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Who Gets to Look Nice and Who Gets to Play? Effects of Child Gender on Household Expenditure

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Abstract

The researchers examine the relationship between a child's gender and family expenditures using data from the Polish Household Budget Survey. Having a first-born daughter as compared with a first-born son increases the share of household expenditures related to children's and adult females' clothing, but reduces spending on games, toys and hobbies, and kindergarten. These expenditure patterns suggest an as-so-far unexamined role of gender in child development: Parents seem to pay more attention to how girls look, while favoring boys with respect to human capital investment. This could have consequences in adult life and contribute to sustaining gender inequalities.

1. Introduction

Children's gender has been demonstrated to influence family stability (Dahl and Moretti, 2008), fertility (Ben-Porath and Welch, 1976; Das, 1987), abortion rates (Sen, 1990; Jha et al., 2006), investment in nutrition and child care (Behrman, 1988; Jayachandran and Kuziemko, 2011; Barcellos et al., 2012), educational and behavioural outcomes (Bertrand and Pan, 2013; Autor et al., 2014), voting preferences (Oswald and Powdthavee, 2010) and labour market activity (Lundberg and Rose, 2002; Ichino et al., 2011).[1] These effects are sometimes explained by gender-biased preferences of parents who, for example, would rather have a boy than a girl. On a number of outcomes, however, they are also consistent with gender-neutral preferences. In these instances, they refer to differences in costs of bringing up boys and girls, differences in the returns from investment in the child's human capital (especially prevalent in the developing world) and the importance of gender-specific roles in the upbringing process. In some cases, such as the effect on voting behaviour, the most natural explanation is a direct causal consequence of children's gender on changes in parental preferences.[2]

Using a detailed dataset on expenditures of Polish households, we extend the existing pool of evidence on the effects of children's gender to include its role in changing household consumption behaviour. Focusing on expenditure patterns may provide further clues in understanding the mechanisms behind the already-identified effects on parental outcomes. Moreover, it seems natural to expect that if there is differential treatment of boys and girls by their parents, it should be reflected in the way households allocate their resources. The latter case is of particular importance in the light of the growing evidence on the role of early interventions (Blau and Currie, 2006; Cascio, 2009; Almond and Currie, 2011; Carneiro and Ginja, 2014) and investment in children in the form of prenatal care, vaccinations or medical care (Aizer, 2003; Figlio et al., 2009; Levine and Schanzenbach, 2009). One could expect that differential levels of expenditure related to the child's human capital development or on items that may solidify gender stereotypes could have long-term consequences for children's outcomes in the future.

The Polish Household Budget Survey (PHBS), which we use in this paper, offers a unique chance to study detailed patterns of household expenditures differentiated by a child's gender as well as other family characteristics. In contrast to most expenditure datasets, in the PHBS it is

[1] For a review of economic, sociological and psychological studies, see Raley and Bianchi (2006).

[2] In Oswald and Powdthavee (2010), the father's utility function does not change as a result of having a boy or a girl. However, since his children's gender enters the utility function, the outcome – in this case, voting behavior – is *conditional* on the number of boys and girls.

possible to classify a number of detailed expenditures by age and gender. This allows us to split spending between adults and children aged up to 12 and by gender among adults.[3]

Using data for the years 2003-2011, we compare 17,305 families with first-born girls and 18,612 families with first-born boys to study the differential patterns of household expenditure. Since we observe some families in two consecutive years, in total we work with a sample of 53,300 observations. We first discuss three main potential confounding factors, namely marital stability, fertility and labour supply. We then examine the effect of child's gender on several broad expenditure categories, such as food, clothing and shoes, health, education and transport, including expenditure on adult clothing items split by gender as recorded in the PHBS data. Finally, we can distinguish several child-related expenditure items, such as spending on clothing for children aged below 13 and expenditure on kindergarten. Additionally, we examine two categories of expenditure that include mainly child-related goods, namely 'games, toys and hobbies' and 'educational books and materials'.

We confirm that having a first-born girl decreases marital stability and fertility, but we do not find any relationship between child's gender and parental labour supply. Our findings suggest that the gender of children can have a significant effect on household expenditure patterns. We find that having a first-born girl increases spending on clothing and shoes by 2.9%, and this overall effect is found to reflect a 5.6% increase in spending on women's clothing, a 6.5% decrease on men's clothing and a 5.7% increase on children's clothing (in all cases when we refer to clothing the category in the text, it also includes shoes expenditure). Moreover, households with a first-born girl spend less on games, toys and hobbies (by 14.8%) as well as on kindergarten (by 5.4%) compared with parents of first-born boys. These findings seem to point towards a gender-stereotypical pattern of child-related expenditure, with girls' parents buying them more clothing and boys' parents spending more on games. More importantly, though, lower

[3] In the United States, the Consumer Expenditure Survey (CEX) also contains some information on child-specific expenditure such as clothing and private education. In the US data, however, children's goods are classified up to the age of 17, i.e. way into teenage years. This might be a problem because the older the children the more they take an active part in consumption decisions. Therefore, in the US, we often cannot distinguish between the decision of a teenager and that of a parent. Furthermore, CEX offers small sample sizes relative to the US population. For example, Blundell et al. (2008) start off with 192,564 households for years 1980 to 2004 but end up using only 14,430 households with complete data for their food demand estimation; Charles et al. (2009) use 1986 to 2002 data for all households and work with a sample of 49,363 households. Another problem in the case of the US is the much more lenient abortion legislation and evidence that immigrants from Asia keep their skewed gender preferences towards boys even long after immigration to North America (Almond et al., 2013). From this perspective, Poland offers a higher-quality and larger dataset, homogeneous population, strict abortion legislation and only limited access to in vitro fertilization (IVF) treatment. It is thus unlikely that our estimates will be biased due to lack of randomness in the gender of a child.

kindergarten spending on girls might constitute expenditure differentiation with potentially significant long-term disadvantages for girls.

The findings on clothing expenditure are consistent with a number of potential hypotheses. First of all, the gender of the first child might have a direct effect on parents' consumption preferences, which would be in line with the effect of having a girl on voting preferences (Oswald and Powdthavee, 2010). Alternatively, mothers' and daughters' clothing might be complements, in which case spending more on one may lead to higher spending on the other, at the expense of fathers' clothing.

Our findings constitute first evidence suggestive of the fact that a child's gender affects the pattern of parental and child-related expenditure. On the one hand, this evidence may reflect the direct effect of the first child's gender on parental consumption preferences. On the other, it points towards lower levels of human capital investment in girls and a pattern of consumption suggestive of early assignment of stereotypical gender roles. Thus, girls get to look nice and boys get to play.

2. Data and sample statistics

We use a dataset from the Polish Household Budget Survey for years 2003-2011. It is a nationally representative dataset collected annually by the Central Statistical Office in Poland (GUS).[4] The data include information on household demographic composition and labour market activity, as well as income and expenditure data recorded over the period of a month in which households participate in the survey. In total, we have information on 323,754 households and 965,082 individuals over the nine years from 2003 to 2011. The PHBS contains a rolling panel element covering over a third of the participating households, which are interviewed in two consecutive years (in the same calendar month). In the full sample, we identify 121,382 households for which information is available for two periods.

Since the dataset does not contain retrospective fertility information, we rely only on contemporaneous family composition. Individuals in every household are matched into families, which we define as a single adult or a couple (married or cohabiting) with any dependent children. This is done using available information on the relationship to the head of household and detailed pairing in the data using information on the unique identifiers of mothers, fathers

[4] For more information on the methodology used by GUS, see Barlik and Siwiak (2011). The methodology complies with EUROSTAT recommendations. A summary of the survey methodology is given in the Appendix.

and partners of each individual. Following other studies in the literature, we limit the analysis to mothers aged between 18 and 40 who had their first child at the earliest at the age of 16. The limit for the age of the oldest child is set at 12 years, which is consistent with the approach of Dahl and Moretti (2008) and at the same time corresponds to the grouping of expenditure information on clothing and shoes.[5]

Because expenditure data are collected at the household level, we additionally limit the sample to households where there is only one family with children below 13 years of age. This does not preclude the possibility of there being more than one family in the household (for example, parents living with children and their grandparents). In fact, such complex households are relatively common in Poland (Haan and Myck, 2012). In the full PHBS sample, 71.0% of households contain only one family, 22.2% include two and 6.8% three or more. In the sample used in this analysis, 74.6% are single-family households. We further restrict the sample to families with a mother present in the household and where the child-mother relationship is clearly specified in the data. We exclude twins and triplets at first birth, widowed mothers and lone fathers.[6]

The analysis is conducted for the full sample of families and then separately for the sample of married couples and non-married families. If the welfare of families is affected by the marital status of parents, and the latter driven to some extent by the gender of children, then any identified effect of gender on expenditure in the full sample could be a consequence of different partnership arrangements of girls' and boys' families, rather than directly a consequence of different expenditure behaviour of boys' and girls' parents. Section 4 also presents analysis relating to other potential sources of bias, namely the indirect effects of gender through fertility, parental labour supply or household income.

Descriptive sample statistics are presented in Table 1 separately for all families and for married couples. The sample size for all families, used in the main analysis, is 53,300, and for the married couples it is 46,185. Among all families, 9.0% of children live without a father. This number can be decomposed into 4.6% of mothers who were never married and 4.4% of mothers who are divorced or separated. The average number of children in the main sample is 1.62 and it

[5] Sample selection bias is likely to be very small as schooling in Poland is compulsory until the age of 18 and most children live with their parents until at least that age.

[6] Lone fathers are defined as families in which mothers do not live with their children in the household. Paternal custody is rare in Poland. In the full sample we only have 476 cases of lone fathers aged 18-40 (which is the age groups considered for estimation) of whom 71 are widowers. For comparison there are 12,556 lone mothers in the full sample (919 widows) in the same age group.

is lower than among married couples. However, the share of first-born girls is virtually identical in the two samples. Finally, the demographic and socio-economic characteristics of the mothers are similar in both examined samples.

TABLE 1 ABOUT HERE

The PHBS contains detailed information on over 400 specific household expenditure items collected over a period of a month. These items are aggregated into 11 basic broad categories of expenditures such as food, clothing, housing and energy, health, education and transport. Table 2 provides the full list of the categories and information on mean expenditure levels in the two samples we consider.

TABLE 2 ABOUT HERE

Additionally, the dataset separates spending on such items as clothing and shoes into male and female adult (aged at least 13) and child (aged under 13) expenditures.[7] Moreover, the detailed categories allow us to identify the following items (see Table 2):

- games, toys and hobbies (labelled as 'Games and toys');
- educational books and educational stationery ('Educational materials');
- kindergarten expenditure ('Kindergarten').

While the first two of these three categories could include spending on adult goods (e.g. on sports or fishing equipment and on training or educational books unrelated to children's education), they are most likely to cover child-related expenses.[8] The last category is directly related to expenditure on children.[9] In both samples, 15% of households declare expenditure on kindergarten in the month of the survey; 67-69% of families declare positive expenditure on child clothing, with an average (unconditional) expenditure of about 60 PLN ($19) per month. Positive

[7] The total clothing category contains adult (male and female) and child clothing and shoes as well as several smaller items such as dyeing and cleaning.

[8] The average expenditures in these categories in families without children are less than 25% of those among the families in our sample.

[9] Our survey data also include information on schooling and tutoring expenditure. Given that primary schooling is for the most part public in Poland and we focus on households with the oldest child below the age of 13, the incidence of private schools or private tutoring is very low. Less than 10% and less than 1% of households declare any positive spending on schooling and tutoring, respectively. The nominal values are also very small. We could not detect any significant gender differences in expenditure on either of these categories.

spending on games and toys is recorded in about 41% of the households, and about 34% declare positive expenditure on educational books and materials, with the average (unconditional) amounts spent on each of these categories equal to around 20 PLN ($6) per month.[10]

3. Modelling the effect of children's gender on household expenditures

Our identification strategy relies on treating the child's gender at first birth as randomly determined. While some doubts have been raised with respect to the randomness of this outcome (Das Gupta, 2005; Hesketh et al., 2005; Dahl and Moretti, 2008; Almond and Rossin-Slater, 2013), there are institutional reasons to believe that the random assignment is not confounded in the case of Poland. The assumption of gender randomness implies that any differences that we observe in terms of household expenditure can be attributed to the gender of the child. Since the higher-parity fertility might be affected by the gender of the first child (see Table 4 later), the most common approach in the literature is to focus on the gender of the first child, in which case the estimated model for each of the expenditure categories takes the following form:

$$E_i^j = (First\ child\ \ girl_i)'\alpha_1 + X_{1i}'\alpha_2 + X_{2i}'\alpha_3 + \varepsilon_i \quad (1)$$

where E_i^j is the expenditure of household i in expenditure group j, vector X_1 contains mother's socio-demographic characteristics (mother's age at first birth, cubic polynomial in age, educational attainment indicators), while X_2 includes town size indicators and regional and year dummies.[11] The *First child girl* indicator takes value 1 if the first-born child was a girl and 0 if it was a boy. ε_i is the residual, which is clustered at household level because some households are observed twice in our data. Since we are interested in estimating the differences between a single female birth and a single male birth, we exclude twin and triplet births at first pregnancy from the

[10] All absolute values are given in Polish zloty (PLN) in June 2006 prices. The exchange rate between the US dollar and the PLN on June 14, 2006 was $1=3.194 PLN (National Bank of Poland). For reference: the gross monthly minimum and mean wage in Poland in 2006 were respectively 899.10 PLN (Ministry of Labour and Social Policy) and 2,477.23 PLN (Central Statistical Office).

[11] Maternal education and town size can be endogenous with respect to first child gender. First, when we do not control for these, the results remain unchanged. Second, we directly tested in a regression framework that a child's gender is not related to these controls. Expenditure estimates have also been produced with controls for fertility and they do not change qualitatively.

sample. Equation (1) is estimated by ordinary least squares (OLS) in levels, and in each case we also report the percent effect.[12]

Our results should be interpreted with caution if there are substantial effects of child's gender on partnership stability, fertility or parents' labour supply. For example, if a first-born boy increases the probability of partnership stability, and this has a positive effect on family resources, then expenditure levels in such families could be higher. This would show up in the estimations as the effect of a first-born boy, but could reflect only the indirect effect of higher resources among families with a first-born boy, and not the effect of different expenditure patterns directly resulting from the gender of the first child. We show that partnership stability and fertility are significantly related to the gender of the first child in Poland, but parental labour supply is not. We find that the potential bias related to fertility is around 2% in favour of girls, while the bias related to marriage could be as high as 10% against girls. Since the latter number is large enough to invalidate some of our consumption estimates, we present results for all, married and unmarried couples, and take the point estimates for married couples as the most reliable. In most cases, the estimates for all and married families are similar; however, due to small sample sizes, we cannot provide meaningful inference in the case of unmarried mothers.

4. Potential confounding factors: partnership stability, fertility and labour supply

Table 3 presents regression results from the model specified in equation (1) for the probabilities of living without a father, of the mother being never married and of the mother being divorced or separated conditional on being ever married. A significant coefficient on the *First child girl* variable has usually been interpreted in the literature as a reflection of parents' gender preferences through its effect on the stability of parental partnership. Our results confirm the influence of the gender of the first-born child on family structure. The first child being a girl increases the probability of children living without a father by 5.8% and of the mother never marrying by 10.0%. Unlike previous studies, however, we do not find any significant or sizable effects of child gender on the probability of divorcing or separating conditional on being ever married. This could potentially be a consequence of the Polish legal system, in which it is much

[12] We could also compare twin-girl with twin-boy births, but we do not have enough power to credibly conduct such an analysis. Given that we observe some households multiple times, we have also estimated random effects models and models where we only keep the first or second interview for each household. We present these results in Table A1 in the appendix. The conclusions remain qualitatively unchanged except for the fact that we lose precision in kindergarten estimates in the two smaller samples.

harder and more costly to obtain a divorce than in countries such as the US or Sweden. The results suggest that the gender of a child can have a detrimental effect on family stability through selection into marriage, and this could influence family resources and expenditure decisions.

TABLE 3 ABOUT HERE

Another important channel that can indirectly affect family expenditure is the influence of the gender of the first child on subsequent fertility, and hence its effects on total and per capita resources (Table 4). Furthermore, child gender could influence not only fertility per se but also the spacing between the first and subsequent children, and closely-spaced siblings might impose a larger financial burden on the household's budget. Fertility decisions could also be affected indirectly through the effect on partnership stability. For example, more stable relationships might result in higher fertility.

TABLE 4 ABOUT HERE

In the two samples of all and married families, the results suggest that although a first-born's gender does not have an effect on total family size or spacing between the first and second births, a first-born girl does have a negative effect on fertility decisions at parity two. Families with first-born daughters are around 2.3% less likely to have a second child than families with first-born sons. We do not find any statistically significant evidence that gender affects fertility at any other parity margin and, given the fact that controlling for fertility does not alter our consumption estimates, we conclude that these relatively small effects should not bias our main estimates. It is notable, though, that the negative coefficient on *First child girl* in the fertility equation points towards girl preferences, which seems to contradict our family stability findings. In this case, however, higher fertility could be driven by sample selection bias related to partnership stability.[13]

[13] We do not observe the entire partnership history and it is possible that some of these women have been previously divorced or had a first child prior to getting married. The bias could also result from the fact that (unlike in the case of married parents) if non-married mothers' fertility is affected by the separation, we do not observe their child preference as reflected in the number of children conditional on the gender of the firstborn. To examine the potential extent of this bias, we estimate the role of the first child's gender using the *assumed* gender preferences of parents who are no longer living together or never lived together, which allows us to construct bounds for the estimates, i.e. we impute preferences for either all girls or all boys or a mix of girls and boys to mothers who live without a father conditional on the gender of the first-born child. The results suggest that we cannot rule out positive effects of *First*

Results presented in Table 5 show the effect of children's gender on parental employment and labour market income as well as on total household disposable income. The sample focuses on the one hand on all families (columns 1 and 2) and on the other hand on married mothers and their husbands (columns 3 to 6).[14] Finally, in columns 7 and 8, we report results for households' total disposable income. Panel A presents the total effects, while panel B intends to uncover the direct effect of gender on the outcomes that are independent from fertility by focusing on households where the oldest child is between 0 and 2 years old, under the assumption that in this case the majority of women would not decide to have another child, at least temporarily. With the exception of a marginally significant effect on paternal labour income among families with oldest child between 0 and 2, we do not find any evidence that gender of the first-born child significantly affects any of the labour market outcomes. The estimates are generally small in magnitude compared with our consumption estimates and, if anything, they work in the opposite direction to the effects found for advanced economies in Ichino et al. (2011). Thus, in the case of Poland, we reject the hypothesis that the gender of a first-born child matters significantly for parental labour supply or household resources as proxied by disposable income.

TABLE 5 ABOUT HERE

Thus, of the three indirect channels that may affect our estimates of the relationship between the gender of the first child and expenditure patterns, it is only the marital channel which could play an economically meaningful role. Because of this, our analysis of expenditure patterns is conducted on the entire sample as well as on subsamples differentiated by marital status.

child girl on fertility under the extreme assumption of all separated parents having boy preferences. Under the more plausible assumption of mixed preferences, we still obtain negative and significant effects on fertility. Another possible explanation of the finding is that while fathers are more likely to have boy preferences, mothers might have preferences for girls. If this is the case and fathers are more likely to determine partnership stability, while mothers are more likely to influence fertility decisions then this would yield the estimates we observe.

[14] Due to sample size limitations, we cannot credibly use widowhood as an exogenous shock to family resources. Nonetheless, when we estimate the labor supply regressions for the sample of 264 widows, we cannot confirm any significant effects of child gender on maternal labor supply. Furthermore, to increase power, we also use the whole sample and interact widowhood with firstborn's gender. In this specification, we do not find any significant or sizable effects of either the gender dummy or the interaction term.

5. Differential expenditure by gender of the first child

In this section, we present the main results from the model outlined in Section 3 for various expenditure categories. The results of the baseline estimations are presented in Tables 6 and 7. In Table 8, we present results split by maternal education. Expenditure items are first analysed in the 11 broad categories, for adult clothing split by gender and for total household expenditure (Table 6). We then look at child-related expenditure in Table 7.

Among the broad expenditure categories, we find statistically significant effects of the first child's gender on consumption of 'food and non-alcoholic drinks', 'clothing and shoes' and 'communication', which, respectively, is 1.1% lower, 2.9% higher and 2.1% higher among all households with first-born girls than among those with first-born boys. All these results hold in the sample of married couples and we do not find any statistically significant differences between married and non-married families. We can decompose the 2.9% increase in spending on clothing in families with first-born girls into a 6.5% reduction in adult male spending, a 5.6% increase in adult female spending and a 5.7% increase in child spending (column 3 of Table 7). These results are moderately larger for females and smaller for males among married couples. The estimates suggest that either there is a direct effect of child's gender on parental consumption preferences or there is a degree of complementarity between mothers' and daughters' clothing consumption that is also reflected in the reduction of spending on adult male clothing.

TABLE 6 ABOUT HERE

TABLE 7 ABOUT HERE

Among the analysed child-related expenditures other than clothing, we find precisely estimated effects of the firstborn's gender on several other items of spending. On the intensive margin, these include 'games and toys' expenditure, which in the full, married and non-married samples is lower among households with first-born girls by 14.8%, 13.4% and 26.6%, respectively. On the extensive margin, households with first-born girls are less likely to declare expenditure within this category by 5.4%, 4.2% and 13.0% for the full, married and non-married samples, respectively. We also find that parents of first-born girls more frequently declare expenditure on 'educational materials'. This is true for all three types of households and the effect seems to be largest among non-married parents. At first, this seems contradictory to our results on games and toys; however, when we split this category into educational books and

stationery, we find positive, substantive and significant coefficients only for the latter category. This suggests that families may have a lot of very small expenditures on educational stationery, such as pencils and crayons, which are skewed towards girls. However, these expenditures are so minor that we do not observe any differences on the intensive margin in the expenditure on educational materials. Finally, we find reductions in kindergarten expenditures for households with first-born girls which are economically meaningful. These are only around a third the size of the effects on games and toys expenditure but could potentially lead to negative educational consequences for girls later in their lives.

In order to investigate whether the differentiated pattern of expenditure documented above is aggravated in families with lower socio-economic status (SES), we split our sample into two groups by maternal education (secondary-school dropout and below versus secondary-school graduate and above). The estimates presented in Table 8 point towards different types of consumption differentiation by the gender of the first-born child depending on the mother's education status. The results suggest a stronger link between spending on clothing for mothers and their daughters among better-educated families. Interestingly, it coincides with lower expenditure on fathers' clothing. Among all families with better-educated mothers, a first-born girl increases expenditure on female and child clothing by 4.5% and 7.1%, respectively, and reduces spending on male clothing by 7.8%. Furthermore, we find a strong gender differentiation in spending on educational materials (stationery) and games and toys, but the effect on kindergarten expenditure is smaller (-4.0%) than that among less-educated mothers (and is statistically insignificant). Among lower-educated mothers, a first-born girl only (significantly) increases the spending on the mother's own clothing. Of the other categories presented in Table 8, the negative effect of *First child girl* is significant for kindergarten expenditure and for spending on games and toys, and these effects are substantial (15.0% and 16.5%, respectively). These differences are moderately smaller among married couples.

TABLE 8 ABOUT HERE

6. Conclusion

Gender of children has been shown to influence their parents' decisions in many important dimensions. There is also ample evidence from the developing countries that parents

treat boys and girls differently when it comes to human capital investment. In both cases, the mechanisms believed to be responsible for parental decisions involve either biased preferences against one gender or an optimization mechanism reflecting different costs of investment in boys and girls or different returns from these investments. Some of the findings presented in this paper can also be explained within these frameworks. Parents may be biased against girls when it comes to expenditure on games, toys and hobbies (on average 14.8%) and against boys when it comes to expenditure on children's clothing and shoes (5.7%). They may also differentiate expenditure on boys and girls because they believe there are different returns from such 'investments'. In our view, however, some of our results are difficult to square with these explanations for differentiated outcomes by the gender of children. For example, the fact that parents with first-born girls spend more on adult female clothing and less on adult male clothing than households with first-born boys is hard to reconcile with any of the above standard approaches using either gender-biased or gender-neutral preferences. While the result could possibly be explained by a gender bias towards spending more on girls' clothing combined with its complementarity with adult female clothing, it seems more realistic that the observed pattern of adult clothing expenses reflects a direct effect of children's gender on parental preferences.[15]

Differentiated spending on clothing and toys by child's gender, which could be thought of as gender stereotypical, could suggest a so-far unexamined role of gender in child development. The data suggest that while parents focus more on boys' activities, they pay more attention to how girls look, which is reflected in the expenditure on clothes. On top of this, differentiation in the form of lower expenditure on kindergarten among families with first-born girls could be indicative of gender-biased human capital investment, with potentially important future consequences for the welfare of these children (Blau and Currie, 2006). It is not clear, however, whether parents of girls substitute formal care with informal care provided by grandparents, who might be more willing to take care of girls than of boys. While we do not know what happens to these children later in adolescence and adulthood, the differentiated expenditure patterns we document could have consequences in adult life and contribute to sustaining gender inequalities.

[15] As in Oswald and Powdthavee (2010), this would not have to imply a different utility function, but only conditionality of marginal utilities on the gender of children.

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Tables

Table 1. Descriptive statistics – demographics and labour market information

	All families		Married couples	
	Mean	Standard deviation	Mean	Standard deviation
Sample means at family level				
Living without a father	0.090	0.286	-	-
- never married	0.046	0.210	-	-
- separated or divorced	0.044	0.205	-	-
Married	0.867	0.340	1.000	-
Number of children	1.624	0.760	1.664	0.765
One child	0.510	0.500	0.477	0.500
Two children	0.386	0.487	0.411	0.492
Three or more children	0.105	0.307	0.112	0.315
First-born girl	0.482	0.500	0.480	0.500
Age of mother	30.325	4.560	30.518	4.427
Age of mother at first birth	24.199	3.874	24.333	3.800
Mother's education:*				
- basic	0.342	0.474	0.330	0.470
- secondary	0.360	0.480	0.360	0.480
- higher	0.299	0.458	0.310	0.463
Mother works	0.606	0.489	0.616	0.487
Mother's income (PLN)	692.21	1,019.58	695.98	1,021.68
Father works	-	-	0.933	0.251
Father's income (PLN)	-	-	1,673.15	1,646.22
Observations	53,300		46,185	
Families	35,917		31,057	

Notes: The samples include families in which the mother is younger than 41 and older than 17 and had the first child at the earliest at the age of 16; children's age 0-12; expenditure information for households with at most one family with children aged 0-12. Values in June 2006 prices.

* Education categories cover: basic – no formal education, primary education, gymnasium and vocational education; secondary – secondary academic and secondary vocational education; higher education – education degree higher than secondary.

Source: Authors' calculations based on PHBS data, 2003-2011.

Table 2. Descriptive statistics – expenditure information

	All families		Married couples	
	Mean	Standard deviation	Mean	Standard deviation
Broad expenditure items (average amounts, PLN)				
Food and non-alcoholic drinks	616.9	269.8	626.7	269.0
Alcohol, tobacco and drugs	66.8	96.2	67.2	95.2
Clothing and shoes	165.5	258.8	171.6	259.3
Housing costs and energy	496.3	566.5	501.5	578.9
Housing equipment	152.2	388.3	158.4	406.3
Health	103.6	158.2	105.9	158.7
Transport	294.0	992.0	316.3	1,038.5
Communication	117.0	98.1	119.9	98.8
Recreation and culture	213.3	363.6	221.2	374.6
Education	51.6	168.8	53.4	172.3
Restaurants and hotels	50.9	199.1	52.9	190.3
Gender-specific adult expenditure (average amounts, PLN)				
Male	34.9	108.0	38.1	112.7
Female	63.0	137.7	63.5	128.5
Child-related expenditure (average amounts, PLN)				
Games and toys	21.2	57.2	22.2	58.8
Educational materials	19.4	63.2	20.0	63.9
Clothing and shoes	60.2	90.5	62.3	92.3
Kindergarten	29.8	94.2	31.0	96.4
Child-related expenditure (% with any positive expenditure)				
Games and toys	0.41	0.49	0.42	0.49
Educational materials	0.34	0.48	0.35	0.48
Clothing and shoes	0.67	0.47	0.69	0.46
Kindergarten	0.15	0.35	0.15	0.36
Total declared expenditure:	2,557.4	1,949.6	2,629.9	1,997.5
Observations	53,300		46,185	
Families	35,917		31,057	

Notes: The samples include families in which the mother is younger than 41 and older than 17 and had the first child at the earliest at the age of 16; children's age 0-12; expenditure information for households with at most one family with children aged 0-12. Values in June 2006 prices.
Source: Authors' calculations based on PHBS data, 2003-2011.

Table 3. First child's gender and family status

VARIABLES	(1) Living without father	(2) Mother never married	(3) Mother separated or divorced
First child a girl	0.005*	0.004**	0.001
	(0.003)	(0.002)	(0.002)
% effect	5.8	10.0	2.1
Observations	53,300	53,300	49,344

Notes: Standard errors clustered at household level (*** p<0.01, ** p<0.05, * p<0.1). Control variables include: mother's age at first birth, cubic polynomial in mother's age, mother's educational attainment indicators, town size indicators, regional and year dummies. Families with children living at home aged between 0 and 12; mothers aged <41 and >17; mother's age at first birth at least 16 years old.
Source: Authors' calculations based on PHBS data, 2003-2011.

Table 4. Effects of first child's gender on fertility

	All families			**Married couples**		
VARIABLES	(1) Total number of children	(2) Two or more children	(3) Time since first birth	(4) Total number of children	(5) Two or more children	(6) Time since first birth
First child a girl	-0.009	-0.011**	-0.044	-0.007	-0.012**	-0.067
	(0.007)	(0.005)	(0.038)	(0.008)	(0.005)	(0.041)
% effect	-0.5	-2.2	-0.1	-0.4	-2.4	-0.1
Observations	53,300	53,300	53,300	46,185	46,185	46,185

Notes and source: See Table 3.

Table 5. Effect of first child's gender on labour supply and income

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All mothers		**Married families**				**Disposable income**	
			Mothers		Fathers			
VARIABLES	P(working)	Income from work	P(working)	Income from work	P(working)	Income from work	All	Married
Panel A: All households								
First child a girl	-0.001	-13.016	-0.003	-15.060	-0.000	-8.483	-29.896	-42.255
	(0.005)	(8.899)	(0.005)	(9.626)	(0.003)	(16.054)	(24.983)	(27.476)
% effect	-0.1	-1.9	-0.4	-2.1	-0.1	-0.5	-1.0	-1.3
Observations	53,300	53,300	46,185	46,185	46,185	46,185	53,300	46,185
Panel B: Households with oldest child between 0 and 2								
First child a girl	-0.002	-0.614	-0.004	-14.703	0.003	-58.362*	-5.246	-48.563
	(0.009)	(19.709)	(0.010)	(22.022)	(0.005)	(30.900)	(45.647)	(50.834)
% effect	-0.4	-0.1	-0.8	-2.3	0.3	-3.3	-0.2	-1.4
Observations	11,807	11,807	9,945	9,945	9,945	9,945	11,807	9,945

Notes and source: See Table 3.

Table 6. First child's gender and broad expenditure categories

VARIABLES	(1) Total household consumption	(2) Food and non-alcoholic drinks	(3) Alcohol, tobacco and drugs	(4) Clothing and shoes	(5) Adult male clothing	(6) Adult female clothing	(7) Housing costs and energy	(8) Housing equipment	(9) Health	(10) Transport	(11) Communication	(12) Recreation and culture	(13) Education	(14) Restaurants and hotels
Panel A: All households (N=53,300)														
First child a girl	7.630	-6.541**	0.952	4.653*	-2.350**	3.420***	-1.948	-3.310	-0.515	7.632	2.444***	-3.914	0.474	-1.038
	(17.508)	(2.677)	(0.977)	(2.399)	(0.948)	(1.270)	(5.101)	(3.401)	(1.445)	(8.689)	(0.931)	(3.258)	(1.571)	(1.779)
% effect	0.3	-1.1	1.4	2.9	-6.5	5.6	-0.4	-2.2	-0.5	2.6	2.1	-1.8	0.9	-2.0
Panel B: Households with married partners (N=46,185)														
First child a girl	11.860	-5.555*	1.595	6.100**	-2.285**	4.403***	-2.928	-2.703	-0.355	7.308	2.281**	-3.456	0.960	-0.197
	(19.272)	(2.855)	(1.043)	(2.593)	(1.064)	(1.286)	(5.573)	(3.838)	(1.559)	(9.797)	(1.009)	(3.599)	(1.714)	(1.830)
% effect	0.5	-0.8	2.4	3.6	-5.8	7.2	-0.6	-1.7	-0.3	2.3	1.9	-1.6	1.8	-0.4
Panel C: Households with non-married partners (N=7,115)														
First child a girl	-4.113	-10.340	-2.657	-4.069	-2.212	-3.079	7.384	-5.841	-1.702	13.703	4.541**	-5.745	-2.594	-7.331
	(37.119)	(7.250)	(2.719)	(6.140)	(1.574)	(4.518)	(11.833)	(5.675)	(3.808)	(14.019)	(2.298)	(6.783)	(3.747)	(6.694)
% effect	-0.2	-1.9	-4.1	-3.2	-14.3	-5.0	1.6	-5.1	-1.9	9.6	4.7	-3.5	-6.3	-17.8
p-value B=C	0.701	0.537	0.143	0.126	0.969	0.110	0.427	0.646	0.742	0.708	0.366	0.765	0.387	0.303

Notes and source: See Table 3.

Table 7. First child's gender and child expenditure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Intensive margin				**Extensive margin**			
VARIABLES	Games and toys	Educational materials	Clothing and shoes	Kindergarten	Games and toys	Educational materials	Clothing and shoes	Kindergarten
Panel A: All households (N=53,300)								
First child a girl	-3.368***	0.913	3.333***	-1.655*	-0.022***	0.018***	0.013***	-0.004
	(0.536)	(0.607)	(0.848)	(0.898)	(0.004)	(0.004)	(0.004)	(0.003)
% effect	-14.8	4.8	5.7	-5.4	-5.4	5.3	2.0	-2.7
Panel B: Households with married partners (N=46,185)								
First child a girl	-3.177***	0.718	3.610***	-1.603	-0.018***	0.018***	0.014***	-0.005
	(0.593)	(0.658)	(0.931)	(0.990)	(0.005)	(0.004)	(0.005)	(0.004)
% effect	-13.4	3.7	6.0	-5.1	-4.2	5.1	2.1	-3.0
Panel C: Households with non-married partners (N=7,115)								
First child a girl	-4.506***	2.447	1.748	-1.916	-0.046***	0.020*	0.012	-0.000
	(1.108)	(1.565)	(1.899)	(1.928)	(0.012)	(0.010)	(0.012)	(0.008)
% effect	-26.6	16.8	3.8	-8.2	-13.0	7.3	2.0	-0.1
p-value B=C	0.287	0.307	0.377	0.884	0.025	0.851	0.879	0.615

Notes and source: See Table 3.

Table 8. First child's gender and expenditure by mother's education

VARIABLES	(1) Adult clothing and shoes Man	(2) Woman	(3) Child expenditure Games and toys	(4) Educational materials	(5) Clothing and shoes	(6) Kindergarten	(7) **Total expenditure**
Panel A: All below secondary (N = 18,202)							
First child a girl	-0.126	3.351***	-2.018***	0.094	1.013	-1.800**	18.109
	(0.852)	(1.113)	(0.599)	(1.176)	(1.186)	(0.776)	(18.703)
% effect	-0.7	10.8	-16.5	0.4	2.2	-15.0	1.0
Panel B: All above secondary (N = 35,098)							
First child a girl	-3.511**	3.456*	-4.084***	1.581**	4.648***	-1.606	3.780
	(1.379)	(1.858)	(0.756)	(0.720)	(1.137)	(1.305)	(25.334)
% effect	-7.8	4.5	-14.4	8.9	7.1	-4.0	0.1
Panel C: Married below secondary (N = 15,232)							
First child a girl	0.069	4.074***	-1.704**	-0.293	1.733	-1.401	28.408
	(0.973)	(1.229)	(0.674)	(1.309)	(1.323)	(0.857)	(20.826)
% effect	0.3	13.0	-13.6	-1.3	3.7	-11.6	1.5
Panel D: Married above secondary (N = 30,953)							
First child a girl	-3.367**	4.707**	-3.880***	1.470*	4.730***	-1.653	8.436
	(1.519)	(1.838)	(0.823)	(0.774)	(1.234)	(1.417)	(27.422)
% effect	-7.0	6.2	-13.3	8.1	7.0	-4.0	0.3

Notes and source: See Table 3.

Appendix

A1. Polish Household Budget Survey – summary of the methodology

The Polish Household Budget Survey is a representative survey of Polish households. It is conducted every year and is spread over the entire calendar year, with each household surveyed over a period of a month during which it records its expenditures and incomes. This information is complemented with an additional interview, which is conducted at the end of each quarter of data collection (the so-called quarterly interview). Each year since 2005, when the most recent sampling procedure was introduced, the target sample is 37,584 households.

In the case of refusal to participate among households from the principal gross sample, households are replaced by another household from a reserve list of randomly-chosen households. This reserve list is prepared separately for each sampling unit. Households that drop out of the survey in the first half of their survey month are also replaced by households from the reserve list. Those that drop out in the second half of the month are not replaced. Households from the principal gross sample that agree to participate are re-interviewed in the same month of the following year. Households from the reserve list are not re-interviewed. The survey methodology has been developed in accordance with the EUROSTAT guidelines. The overall response rate in the survey in 2010 was 50.2%. Survey non-response was due to refusal to participate (48.1%), survey dropout during its duration (1.6%) or refusal to complete the final quarterly interview (0.1%).

A2. Tables

Table A1. First child's gender and child expenditure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Intensive margin				**Extensive margin**			
VARIABLES	Games and toys	Educational materials	Clothing and shoes	Kindergarten	Games and toys	Educational materials	Clothing and shoes	Kindergarten
Panel A: Random effects (N = 53,300)								
First child a girl	-3.446***	0.979	3.516***	-1.534*	-0.022***	0.016***	0.013***	-0.003
	(0.535)	(0.604)	(0.845)	(0.884)	(0.004)	(0.004)	(0.004)	(0.003)
% effect	-15.1	5.1	6.0	-5.1	-5.3	4.8	2.0	-2.2
Panel B: Selecting the first interview for families that have been interviewed twice (N = 34,155)								
First child a girl	-3.072***	1.295**	4.259***	-1.142	-0.022***	0.018***	0.013**	-0.002
	(0.600)	(0.655)	(0.960)	(0.971)	(0.005)	(0.004)	(0.005)	(0.004)
% effect	-13.8	6.9	7.4	-3.8	-5.3	5.4	1.9	-1.5
Panel C: Selecting the second interview for families that have been interviewed twice (N = 33,163)								
First child a girl	-4.300***	0.866	3.476***	-1.635	-0.025***	0.013***	0.017***	-0.002
	(0.640)	(0.691)	(0.981)	(1.040)	(0.005)	(0.005)	(0.005)	(0.004)
% effect	-17.6	4.5	5.9	-5.1	-5.9	3.8	2.5	-1.6

Notes and source: See Table 3. Robust standard errors in panels B and C.