfare function (SWF)) (Apps and Rees, 2008). However, in most unitary models this property necessarily implies Pareto optimality or Pareto efficiency of household resource allocation, i.e. first-best allocation of household resources. This condition appears to be quite restrictive.

[23]Terms "cooperative" and "non-cooperative" are used here in the sense of cooperative game theory, which assumes that players can make binding, costlessly enforceable commitments.

consumption for each partner takes the following form:

$$U^j(c^j, q^h, q^w) = c^j + \alpha \mathrm{Ln} q^w; (j = h, w; 0 < \alpha < 1) \tag{B1}$$

The first is a non-cooperative equilibrium analogous to the one in (Lundberg and Pollak, 1993) in which partners play a Cournot game. Each agent decides, given the decisions made by the other player, both consumption of the private good and contribution to the household public good. Formally, each partner solves the following optimization problem:

$$\max_{c^j, q^j} W^j(U^j, \overline{U^{-j}}), \quad j = h, w$$

$$\text{s.t. } c^j + p^j q^j = I^j \tag{B2}$$

$$q^{-j} = \overline{q^{-j}}$$

where p^j is the price of the household public good provided by j, I^j is the income of individual j, and the price of the private good is normalized to one. The price p^j is the shadow price of a unit of the public good. It is shadow because there is no market for household public goods. Typical examples are childcare, preparing meals, and maintaining accommodation. However, there are also other examples more suitable for the current research, like trying to save energy or putting effort in searching for lower prices or more effective solutions when buying furniture and appliances, or housing renovation. The second optimization constraint in B2 means that the optimizing partner treats the amount of the public good provided by another partner as given. The solution to that problem is characterized by the following amounts of the public good provided by each partner:

$$q_{NC}^{h}{}^* = \frac{\alpha(1+s)}{p_h} \quad q_{NC}^{w}{}^* = \frac{(1-\alpha)(1+s)}{p_w} \tag{B3}$$

where p_h and p_w stand for prices of the public good for the husband and the wife

respectively. Assuming that both partners face the same price of the public good [24], it is possible to write an expression for the total amount of the public good provided by the partners:

$$q_{NC}{}^* = q_{NC}^h{}^* + q_{NC}^w{}^* = \frac{(1+s)}{p} \tag{B4}$$

The second equilibrium considered is a cooperative one. In this case individuals choose the allocation of goods which maximizes the product below:

$$N = [W^h(c^h, q^h, q^w) - W_{NC}^h(Z)][W^w(c^w, q^h, q^w) - W_{NC}^w(Z)]$$
$$\text{s.t. } p(c^h + c^w) + p^h q^h + p^w q^w = I^w + I^h = I \tag{B5}$$

the subscripts C and NC stand for "non-cooperative" and "cooperative" respectively. The non-cooperative equilibrium does not mean dissolution of a household but rather specialization of its members on separate spheres of activity according to conventional social norms with little coordination between them. The allocation which maximizes B5 is called generalized Nash-bargaining solution. It is characterized by the following amounts of the public good:

$$q_C^h{}^* = \frac{2\alpha}{p_h} \quad q_C^{w*} = \frac{2(1-\alpha)}{p_w} \tag{B6}$$

Since $p_h = p_w$, the total amount of the public good provided by the partners takes the following form:

$$q_C{}^* = q_C^h{}^* + q_C^{w*} = \frac{2}{p} \tag{B7}$$

It is clear from Equations B4 and B7 that $q_{NC}{}^* < q_C{}^*$ [25] or the amount of the public good provided in non-cooperative equilibrium is lower than the amount

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[24]This assumption comes at no cost because the results do not change, but it helps to simplify the math.

[25]Again, if prices of public goods were not assumed to be equal, it is clear that each term in Equation B7 is larger than the corresponding term in Equation B4, so the conclusion holds.

of the public good provided in cooperative equilibrium. Using Equations B4 and B7, a total amount of the public good provided can compactly be rewritten in the following way:

$$q_i = \theta_0 + \theta_1 d_i \tag{B8}$$

where $d_i = 1$ if a household i is in non-cooperative equilibrium and $d_i = 0$ if a household i is in cooperative equilibrium and $\theta_0 = \frac{2}{p}$, $\theta_1 = -\frac{(1-s)}{p}$.

Then, I can argue that q in the Equation B8 constitutes a latent variable underlying the binary indicator of material deprivation. That is because the public good is the total effort of partners to find the best allocation of household resources. The more such effort they contribute, the better the material condition of the household will be. Thus, Equation B8 constitutes an underlying latent-variable formulation for Equation 1, while the mode of decision making is a proxy variable for d, the dummy for the cooperative bargaining equilibrium in the household.

Abstrakt

Tato studie zkoumá, jak jsou životní podmínky domácností spojeny s alternativními alokacemi kontroly nad rozhodovacím procesem v domácnostech. K určení stupně kontroly, kterou mají jednotliví členové domácnosti nad různými rozhodnutími a k určení životních podmínek, jsou ve výzkumu použity odpovědi z extensivního mnohonárodnostního dotazníkového šetření domácností. Tato studie dochází ke třem hlavním zjištěním. Za prvé více rovnostářský styl rozhodování uvnitř domácností je spojen s lepšími životními podmínkami. Za druhé korelace mezi převládající kontrolou jednoho z partnerů nad rozhodovacím procesem uvnitř domácností a horšími životními podmínkami domácnosti je silnější pro ženy než pro muže. Za třetí pravděpodobnostní rozdělení typu rozhodovacího procesu uvnitř domácností nijak silně nepředpovídá režim správy rodinných financí. Tato zjištění podporují mínění, podle kterého vliv sociální podpory zaměřené na ženy nemusí být nezbytně důsledkem zesílení pozice žen.