Parental Responses to Child Support Obligations: Causal Evidence from Administrative Data*

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Abstract

We leverage non-linearities in Danish child support guidelines together with rich administrative data to provide causal estimates of parental behavioral responses to child support obligations. We estimate that among families with formal child support agreements, a 1,000 DKK ($183) increase in a father's annual obligation is associated with a 573 DKK ($104) increase in his annual payment. However, we also show that an increase in the obligation reduces the likelihood that the father lives with his child, pointing to some substitution between financial and non-pecuniary investments. Further, we find that larger obligations are associated with higher new-partner fertility among both parents. The maternal fertility response is consistent with a positive income-fertility relationship, while the paternal fertility response may reflect increased demand for new offspring as a result of reduced contact with existing children. Finally, we find evidence that some fathers reduce their labor supply to avoid facing higher support obligations. Our findings suggest that government efforts to increase child investments through mandates on parents can be complicated by their behavioral responses to them.

JEL Codes: H4, I1, I3, J1, J2

Keywords: child support, family, divorce, parents, father involvement, fertility, labor supply

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1 Introduction

Most modern governments engage in some redistributive policies, whereby income is transferred from individuals who are taxed to individuals who receive benefits. The donors and recipients usually do not have any direct connection, and a large body of research has examined the behavioral responses of these two groups *separately*. For instance, numerous studies have analyzed the elasticity of taxable income (see, e.g., Gruber and Saez, 2002; Saez *et al.*, 2012; Piketty and Saez, 2013 for some surveys), and the fertility and labor supply responses of welfare recipients (see, e.g., Hoynes, 1997; Moffitt, 1998; Schoeni and Blank, 2000; Moffitt, 2002).

However, as a result of the sharp increase in the proportion of children growing up in single-parent households, a different type of redistributive policy has evolved in the last several decades.[1] In the hopes of improving these children's financial circumstances and shifting the burden of their support from traditional welfare programs, governments mandate child support payments from non-custodial parents to the custodial parents and their children.[2] As the donors (e.g., fathers) have a clear connection to the recipients (e.g., mothers and children), the implications of these policies depend on both the recipients' and the donors' preferences and constraints, as well as their interactions with one another (Weiss and Willis, 1985; Lerman and Sorenson, 2003).

In this paper, we use a new identification strategy and rich administrative data from Denmark to provide causal estimates of the effects of child support obligations on a wide range of parental behaviors, thus studying responses among *both* donors and recipients. To motivate our empirical analysis, in Section 2, we begin with a conceptual framework that highlights the intertwined nature of parental incentives and the complexity of their potential responses to child support mandates. The model demonstrates that child support obligations do not resolve the underlying collective-goods problem among separated parents (Weiss and Willis, 1985), as custodial parents have full allocative power over how to spend the non-custodial parents' payments. As a consequence, non-custodial parents may view their obligations as taxes, which may not always benefit their children. Moreover, the framework shows that when the child support obligation is linked to the custody arrangement (e.g., if the child support mandate is different depending on whether the parents share

[1] In the U.S., 9 percent of children under age 18 lived with only one biological parent in the household in 1960, while over 26 percent do today. Many Western European countries have similar rates—for example, about 22 percent of British children, 18 percent of Danish children, and 15 percent of German children live with only one parent. Data for the European countries are from EU Community Statistics on Income and Living Conditions, 2007. Data for U.S. are from the 1960 Decennial Census and the 2013 Current Population Survey.

[2] Children in single-mother households are disproportionately low-income. In the U.S., children in single-mother households are twice as likely to live in poverty relative to the average child. In Denmark, children in single-mother households are three times more likely to live in poverty relative to the average child. For more information on child poverty rates in Europe, see: http://www.unicef-irc.org/publications/pdf/rc10_eng.pdf.

custody), it may affect parental decisions about child custody, as well as other voluntary and non-pecuniary investments and contact with children. These decisions may in turn have downstream effects on a variety of other parental behaviors, including family formation with new partners and labor market activities. The implications for child well-being and public spending are both complex and theoretically ambiguous.

The existing evidence on the *causal* effects of child support mandates is limited. Researchers are faced with two main challenges. First, child support obligations are not randomly assigned, making it difficult to disentangle their causal effects from the possible influences of other (unobservable) differences between families. The second challenge stems from a substantial data constraint, especially in the United States, where most of the existing work has been set (see Garfinkel *et al.*, 1998; Del Boca, 2003; Lerman and Sorenson, 2003; Cancian *et al.*, 2011 for some surveys). Data sets typically measure outcomes for individuals in a given household, making it impossible to link children to their non-custodial parents. Additionally, because many of the existing studies use survey data such as the Current Population Survey, this literature relies heavily on self-reported income measures, which may be missing or inaccurate for a significant fraction of respondents (Weinberg, 2006). As such, researchers are unable to precisely identify child support obligations (which are based on parental income), and to our knowledge, no studies have exploited variation in child support guidelines across individuals with different incomes.

Our paper addresses these challenges by proposing a new identification strategy that exploits non-linearities in Danish child support guidelines, which assign non-custodial parents different obligations according to their incomes, numbers of children, and years of separation. As described in more detail in Section 3, every year, all non-custodial parents under formal child support agreements are required to pay the same base amount per child. Non-custodial parents with incomes above certain thresholds must also pay additional percentages of the base amount, which range between 25 and 300 percent, depending on the location of the threshold. The locations of the income thresholds vary by the number of children and by year. Additionally, the base amount has increased above the rate of inflation in every year during our analysis time frame.

We use this variation together with administrative data on the universe of Danish children linked to their parents *regardless of their residence status* and with precise information on parental income, as described in detail in Section 4. We are thus able to comprehensively analyze the effects of child support obligations on fathers' payments to children, fathers' likelihood of co-residence with their children, as well as both parents' post-separation family formation and labor market behavior, as

we explain in Section 5.[3] Our analysis uses data on all parents who divorce, separate, or have a child outside marriage or cohabitation over 1999-2008. For each father and in each year post-separation observed in the data, we calculate the annual child support obligation he should face based on his income and number of children *measured in the year of separation*. Put differently, these calculated obligations are based only on variation in the government-mandated guidelines, and do *not* take into account any changes to the father's income or number of children after separation, as such changes may reflect endogenous responses. To identify the causal effects of these obligations, we rely on an assumption that there are no omitted variables that systematically covary with the child support guidelines and differentially affect fathers across income levels, number of children, and years of separation. In support of this assumption, we: (1) provide evidence that our calculated obligations are uncorrelated with a variety of parental characteristics that are not used in setting them, and (2) show that anticipated child support obligations are uncorrelated with selection into divorce, separation, or out-of-wedlock/cohabitation childbearing in the first place.

Our results point to important parental behavioral responses to the child support mandates, as detailed in Section 6. First, we show that child support mandates are moderately effective at increasing financial transfers from non-custodial fathers to children. Among all separated parents, a 1,000DKK ($183) increase in a father's average annual child support obligation is associated with a 430DKK ($78) increase in his average annual payment. Scaling by a formal agreement rate of 75 percent (Skinner *et al.*, 2007) implies a treatment-on-the-treated (TOT) relationship of a 573DKK ($104) increase in payments for every 1,000DKK increase in obligations.

Next, we examine how the child support obligation affects the likelihood that a father ever resides with his child post-separation. In Denmark, parents who share equally in physical custody are not mandated to make child support payments; hence, a higher obligation may increase the incentive for the father to live with his child at least part of the time so to avoid making a larger payment. However, mothers, who have substantial say in custody decisions, have the opposite incentive to refuse to share custody and instead receive the higher payment. Moreover, fathers may consider financial transfers as substitutes for other forms of non-pecuniary investments and contact with children, which would also lead to a negative relationship between child support obligations and paternal physical custody rates. We find that these latter forces dominate in our data—an

[3]Our analysis focuses on studying the effects of *fathers'* child support obligations because they are much more likely than mothers to become the non-custodial parents in case of separation. For example, according to Statistics Denmark, in 2010, about 26 percent of children lived with only one biological parent. Out of them, 23 percent lived with only their mothers or their mothers and their partners, while 3 percent lived with only their fathers or their fathers and their partners. While we observe information on whether the father lives with his child post-separation, we purposely do not drop these fathers since we show that residence with the child is an outcome that can be affected by the child support obligation.

additional 1,000DKK in a father's average annual child support obligation leads to an 1.8 percent reduction in the likelihood that he resides with his child in at least one year post-separation.

We also analyze parental fertility responses. We find that a 1,000DKK increase in the father's average annual child support obligation leads to a 2.7 percent increase in the likelihood that the mother has an additional child post-separation, consistent with a positive income-fertility relationship documented in other studies analyzing child tax and welfare benefits in Western Europe and Canada (Laroque and Salanié, 2008; Brewer *et al.*, 2012; Milligan, 2005).

Fathers face unique fertility incentives because the locations of the income thresholds in the Danish child support guidelines are increasing in the number of biological children, and because the per-child obligation is set according to the father's total number of children (including those within subsequent unions) but only applies to his non-custodial children. Consequently, some fathers can reduce their obligations to their non-custodial children by having more children within unions with new partners. Additionally, our result on father-child co-residence suggests that, for all fathers, an increase in the obligation may lead to less attachment to existing children and more time available to invest in new offspring. We find evidence consistent with these positive fertility incentives: a 1,000DKK increase in a father's average annual obligation increases his likelihood of having a subsequent child by 3.1 percent. This effect is driven by fathers having children while married to or cohabiting with new partners, and by fathers who do not reside with their older children.

Finally, we find that fathers change their labor market behavior in response to child support obligations, while mothers do not. Overall, a 1,000DKK increase in a father's average annual child support obligation reduces his labor force participation by 0.15 percent. This average treatment effect masks important heterogeneity, however. Fathers with separation year incomes below the first guideline threshold, who must all pay the same lump-sum base amount, actually increase their labor supply. In contrast, fathers with separation year incomes above the first threshold—who must make supplemental payments and thus face a competing incentive to reduce their earnings—are the ones driving the decline in labor force participation. This labor supply decline reflects transitions into disability insurance and discretionary early retirement programs. As such, we provide novel support for the relationship between the relative value of labor market participation and the take-up of these programs, which has been previously documented both in Scandinavia (Bratsberg *et al.*, 2010; Bingley *et al.*, 2011) and in the U.S. (Black *et al.*, 2002; Autor and Duggan, 2003).

As we discuss further in Section 7, our findings suggest that government interventions into families with divorced and unmarried parents result in important parental behavioral changes that

can distort their intended impacts on child investment levels, public spending, and overall child well-being. While fathers respond to child support orders with increased financial transfers to their children, they also reduce their contact with them. Moreover, the increases in both parents' subsequent fertility rates point to possible reductions in the allocation of resources toward the existing children whom child support guidelines are meant to help. Finally, the decreases in paternal labor supply among higher-income fathers demonstrate the market distortions generated by the "tax-like" nature of child support mandates. Our results suggest that although child support mandates may shift some of the cost of single-mother household support from welfare programs to the non-custodial fathers, they also pass part of this cost on to other government programs such as disability insurance and early retirement.

In sum, our results highlight the role of parental agency in family resource allocation, and suggest that government efforts to increase child investment levels through mandates on parents can be complicated by their behavioral responses to them.

2 How Might Child Support Obligations Affect Parental Behaviors?

This section presents a general framework for understanding the channels through which non-custodial parents' child support obligations could affect parental behaviors *after separation*.[4] This framework draws on several existing models of interaction within non-intact families (e.g., Weiss and Willis, 1985; Del Boca and Flinn, 1995; Willis, 1999; Flinn, 2000; Del Boca and Ribero, 2003; Roff and Lugo-Gil, 2012). As noted above, throughout this paper, we treat fathers as the non-custodial parents and mothers as the custodial parents.

2.1 Conceptual Framework

Consider a set of separated parents with one child between them, where mothers are denoted by subscript m and fathers are denoted by subscript f. Each parent obtains utility from child quality,

[4]Child support orders, which, in theory, make separation and family formation more costly for non-custodial fathers and increase custodial mothers' bargaining power, may also influence the rates of divorce and separation among parents who are still together, as well as the rates of childbearing outside marriage and cohabitation among men and women who are not yet parents (Brown and Flinn, 2011). Other policies, such as unilateral divorce laws and joint custody reforms, which aim to affect the outcomes of families with divorced and unmarried parents, have been shown to also impact divorce and marriage rates (Stevenson and Wolfers, 2006; Wolfers, 2006; Halla, 2013). Such effects can complicate the study of outcomes among separated parents because of bias due to the treatment (in our setting, the child support order) being correlated with selection in or out of the sample of analysis. However, this issue is not empirically relevant in our context. As discussed in detail in Section 5, we find no relationship between child support obligations and the likelihood of parental separation in our data.

Q, their own private adult consumption, C, and their leisure time, L.[5] Utility from child quality is comprised of two components: Q^0 (current child quality), Q^1 (child quality from a possible subsequent child born within a new union). For simplicity, we do not explicitly model future children born outside marriage/cohabitation; however, we discuss how incorporating this decision into the model would affect the main conclusions below. For each parent $i \in \{m, f\}$, denote the number of subsequent children by n_i, where n_i can take on integer values $\{0, 1, 2, \ldots\}$.

Additionally, assume that child quality is a function of two types of investments: financial, F, and time, K. Denote the financial and time investments in the current child by F^0 and K^0, respectively. For mothers' subsequent children, financial and time investments are F_m^1 and K_m^1, respectively; for fathers' subsequent children, financial and time investments are F_f^1 and K_f^1, respectively.

Thus, in terms of time allocation, each parent must divide his/her time between work in the labor market (denoted by H), time investments into children, and leisure. Each parent $i \in \{m, f\}$ earns wage w_i in the labor market, and total time available is denoted by T.

We assume that the separated parents do *not* bargain cooperatively and instead face a static Stackelberg game.[6] In this setting, the non-custodial father can make two types of transfers to the custodial mother: a financial transfer, s, and a time transfer, t. The custodial mother chooses how to allocate these transfers. Intuitively, we can think of the time transfer as the amount of extra time freed up for the mother as a result of the father offering to spend time with the child.

For subsequent children, we assume that the parents expect to bargain cooperatively with new partners. Each parent i expects to be responsible for fraction λ_i^F of the total financial investment and fraction λ_i^K of the total time investment per subsequent child born.

[5] Note that our framework differs from the model in Neal (2004), which assumes that "absent fathers do not enjoy any consumption gains from having children". We instead follow Willis (1999) and Flinn (2000) (among many others) by assuming that non-custodial fathers in fact obtain utility from child quality. This assumption is arguably more realistic in our setting, where an estimated 20 percent of Danish children with divorced or separated parents have fathers who share in their physical custody (Bjarnason and Arnarsson, 2011), and another 45 percent have non-custodial fathers who visit with them at least every other weekend (Kampmann and Nielsen, 2004).

[6] The non-cooperation assumption is common in the literature on non-intact families (e.g., Weiss and Willis, 1985; Del Boca and Flinn, 1995; Willis, 1999; Roff and Lugo-Gil, 2012). In an important contribution, Flinn (2000) instead develops a model where separated parents can choose between cooperative and non-cooperative equilibria, and where institutions (e.g., judges determining child support or custody settlements) are modeled as coordination devices. Such a model is useful for generating predictions about the impacts of changes to institutional enforcement capabilities. For example, a key result of the model is that when institutions can perfectly enforce compliance with child support orders, the custodial parent loses the incentive to engage in cooperative behavior; for a large set of parental preferences, perfect child support enforcement can thus lead to lower child investments relative to imperfect enforcement. In our case, the empirical analysis uses variation in child support order *amounts*, rather than in the degree of institutional enforcement (in fact, enforcement does not change throughout our sample time frame). As such, we do not take this approach, and instead assume perfect complicance with child support orders (see below).

More concretely, $\forall i \in \{m, f\}$ parental utility is represented by the following function:

$$U\Big(Q^0, Q_i^1, n_i, C_i, L_i\Big) = \beta_i U_c\Big(Q^0(F^0, K^0),\ \ n_i * Q^1(F_i^1, K_i^1)\Big) + (1-\beta_i)U_a\Big(C_i, L_i\Big)$$

where $U_c(\cdot)$ represents utility from children, $U_a(\cdot)$ represents utility from adult activities, and β_i, $0 < \beta_i < 1$, represents the weight each parent places on his/her preferences toward children relative to other adult consumption goods.[7]

The mother chooses the optimal current and subsequent child investments, the number of subsequent children she will have, and her own adult consumption and leisure, conditional on the father's transfers:[8]

$$\max_{F^0, K^0, n_m, F_m^1, K_m^1, C_m, L_m} \beta_m U_c\Big(Q^0(F^0, K^0),\ \ n_m * Q^1(F_m^1, K_m^1)\Big) + (1-\beta_m)U_a\Big(C_m, L_m\Big)$$

$$\text{s.t.} \quad F^0 + n_m \lambda_m^F F_m^1 + C_m = w_m\Big(T - L_m - K^0 + t - n_m \lambda_m^K K_m^1\Big) + s$$

The father then maximizes his indirect utility function, taking into account the maternal optimal response functions for current child investments, $F^0(s,t)^*$ and $K^0(s,t)^*$. He chooses his optimal financial and time transfers for the current child, the number of subsequent children he will have, his investments into subsequent children, his private adult consumption, and his time spent in leisure. Additionally, we assume that for the current child, the father is subject to a child support mandate, R, which depends on his earned income, his number of children, and his time transfer, and is defined further below. The father thus solves the following problem:

$$\max_{s, t, n_f, L_f, F_f^1, K_f^1} \Bigg\{ \beta_f U_c\Big(Q^0(F^0(s,t)^*, K^0(s,t)^*),\ \ n_f * Q^1(F_f^1, K_f^1)\Big)$$

$$+(1-\beta_f)U_a\Big(w_f(T - L_f - t - n_f \lambda_f^K K_f^1) - s - n_f \lambda_f^F F_f^1,\ \ L_f\Big)\Bigg\} \qquad \text{s.t.} \quad s \geq R(w_f H_f, n_f, t)$$

The child support obligation for the current child, $R(w_f H_f, n_f, t)$, is set according to a formula that depends on the father's earned income, $w_f H_f$, his total number of biological children $(n_f + 1)$, and his time transfer, t, in a way similar to the actual Danish child support guidelines that we study. In particular,

[7] While we do not make any assumptions about a particular functional form of the utility function in this discussion, we note that the utility function in this framework must allow for corner solutions as n_i is allowed to be set to zero. More formally, it must be that $\lim_{x \to 0} U'(x) \neq \infty$.

[8] Prices of consumption goods are normalized to 1 for simplicity.

$$R(w_f H_f, n_f, t) = \begin{cases} \xi & \text{if} \quad w_f H_f \leq \overline{Y}_{n_f} \quad \text{and} \quad t \leq \bar{t} \\ \xi + \tau & \text{if} \quad w_f H_f > \overline{Y}_{n_f} \quad \text{and} \quad t \leq \bar{t} \\ 0 & \text{if} \quad t > \bar{t} \end{cases}$$

for some $\xi > 0$, $\tau > 0$, and $\bar{t} > 0$. Additionally, $\overline{Y}_{n_f} > 0$ and is strictly increasing in n_f. In other words, the guidelines are set such that fathers must pay a base amount, ξ, and fathers with incomes above some threshold, $\overline{Y}_{n_f}$, face an additional obligation of τ. The location of $\overline{Y}_{n_f}$ is increasing with the father's subsequent number of children, n_f. The child support constraint is removed once fathers make high enough time transfers, t. For example, in our context, fathers who share in physical custody of their children do not need to pay child support.

Denote the father's optimal financial transfer by:

$$s^* = \max\left(s^{unc},\ R(\cdot)\right)$$

where s^{unc} is the (unconstrained) solution to the father's optimization problem if the child support mandate constraint is not binding.[9]

2.2 Possible Effects on Parental Behaviors

Consider two order schemes: $R_1(w_f H_f, n_f, t)$ and $R_2(w_f H_f, n_f, t)$, with $\xi_2 > \xi_1$ and $\tau_2 > \tau_1$. What happens to parental behaviors when we increase the child support obligation from R_1 to R_2? Our model highlights the theoretical ambiguity of this question with regard to the following parental behaviors:

Fathers' Financial Transfers Consider three possible cases that depend on what fathers' financial transfers would have been in the absence of government intervention:

First, if $s^{unc} \geq R_2$, the father optimally transfers as much or more than what is mandated under the higher order, R_2. This father will not alter s^* in response to a switch from the lower to the higher order.

[9] As noted, we assume perfect compliance with child support mandates and do not model the compliance decision. This decision is modeled explicitly through an incorporation of a cost associated with non-compliance in Del Boca and Flinn (1995) and Flinn (2000). Modeling the compliance decision is important in a setting where the degree of institutional enforcement changes and child support obligations are set endogenously (e.g., by judges). In our case, enforcement is stable over the analysis time frame, and we argue that our variation in child support orders is policy-driven and exogenous.

Second, if $R_1 < s^{unc} < R_2$, then the father would optimally pay more than the lower order, R_1, but less than the higher order, R_2. When faced with a change from R_1 to R_2, it may be optimal for the father to increase s^* from s^{unc} to R_2. The magnitude of this increase is strictly less than the difference between the two order schemes, $R_2 - R_1$. However, as discussed further below, some fathers may also respond by having more children or lowering their labor supply so to reduce their R_2 obligations from $\xi_2 + \tau_2$ to ξ_2. If $\xi_2 < s^{unc} < \xi_2 + \tau_2$, then there may be a decrease in s^* from s^{unc} to ξ_2.

Third, if $s^{unc} \leq R_1$, then the father would optimally pay less than the lower order. There are two possibilites for these fathers as well. Some fathers may increase s^* exactly from R_1 to R_2 (either from ξ_1 to ξ_2 or from $\xi_1 + \tau_1$ to $\xi_2 + \tau_2$). However, as before, if some fathers respond by having more children or lowering their labor supply, s^* may instead change from $\xi_1 + \tau_1$ to ξ_2, which may reflect either an increase or a decrease in optimal payments, depending on whether ξ_2 is smaller or larger than $\xi_1 + \tau_1$.

Thus, while increases in child support orders are predicted to increase some fathers' financial transfers to their children, this relationship is complicated by other paternal behaviors, and may not be one-for-one on average. Some fathers may just substitute for non-mandated transfers that they would have made in the absence of government intervention. Additionally, fertility and labor supply responses may even lead to a perverse relationship between child support mandates and actual payments.

Fathers' Time Investments There are two opposing forces on fathers' time investments. On the one hand, since fathers who make high enough time transfers do not face the child support mandate, a higher order may lead to an increase in t^* as the father can forego a larger financial cost by being above $\bar{t}$.

On the other hand, the higher order increases the maternal incentive to actually receive the higher mandated financial transfer by ensuring (via her optimal response functions) that the father's time transfer does not exceed $\bar{t}$. In our setting, when the father is faced with the higher order, the mother has a greater incentive to make sure that the father does not share in physical custody.[10] Moreover, since child quality is a function of both financial and time investments, and since higher

[10]In practice, parents can either agree on a custody arrangement informally or they can go to the court if they are unable to reach an agreement. Hence, if the mother refuses to share physical custody, the father can in principle take the issue to court. However, prior to a reform in October 2007, which made joint legal custody the default determination (and hence made joint physical custody more likely as well), courts were likely to rule in favor of maternal sole custody. Thus, it is reasonable to assume that, during our sample time frame of 1999-2008, mothers had substantial influence over the custody decision.

orders increase financial investments, F, there may be additional downward pressure on paternal optimal time transfers, t^*, due to properties of the child quality function (i.e., if financial and time investments are at all substitutes).

Both Parents' New Family Formation Fathers face complex fertility incentives. First, for fathers with incomes below the threshold, $\overline{Y}_{n_f}$, a higher order represents a negative income effect, which may decrease subsequent fertility. However, since the income threshold is increasing in the number of subsequent children, and since the father is only mandated to make financial transfers to his one existing non-custodial child, some (higher-income) fathers have an incentive to have more children so to reduce their child support obligation from $\xi + \tau$ to ξ. Additionally, for fathers at all income levels, higher orders may lead to less time spent with existing children, t^*, freeing up time available to invest in future children.

For mothers, consider the case where higher orders increase fathers' financial transfers. For them, higher orders constitute larger positive income effects, resulting in greater investments in current children as well as greater demand for subsequent children. Mothers also face an opposite incentive to lower subsequent fertility because their time available to invest in subsequent children may be lower as a result of a reduction in the paternal time transfer.

Moreover, although we do not model this explicitly, there are different incentives for mothers' and fathers' subsequent fertility *outside* marriage and cohabitation. In particular, although a father may lower his per-child obligation by having more children out-of-wedlock/cohabitation (since the income threshold is increasing in his total number of children), fertility within unions is relatively less costly as he is only subject to child support mandate for his out-of-union children. By contrast, a mother may have larger incentives for childbearing outside unions because the receipt of a higher payment for her existing child may increase her expectation of child support transfers associated with subsequent offspring from new partners.[11]

Both Parents' Labor Market Behavior Fathers face opposing labor supply incentives. For a father with earnings below the threshold, $\overline{Y}_{n_f}$, the child support order is a flat negative income shock in the amount of ξ. This shock is predicted to reduce demand for leisure and increase labor supply. In contrast, a father with an income above the threshold faces a type of tax on earnings. This higher-income father has an incentive to lower his labor supply in order to reduce his income

[11]Note that all of these fertility responses for fathers and mothers are relevant insofar as we hold the fertility responses of the other parents constant. As these parents are all arguably in the same matching market post-separation, the net effects on overall parental fertility rates also depend on the numbers of men and women and their relative bargaining powers.

and avoid paying the additional τ amount.

For a mother, again consider the case where a higher order increases the father's financial transfer. The child support order is then a positive income shock that is not dependent on her own earned income. As such, we may expect an increase in maternal demand for leisure and therefore a reduction in her labor supply. Additionally, maternal labor supply may also be affected by possible changes to her time available to work due to impacts on the father's time transfer.

2.3 Existing Evidence on Child Support

There are two strands of existing literature on issues related to child support, both focused on the U.S. setting. One strand has used a structural model approach to directly estimate parameters of utility functions among separated parents (see, e.g., Del Boca and Flinn, 1995; Flinn, 2000; Del Boca and Ribero, 2003; Brown and Flinn, 2011; Roff and Lugo-Gil, 2012; Tartari, 2014). This approach is also useful for generating predictions about the impacts of various policy counterfactuals (e.g., perfect institutional enforcement of child support orders versus weak enforcement). As with all such structural estimations, however, functional form assumptions and concerns about endogeneity present some limitations.

We take a complementary approach by using quasi-exogenous variation in an existing policy (namely, the Danish child support guidelines) and studying the reduced-form impacts of child support obligations on a wide range of parental behaviors. While our results cannot directly speak to parental preferences or overall welfare, our analysis instead focuses on producing *causal* estimates.

We thus more directly contribute to the other strand of existing literature on child support, which uses variation across U.S. states in child support enforcement spending or the implementation of specific policies (such as automatic wage withholding and license revocation for non-payment) to identify their effects. Several such studies have shown that child support enforcement policies and spending are correlated with higher child support payments (Sorensen and Halpern, 1999; Freeman and Waldfogel, 2001; Sorensen and Olivier, 2002; Cancian *et al.*, 2007), and have varied effects on non-mandated forms of involvement (Nepomnyaschy, 2007; Nepomnyaschy and Garfinkel, 2010; Gunter, 2013).[12] The evidence on paternal labor supply is also mixed: Freeman and Waldfogel (1998) find no correlation between child support enforcement and fathers' work behavior, while Holzer *et al.* (2005) and Cancian *et al.* (2013) show a negative relationship between child support

[12] In particular, Nepomnyaschy (2007) finds fathers who pay more child support increase contact with their children (i.e., formal payments and contact are complements); Nepomnyaschy and Garfinkel (2010) find evidence of substitution between formal and voluntary payments; Gunter (2013) shows that formal payments and in-kind transfers may be substitutes as well.

mandates and paternal formal labor supply. With regard to family formation, to the best of our knowledge, no previous work has examined subsequent fertility patterns of mothers and fathers who have already separated. However, there is evidence that greater child support enforcement is negatively correlated with overall non-marital fertility rates, possibly implying that a deterrence effect on men may dominate the opposite effect on women (Case, 1998; Huang, 2002; Plotnick *et al.*, 2004; Aizer and McLanahan, 2006).[13]

On the whole, the existing literature cannot yet paint a complete picture of the implications of redistributive policies mandating transfers from non-custodial parents to the custodial parents and their children. Moreover, studies may be limited in their ability to establish causal relationships as child support enforcement spending and the timing of policy implementation may be correlated with other state time-varying factors that could affect the outcomes of interest (e.g., local labor market conditions, other welfare programs, changes to population demographics, etc.). Additionally, by relying on survey data, most of the existing work is unable to calculate child support obligations faced by fathers because of the substantial noise in self-reported income measures.

Most recently, two papers have used proprietary data from Wisconsin to study the impacts of child support on parental employment and cohabitation decisions. In the first paper, Cancian *et al.* (2013) study 23 Wisconsin counties and find that higher child support debt is associated with lower subsequent earnings among low-income fathers. In the second paper, Cancian and Meyer (2014) study a randomized experiment conducted on approximately 700 single mothers in Wisconsin's Temporary Assistance for Needy Families (TANF) program, and find that mothers who received higher child support payments were less likely to cohabit with new partners.

Our work builds on this literature by developing a new identification strategy and using administrative population-level data to lend causal estimates of the effects of child support obligations on a comprehensive set of parental behavioral outcomes.

3 The Danish Child Support System

In Denmark, all issues related to divorce, separation, and child support are handled by a central government body called the County Governor's Office. Parents who have sole physical custody of their children can request a formal child support agreement from this agency, which then assigns child support obligations to the non-custodial parents according to guidelines described in detail below. Child support mandates apply to previously married, previously cohabiting, and never-

[13]There is also some evidence that higher child support payments are correlated with lower subsequent remarriage rates among fathers (Bloom *et al.*, 1998).

married/non-cohabiting parents in the same way.[14] The non-custodial parent must start payments in the year when he no longer lives with his children (i.e., married parents who separate do not need to wait until they are divorced).

Not all separated and divorced parents institute a formal child support agreement, either because they share physical custody of their children or because they establish an informal arrangement. Without a formal agreement, parents do not face any mandates from the government regarding child support payments. However, recent evidence suggests that most parents do seek government intervention in determining child support payments—for example, in 2006, 75 percent of separated parents had a formal child support agreement.[15]

In each year, a non-custodial parent's child support obligation is determined according to a schedule that takes into account his gross income and his total number of biological children under age 18, including any new children from subsequent marriages or unions. For example, if a parent has one non-custodial child and one child within a new union, then he is treated as a two-child parent by the child support schedule (although he is only obligated to make payments for the one non-custodial child).

The per-child obligation consists of a "normal amount" and an "extra amount," the sum of which all non-custodial parents must pay. Non-custodial parents with incomes above certain thresholds must also pay an additional percentage of the "normal amount" that ranges between 25 and 300 percent. The locations of the thresholds are increasing with the number of children—for example, the first income threshold was at 275,000DKK ($50,263) for one-child families and at 290,000DKK ($53,003) for two-child families in 1999, meaning that two-child parents with incomes slightly above 275,000DKK were ordered to pay less per-child relative to one-child parents. Moreover, in every year, the County Governor's Office has increased both the "normal" and "extra" amounts above the rate of inflation and changed the locations of the thresholds.[16] As an example, Appendix Table 1 depicts the child support scheme for three of our analysis years: 1999, 2005, and 2008.[17]

[14]The only distinction is that among previously married couples, paternity of the ex-husband of the mother is presumed and does not need to be established. Among previously cohabiting or never-married/non-cohabiting parents, the parents can either sign a "Declaration of Care and Responsibility" form if they wish to share custody, or the father can sign an "Acknowledgement of Paternity" form if the parents do not want to share custody. If neither form is signed, then the mother is required to designate a father on the child's birth certificate, and a DNA test is ordered to confirm paternity. As such, almost all children have a legal father, who is obligated to make child support payments if the mother establishes a formal child support agreement. See http://www.york.ac.uk/inst/spru/research/childsupport/denmark.pdf and Skinner *et al.* (2007) for more details.

[15]See http://www.york.ac.uk/inst/spru/research/childsupport/denmark.pdf and Skinner *et al.* (2007) for more details.

[16]According to the County Governor's Office, these changes are meant to follow average wage development in Denmark.

[17]Information on annual child support guidelines comes from *Statsforvaltningen*. For more information, please see http://www.statsforvaltningen.dk/site.aspx?p=6404.

The structure of the child support mandates leads to substantial non-linear variation in the child support orders faced by non-custodial parents depending on their incomes, their numbers of children, and the year: 1) in the same year, non-custodial fathers face different child support orders depending on their incomes and numbers of children, 2) at the same amount of real income, non-custodial fathers face different child support orders depending on the year and number of children, and 3) non-custodial fathers with the same number of children face different child support orders depending on their incomes and the year. This variation is displayed in Figure 1 and Appendix Figure 1, which plot the child support orders in real year 2000 DKK by year for parents with one and two children, respectively, and in Appendix Figures 2 and 3, which plot the child support orders for these parents in nominal amounts.

Notably, the guidelines have changed in such a way that over different time periods, fathers in some income ranges have experienced increases in real obligations, while fathers in other income ranges have experienced decreases.[18] The magnitudes of these increases and decreases are different across time periods, income ranges, and the number of children. In our main analysis sample, real annual child support obligations have ranged between 9,395DKK ($1,705) and 42,136DKK ($7,649), representing between 3 and 15 percent of fathers' annual real gross incomes.[19]

Importantly, non-custodial fathers face a strong incentive to make their payments—all child support payments above the "extra amount" are tax-deductible for them, with the value of the deduction amounting to an average compensation for around one third of the payment.[20] The custodial mothers also have an incentive to receive these payments, as child support orders constitute non-trivial contributions to their incomes. In our sample, a father's annual obligation represents between 2 and 73 percent of the mother's annual real gross income, with a median of 10 percent. A non-custodial father must make payments directly to the custodial mother, and if he does not comply with his order, the mother can inform the County Governor's Office, which then issues

[18] For example, fathers with real incomes below 275,000DKK ($50,199) have seen an increase in real orders in each year over 1999-2008; fathers with real incomes around 300,000DKK ($54,762) experienced a decrease over 1999-2001 and then an increase over 2001-2008; while fathers with real incomes around 350,000DKK ($63,889) witnessed an increase over 1999-2002, a decrease over 2002-2003, an increase over 2003-2005, a decrease over 2005-2006, an increase over 2006-2007, and a decrease over 2007-2008.

[19] In the U.S., states follow either the "Income Shares" or the "Percentage of Income" formula in determining child support orders. Under the "Income Shares" formula, non-custodial parents have to pay a share of the net *joint* income of both parents: between 18 and 24% for families with one child and between 28 and 37% for families with two children. The "Percentage of Income" formula only considers the non-custodial parent's gross income (as in Denmark): non-custodial fathers have to pay 17% of gross income if they have one child and 25% if they have two children. See Garfinkel *et al.* (1994) for more information. While these orders represent higher percentages of non-custodial fathers' incomes than those in Denmark, it should be noted that non-compliance rates are quite high in the U.S. According to data from the 2010 CPS Child Support Supplement, 41% of custodial mothers with formal child support agreements reported receiving all the child support that was due in the previous year.

[20] The "extra amount" was introduced in 2000 and has varied from 1,224DKK ($221) to 1,270DKK ($230) per child during our analysis time frame.

reminders.[21] In case of further non-compliance, cases are turned over to the tax authorities who can withhold non-custodial fathers' tax benefits and refunds, as well as seize their assets.

As described in more detail in Section 5, we leverage the variation in child support obligations in a type of "triple-difference" analysis, essentially comparing fathers who have different incomes, different numbers of children, and separate, divorce, or have a child outside marriage and cohabitation in different years, while controlling flexibly for the main effects and double interactions of income, number of children, and year.[22] The effects of child support obligations are thus only identified by quasi-exogenous variation in the mandates and not by any other factors. This identification strategy is similar in spirit to the approaches in Dahl and Lochner (2012) and Milligan and Stabile (2011), who exploit variation in the U.S. Earned Income Tax Credit (EITC) guidelines and Canadian tax benefits, respectively, to identify the causal effects of family income on child outcomes.

4 Data

We link administrative birth records data for all children born in Denmark over 1985-2008 and their siblings with information on their parents from the population register for every year that they reside in Denmark. For each parent, we observe his/her income from different sources, cohabitation and marital status, labor market behavior (employment, labor force status, and annual wages), and educational attainment in every year, as well as demographics such as exact date of birth and country of origin.

Analysis Sample To construct our analysis sample, we begin with all fathers who are observed in the population register data in every year over 1998-2010. We then limit the sample to fathers who either 1) were married to or cohabiting with their oldest children's mothers at the time of childbirth (or in 1998 for oldest children born before), or 2) had a first child between 1999 and 2008 while not married to or cohabiting with the child's mother. For each father, the year in which he either is no longer observed to reside with his oldest child's mother or has a first child while not

[21] The only exception to this rule is that non-custodial parents who are on public assistance and under a formal agreement have child support payments automatically deducted from their benefits and transferred to the custodial parents by the municipality government. As described in Section 4, our analysis sample consists of relatively higher-income fathers who are very unlikely to qualify for social assistance.

[22] Since the thresholds in the guidelines induce discontinuities in obligations, one might in principle try to employ a regression discontinuity (RD) design in this setting as well. However, in practice, since the thresholds are quite close together in the income distribution (for example, in some cases, the thresholds are just 5,000DKK apart), there are not enough observations immediately surrounding each threshold to implement an RD. Moreover, the fact that there are multiple thresholds in each year and for each number of children makes it challenging to center the observations around any particular threshold.

married to or living with the child's mother is referred to as the "separation year". We limit to the 124,114 fathers with separation years between 1999 and 2008. We only consider separations from 1999 onwards because child support guidelines prior to 1999 did not exhibit as much variation with respect to income and were often not enforced.[23] We choose 2008 as the final separation year to allow for at least three years of post-separation observations in the data.

Finally, we limit the sample to fathers who had either one or two children aged less than 18 at the time of separation and who had annual separation year incomes in a 100,000DKK window surrounding the range of the first three thresholds in the child support schedule, where much of the variation occurs (between 175,000DKK/\$31,979 and 505,000DKK/\$92,957).[24] These restrictions create a panel of 73,325 fathers linked to their children and their children's mothers. Our analysis uses one observation per father.[25]

Importantly, we do *not* condition our sample on parents who have a formal agreement, since we do not observe this information in our data. Additionally, as child support obligations could impact the likelihood that parents choose to establish such an agreement, selecting the sample on this potentially endogenous variable could be problematic. Thus, estimates of the relationship between child support mandates and payments in our sample represent intent-to-treat (ITT) effects. To provide approximate treatment-on-the-treated (TOT) magnitudes, we sometimes scale them by the 75 percent formal agreement rate available from Skinner *et al.* (2007).

Calculating Child Support Obligations For each father, we calculate the child support obligation he should face in each year post-separation based on his gross income in the separation year and his number of children with the oldest child's mother aged less than 18 years. For example, for fathers who separate in 2005, child support obligations are calculated for every year over 2005-2010. Note that these calculated orders account for the father's children aging out of child support by turning 18, but do not take into account any new children that he might have with subsequent partners. Additionally, these orders do not account for any changes in the father's income post-separation. We do this because changes in income and the number of children post-separation may

[23] In supplementary analyses we have estimated our main regressions adding in data from 1993-1998. The results are qualitatively similar to those presented here, although the relationship between child support orders and payments is weaker, likely due to the lower level of enforcement.

[24] We drop fathers with more than two children at the time of separation because they constitute a relatively small fraction of the sample (10%) and experience much of the child support formula variation at higher income levels where the data contain fewer observations.

[25] The 73,325 observations represent unique fathers who are linked to their oldest children's mothers. However, mothers can appear multiple times in these data as they can have multiple first births with different partners from whom they separate. As such, when we analyze mothers' outcomes, we only consider their first separation spells and are left with 72,097 unique mother observations.

occur in response to child support obligations and thus are potentially endogenous. As such, the variation in child support obligations comes only from variation in what the father would have to pay based on changes in the guidelines, *holding constant any possible behavioral responses.*[26] We then calculate average annual child support orders for each father over the time of separation as well as over different time spans (e.g., the first 2, 3, 4, and 5 years of separation).

Data on Child Support Payments and Physical Custody Arrangements Our data on actual child support payments come from the population register, which records annual monetary transfers made by non-custodial parents to their children that are tax-deductible and reported to the tax authorities. In other words, we only observe any payments made above the "extra amount". Additionally, as non-custodial parents do not need to have a formal agreement in order to receive the tax deduction for transfers made to their children, the variable we observe includes both payments that are mandated by formal agreements and additional payments not mandated by the government (we cannot distinguish between the two types of payments).

The population register also contains information on the parents' and children's primary residences. Thus, we can observe some fathers sharing in physical custody based on whether they are registered at the same primary residence as their children. This measure captures both joint and sole-father physical custody arrangements since children can only be registered at one primary residence. However, this measure does not capture joint custody arrangements in which the child is registered at the mother's home, and we therefore underestimate the prevalence of joint custody in our data.

Summary Statistics Appendix Table 2 provides summary statistics on selected variables. Column 1 reports information on all fathers in our sample, while columns 2-4 split the sample by parental relationship status—previously married, previously cohabiting, and never-married/non-cohabiting, respectively. The average separation year real gross incomes for fathers and mothers in our sample are 286,300DKK and 205,600DKK, respectively, which are slightly larger than the corresponding average real incomes of 262,000DKK and 191,300DKK for all Danish men and women over the same time period.[27] Additionally, previously married parents are older, wealthier, and more educated than previously cohabiting parents, who in turn are more advantaged than

[26] As we discuss in Section 6, we have also calculated the child support obligations that fathers under formal agreements should face based on their current incomes and numbers of children in each year. We present some results from specifications where we instrument for this potentially endogenous calculated child support obligation with the measure we describe here.

[27] Information on average incomes for Danish men and women comes from Statistics Denmark.

never-married/non-cohabiting parents.

Appendix Table 2 also presents information on the average annual child support orders that we calculate and the payments we observe. We report both the annual full child support orders as well as the annual tax-deductible orders (i.e., orders net of the "extra amount") so that we can more accurately compare them to the tax-deductible payments we see in our data. For all fathers in our sample over the time of separation, the average annual full order is 16,830DKK, the average order net of the "extra amount" is 15,180DKK, while the average annual payment net of the "extra amount" is 9,211DKK.

Differences Between Calculated Orders and Actual Payments We investigate the discrepancy between calculated orders and observed payments further in Appendix Table 3. Here, we show that, on average, fathers pay about 61 percent of the tax-deductible order that we calculate using the child support guidelines. This gap is partially driven by the 19 percent of sample fathers who make zero child support payments post-separation. These "non-payers" are likely comprised of two groups: 1) fathers without formal child support agreements (including those who have full or joint physical custody of their children), and 2) fathers who are completely non-compliant with their orders.[28]

While we inherently cannot distinguish between these two groups in our data, we provide some indirect evidence suggesting that joint and sole-father physical custody arrangements likely play a large role in explaining the zeros. As described in more detail in Appendix B, we link our administrative data to survey data with parent-reported information on custody arrangements. Since the surveys were only conducted in selected years and have small sample sizes, we do not use these data for our main analysis and instead just examine them descriptively. We show that survey reports of joint and sole-father physical cusody arrangements coincide with lower average post-separation child support payments and with a higher prevalence of zero payments by fathers. Additionally, in our administrative data, among the 6 percent of fathers who are registered at the same residence as their oldest children in all years after separation (which is an underestimate of the joint physical custody rate), nearly two-thirds make zero child support payments.[29]

Finally, while the "non-payers" account for some of the gap between average orders and pay-

[28] A third possibility in our data is that some fathers make child support payments but do not report them to the tax authorities. However, given that all payments above the "extra amount" are tax deductible, this seems unlikely as fathers have a strong incentive to report these transfers.

[29] Moreover, other data suggest that out of all Danish children aged 11-15 who had split parents in 2005-2006, about 20 percent lived in either joint or sole-father physical custody arrangements—a number very close to the percentage of "non-payers" that we observe in our sample (Bjarnason and Arnarsson, 2011).

ments, they do not explain all of it. Among those who pay a strictly positive amount, fathers on average pay 76 percent of the tax-deductible order that we calculate. We find that 65 percent of the fathers in the sample pay more than zero but less than their calculated order, while 16 percent pay the amount of the order or more. The "underpayment" likely results from the fact that we observe both mandated and voluntary payments in one variable where voluntary payments do not need to follow any guidelines, as well as possibly from imperfect compliance. "Overpayment" is most common among previously married parents and is likely driven by voluntary transfers.[30]

5 Empirical Methods

We estimate the following baseline models for each father i who separated from his oldest child's mother in year t, with k number of children aged less than 18, and with T total years post-separation observed in the data:

$$Y_i = \beta_0 + \beta_1 * \Big[\frac{1}{T}\sum_{j=0}^{T} CSorder_{ik,t+j}\Big] + \gamma' X_{it} + \delta_t + f(income_{it})$$

$$+ \alpha_{kt} + \sum_{j=1}^{T} \alpha_{k,t+j} + \delta_t * f(income_{it}) + \alpha_{kt} * f(income_{it}) + \delta_t * \alpha_{kt} + \epsilon_{itk} \quad (1)$$

where Y_i is an outcome of interest measured *post-separation*, such as the father's average annual child support payment or an indicator for having subsequent children. $\Big[\frac{1}{T}\sum_{j=0}^{T} CSorder_{ik,t+j}\Big]$ is the father's average annual child support order in thousands of real year 2000 DKK during the time of separation based on our calculations using the child support guidelines as described above.[31]

The vector X_{it} includes controls for a variety of family characteristics measured *in the year of separation*: father's age and age squared, dummies for the father's education (less than high school, high school, vocational/short-term higher education, college/university, and missing), an indicator for the father being from Western Europe, mother's age and age squared, dummies for

[30] Additionally, all discrepancies shown in Appendix Table 3 are partially driven by our calculation of orders based on fathers' incomes and numbers of children in the year of separation. We do not capture how orders may be adjusted to reflect changes in fathers' incomes and number of children post-separation. When we compare payments to the (potentially endogenous) calculated orders based on fathers' actual incomes and numbers of children in each year, we still find similar-sized gaps between payments and orders.

[31] We use the average annual child support obligation as the main explanatory variable because we can relate it easily to average annual payments (one of our outcomes of interest). We prefer to use average annual payments to capture paternal monetary transfers during separation to reduce some of the measurement error that arises when, for example, fathers skip payments in one year and make extra (back-)payments in a subsequent year. However, our results are similar (although at times less precise) when we instead use the child support order measured in the year of separation or in the year after separation as the key explanatory variables.

the mother's education (less than high school, high school, vocational/short-term higher education, college/university, and missing), an indicator for the mother being from Western Europe, mother's total income in year 2000 DKK, oldest child's age and age squared, youngest child's age and age squared, and indicators for original parental relationship status (married, cohabiting, never-married/non-cohabiting).

We also include fixed effects for the year of separation, δ_t, fixed effects for the number of children under age 18 in the year of separation, α_{kt}, and a flexible function of the father's real gross income in the year of separation, $f(income_{it})$, as well as all the double interactions between them. Moreover, we include a set of indicators for the father's number of children still under age 18 in each year post-separation (but not including any new children born post-separation), denoted by $\sum_{j=1}^{T} \alpha_{k,t+j}$. The key coefficient of interest is β_1, which measures the effect of a $1,000$DKK increase in the average annual child support order on the outcome of interest.

Additionally, while our baseline estimates represent the effects of average annual obligations over all the years of separation, we also investigate the timing of their impacts more closely. For these analyses, we estimate the following models:

$$Y_{i,t+\tau+1} = \beta_0 + \beta_1 * \Big[\frac{1}{\tau}\sum_{j=0}^{\tau} CSorder_{ik,t+j}\Big] + \gamma' X_{it} + \delta_t + f(income_{it})$$

$$+ \alpha_{kt} + \sum_{j=1}^{\tau} \alpha_{k,t+j} + \delta_t * f(income_{it}) + \alpha_{kt} * f(income_{it}) + \delta_t * \alpha_{kt} + \epsilon_{ik,t+\tau+1} \tag{2}$$

where τ ranges between 1 and 5. In other words, for years $\tau \in [1,5]$—the first five years of separation—we study the relationship between outcomes measured in year $t+\tau+1$ and obligations averaged over the preceding post-separation years only (i.e., years t to $t+\tau$).

Identifying Assumption The identifying assumption for the estimation of equations (1) and (2) is that no variables systematically covary with the child support guidelines and differentially affect fathers who have different incomes, numbers of children, and separate in different years. Note that the fixed effects for the year of separation control for any overall trends in parental outcomes over the time of our analysis and absorb any effects of national policies that may have been implemented in any given year.[32] Moreover, by including fixed effects for the number of children and interacting them with year fixed effects, we control for the fact that one- and two-child families may be different

[32] Additionally, the year of separation fixed effects control for differences in the length of separation time, T, observed in our data.

and may have different trends over time. Finally, we allow for a flexible relationship between the father's annual separation year income and the outcomes of interest (e.g., we include different order polynomials as well as some non-parametric specifications controlling for small income bins), and allow for this relationship to be different over time (i.e., we control for potential wage growth) and across families with different numbers of children by including interactions between $f(income_{it})$ and the fixed effects for separation year and number of children.

While the identifying assumption is fundamentally untestable, we conduct some indirect tests to evaluate its plausibility. First, we examine the relationship between child support obligations and the likelihood of parental separation in Table 1. If parents respond to (anticipated) child support obligations by changing their decisions to divorce, separate, or have an out-of-wedlock/cohabitation child, then studying the behavior of already separated parents may be subject to sample selection bias as child support orders may affect the composition of parents who appear in the analysis sample.

In Table 1, our sample is a panel of all fathers in our data observed over 1999-2010 (i.e., we do *not* limit to those who have separated as we do for our main analysis).[33] We only keep father-year observations until the year of separation (if it occurs). Our outcome of interest is an indicator for parents separating, divorcing, or having an out-of-wedlock/cohabitation birth. We regress this outcome on the child support obligation that a father would face in that year (calculated based on his income and number of children), with a full set of fixed effects and interactions for the number of children, year, and different functions of the father's income.[34]

The results in Table 1 show that child support obligations are generally uncorrelated with the likelihood of parental separation. While there are some significant effects in specifications using lower-order polynomial functions in father's income, they have opposite signs. Moreover, in our preferred specification that includes indicators for 20,000DKK (approximately \$3,630) bins of father's income, we find no statistically significant relationship. We thus conclude that parents do not seem to make their relationship and fertility decisions in anticipation of expected child support orders in our data.

[33]We do, however, make the same sample restrictions on income, number of children, and years of observation as before: We limit to fathers who were either married to or cohabiting with their oldest children's mothers at the time of childbirth (or in 1998 for oldest children born before), or who had a first child between 1999 and 2010 while not cohabiting with their child's mother. We also only keep father-year observations with nominal incomes between 175,000 and 505,000DKK and with either one or two children aged less than 18.

[34]In column 5, when we include indicators for 20,000DKK (approximately \$3,630) bins in the father's income, for computational feasibility, we collapse the data into cells according to the interactions these father income bins, years 1999-2010, and the number of children. The regression in column 5 is weighted by the number of observations in each cell and has standard errors clustered on the cell level.

We also present additional evidence that our primary treatment variable is uncorrelated with parental characteristics not used in setting child support obligations. For this analysis, we focus on our main analysis sample of separated parents, and estimate versions of equation (1), omitting the controls in vector X_{it} and with the following variables measured in the year of separation as outcomes: father's age, mother's age, indicators for the father's and mother's education levels (university, vocational/short-term higher education, high school only), and mother's income. The results, presented in Table 2, show that child support orders have no statistically significant relationships with any of these variables.

These results are reassuring as they support the conjecture that the variation in child support mandates, conditional on the father's income, year of separation, and his number of children, is essentially random, at least based on observable characteristics. Nevertheless, we also examine the robustness of our results to different specifications; see Section 6 for more details.

6 Results

6.1 Child Support Payments and Father-Child Co-Residence

We begin by analyzing how child support obligations affect fathers' child support payments and father-child co-residence. Table 3 presents results from estimating equation (1) for the following outcomes measured post-separation: father's average annual child support payment, an indicator for the father paying zero child support in at least one year, and an indicator for the father living with his oldest child in at least one year.[35] In these specifications, the $f(income_{it})$ function is captured by indicators for $20,000$DKK (approximately $\$3,630$) bins in the father's real separation year income.

Column 1 shows that a $1,000$DKK increase in the average annual child support order is associated with about a 430DKK increase in the average annual payment. Scaling by the 75 percent formal agreement rate from Skinner *et al.* (2007), we obtain a TOT relationship where a $1,000$DKK increase in the order induces a 573DKK increase in the payment among parents with formal agreements. As hypothesized in Section 2, the lack of a one-for-one correlation between orders and payments may reflect the possibility that mandated payments are partially substituting for voluntary payments that some fathers would have made in the absence of the orders, as well as other parental behavioral responses, which we analyze below.

[35]The regression results using average orders net of the "extra amount" are identical to those reported here as the "extra amount" does not vary across the father's income and so all variation in the "extra amount" is entirely absorbed by the interactions between the year of separation and the number of children.

In column 2, we see that fathers facing higher obligations are less likely to pay zero in at least one post-separation year.[36] Column 3 shows that this effect seems to be driven by a reduction paternal physical custody rates: a 1,000DKK increase in the average order is associated with a 1.8 percent decrease in father-child co-residence post-separation, evaluated at the sample mean.

As discussed in Section 2, there are two opposing forces on paternal physical custody. On the one hand, relative to fathers with lower child support obligations, fathers facing larger obligations may have a greater incentive to avoid paying them by instead sharing in physical custody. On the other hand, mothers have the opposite incentive to receive the higher payments by making sure that fathers do not share in physical custody. Additionally, fathers with higher child support obligations orders may be more likely to substitute away from other forms of non-pecuniary involvement with their children. Our empirical results suggest that the latter forces seem to dominate in our sample, leading to a negative relationship between obligations and paternal physical custody rates.

In Appendix Figure 4, we investigate the timing of the paternal physical custody effect during the length of separation. This figure presents the coefficients and 95% confidence intervals from five separate regressions of equation (2). For years $x \in [1, 5]$—the first five years of separation displayed on the x-axis—each regression uses an indicator for the father living with his oldest child in year $x + 1$ post-separation as the dependent variable and the average annual obligation over the preceding post-separation years (0 to x) as the explanatory variable. The results suggest that the magnitude of the reduction in the paternal physical custody rate is increasing over the length of separation, although the confidence intervals are large enough such that we cannot reject that all five coefficients are equal.

We test the robustness of these results across different specifications in Appendix Tables 4 to 9. As outcomes, we look at average child support paid and an indicator for the father living with his child in at least one year post-separation. Appendix Tables 4 and 5 consider four alternative polynomial functions of father's income: linear (column 1), quadratic (column 2), cubic (column 3), and quartic (column 4); the main specification from Table 3 is replicated in column 5 for ease of comparison. Appendix Tables 6 and 7 consider four alternative "bin" indicator functions of father's income: 50,000DKK bins (column 1), 25,000DKK bins (column 2), 20,000DKK bins (column 3; same as the main specification), 15,000DKK bins (column 4), and 10,000DKK bins (column 5). Appendix Tables 8 and 9 consider four alternative samples based on father's income

[36] In supplemental results, we found no statistically significant relationship between the average annual obligation and the likelihood of the father paying zero child support in all post-separation years, suggesting that fathers with higher orders are no more or less likely to have full or joint physical custody during *all* years of separation, or to not comply entirely.

windows surrounding the first three thresholds in the child support formula: 20,000DKK (column 1), 40,000DKK (column 2), 60,000DKK (column 3), 80,000DKK (column 4), and 100,000DKK (column 5; same as the main sample of analysis). For both outcomes, across the additional 24 regressions, the coefficients are of the same sign and of similar magnitude as those reported in Table 3. Moreover, 20 out of the 24 coefficients are statistically significant at the 5 percent level. These robustness tests provide support for the validity of the identification strategy and the strength of the results.

In sum, these results suggest that, while government-mandated child support orders are moderately effective in increasing fathers' monetary payments to children, they may also crowd-out other forms of father involvement, such as father-child co-residence.

6.2 Parental Subsequent Family Formation

Next, we proceed to examine parental fertility behavior post-separation. Tables 4 and 5 present results for family formation outcomes for the mothers and fathers, respectively.

We find that, for both parents, higher child support orders lead to increased subsequent fertility with new partners. In particular, the first columns in both tables show that each 1,000DKK increase in the child support order is associated with 2.7 and 3.1 percent increases in the likelihoods of mothers and fathers having more children, respectively. Notably, as seen in columns 2-4, fathers increase their fertility only within marriage or cohabitation, while mothers increase their fertility both in and outside these unions. Appendix Tables 10 and 11 test the sensitivity of these results to different polynomial functions of the father's income and show that the estimated coefficients are quite stable across specifications.

We also explore the timing of the fertility effects for mothers and fathers in Appendix Figures 5 and 6, respectively. For fathers, fertility increases materialize after 4 to 5 years post-separation, while for mothers, the positive impacts on fertility are present 3 and 5 years after separation.

As we discussed in Section 2, the positive impact on maternal fertility is consistent with higher child support orders generating greater income effects. The magnitude of our estimate—a 2.7 percent increase for every 1,000DKK increase in obligations—is comparable to estimates in the existing literature on the income-fertility relationship. For example, after converting the estimates from Canadian dollars to Danish krones, Milligan (2005) finds a 3.4 percent increase in fertility associated with a 1,000DKK increase in tax benefits in Quebec. In France, the relevant relationship is a 4 percent increase in fertility for every 1,000DKK increase in benefits (Laroque and Salanié, 2008). In the UK, there is a slightly more modest 2 percent increase in fertility for every 1,000DKK

increase in welfare benefits stemming from a 1999 reform (Brewer *et al.*, 2012).[37]

For fathers, the positive relationship between obligations and fertility is consistent with two incentives: First, fathers with incomes above the first threshold can reduce their obligations to non-custodial children by having more children within new unions. Additionally, as we found above that higher obligations are associated with a reduced incidence father-child co-residence, fathers who are facing higher orders may have less attachment to their existing children and thus more demand for new offspring with new partners. In fact, column 5 of Table 5 shows that the fertility increase is driven by fathers who do not reside with their older children post-separation.[38]

Finally, the fact that fathers facing larger obligations only increase fertility within marriage or cohabitation is consistent with them expecting higher costs of children born outside these unions. In contrast, higher orders for mothers are associated with increased fertility both in and outside new partnerships, consistent with larger orders signaling expectations of higher future transfers to them if they are separated.

6.3 Parental Labor Market Behavior

Finally, we analyze the effects of child support orders on parental labor market outcomes. Table 6 presents the results on fathers' post-separation labor market behavior. We find that, on average, higher orders are associated with a reduction in the amount of time fathers spend in the labor force. Specifically, each 1,000DKK in the child support order reduces the fraction of years post-separation during which they have any positive labor income by 0.15 percent and increases the proportion of years they spend not in the labor force ("NILF") by 4.2 percent at the respective sample means. In contrast, we find no consistent evidence of changes to maternal labor market behavior (see Appendix Table 12).

Appendix Table 13 shows that the result on paternal labor force participation is robust across different polynomial functions of the father's separation year income. Further, by studying labor market outcomes that are measured both before and after separation, we can test for placebo effects

[37] More precisely, Milligan (2005) finds that a $1,000 (in Canadian dollars) increase in tax benefits increases fertility by 17%. $1,000 Canadian dollars is approximately 5,000DKK. Laroque and Salanié (2008) find that 100 Euros per month (i.e., 1,200 Euros per year) increase higher-parity fertility by 37%. 1,200 Euros is approximately 8,957DKK. Brewer *et al.* (2012) find that the mean £900 increase in welfare benefits following a 1999 reform led to a 15% increase in fertility among low-income married women. £900 is approximately 8,300DKK. The muted response in the U.K. may be in part due to an accompanying work incentive that likely reduced fertility.

[38] In supplementary analyses, we explored the heterogeneity in the paternal fertility response with regard to the father's separation year income. While we found no statistically significant differences across fathers with incomes above and below the first guideline threshold, the signs and magnitudes of the coefficients are consistent with fathers who have separation year incomes above the threshold having a greater incentive to have subsequent children within new unions.

on paternal labor force participation pre-separation. Specifically, in Figure 2, in addition to looking at the timing of effects post-separation, we also study whether obligations in the year of separation are correlated with paternal labor force participation in the five years *before* separation. We find that the coefficients in the years before separation are all very close to zero, and that the positive effect on the likelihood of the father being out of the labor force begins to materialize about 3 years following separation.

We explore the overall negative effect on paternal labor force participation further in columns 6-8 of Table 6, and find that it seems to be driven by transitions into disability leaves and retirements (including discretionary early retirements).[39] In contrast, we find no effects on exiting the labor force to receive welfare benefits, as this transition is likely unrealistic for the majority of our (relatively higher-income) sample fathers due to the associated strict means-testing.

Moreover, although these results point to higher obligations being associated with lower paternal labor supply on average, they conceal important heterogeneity in responses. Because the structure of the child support guidelines creates divergent labor supply incentives depending on where the father's income is located relative to the guideline thresholds, in Table 7 we include an interaction term with an indicator for the father's separation year nominal income being above the first threshold in that year. We find that fathers with separation year incomes below the first guideline threshold actually increase their labor supply. The decline in labor force participation is driven entirely by fathers with separation year incomes above the first threshold, who have an incentive to reduce their labor supply in order to avoid paying the additional percentages of the "normal amount".

While all fathers with incomes above the guideline thresholds have an incentive to reduce their earnings, the *relative* value of such an action varies across fathers. Put differently, some fathers will save a larger fraction of their incomes than others by reducing their child support obligations. We therefore examine whether the labor supply response we observe is correlated with these expected savings.

More specifically, for each father, we calculate the average annual real savings in child support

[39]In Denmark, individuals mainly receive disability income through the Social Disability Pension (SDP) program. SDP is granted based on several medical and social criteria, and there are three levels depending on the degree of work capacity. Eligibility for the lowest level depends on work capacity having been reduced to below half the normal level, based on an evaluation using a combination of health and social criteria. Thus, although transitioning from the labor force and into disability leave is not costless, the subjectivity in the eligibility requirements leaves room for behavioral responses on this margin that may be unrelated to changes in fathers' actual health conditions. The main retirement program in Denmark is the Old Age Pension program, for which individuals are eligible starting at age 65. The Post-Employment Wage (PEW) program is the program for early retirement, for which individuals are eligible during ages 60-64. Other eligibility requirements for the PEW include sufficient contributions to the Unemployment Insurance fund and being in the labor force at age 59. See Larsen and Pedersen (2012) for more information.

obligations, as a percentage of his real separation year income, that would accrue if his income were below the first guideline threshold in each year post-separation. For instance, a father who earns 425,000DKK, separates in 2000, and has two children under age 18 throughout the length of separation faces an average annual real obligation of 36,606DKK. If he reduced his income such that it fell below the first guideline threshold in each year post-separation, his average annual real obligation would be 22,056DKK—a reduction of 14,550DKK, representing about 3.4 percent of his separation year income. We calculate this value for all fathers in our sample (note, that it is equal to zero for fathers whose separation year incomes are always below the guideline thresholds). Then, we re-estimate equation (1), substituting this calculated percentage as the key explanatory variable.

Appendix Table 14 presents the results from these specifications. We find that reductions in paternal labor supply are greater when the relative value of such a reduction is higher. In particular, each additional percent of paternal separation year income in child support obligation savings is associated with a 1 percentage point increase in the fraction of years the father spends out of the labor force, and either in retirement or on disability leave. In other words, fathers who have the most to gain (in terms of child support savings) from exiting the labor force are the ones who are most likely to do so.

Overall, as postulated in Section 2, the decline in paternal labor force participation implies that, at least for some fathers, child support orders play the role of income taxes, with the substitution effect dominating the income effect. Our findings are broadly consistent with other studies on the relationship between the relative value of labor market participation and disability/retirement program take-up in the U.S., Canada, and Europe.[40] Thus, our estimates point to an unintended consequence of child support mandates on public budgets: although they may shift the burden of single-mother household support from welfare programs to non-custodial fathers, they also may pass part of this cost on to other government programs including disability insurance and early retirement.

6.4 Additional Results

Instrumental Variables Models As we have noted throughout the paper, we calculate fathers' child support obligations using his income and number of children measured in the year of separation; obligations based on contemporaneous measures of these variables are endogenous because of

[40] See, e.g., Black *et al.* (2002); Autor and Duggan (2003); Gruber (2000); Gruber and Wise (2004, 2009); Bratsberg *et al.* (2010); Bingley *et al.* (2011).

the post-separation fertility and labor supply responses we have shown. Yet by ignoring fathers' income and family size changes post-separation, we also introduce some measurement error into the calculated obligations. We can address this issue by calculating the average obligation a father should face using his current income and number of children in each year post-separation, and use our main treatment variable as an instrument in two-stage least squares models. Note that these IV models do not yield estimates of the impacts of actual obligations faced by fathers under formal agreements as we do not have that information in our data; instead, these specifications essentially scale our main estimates by the first stage relationship between calculated orders based on separation-year variables and calculated orders based on contemporaneous variables.[41] The results from these specifications are in Appendix Table 15, and are quite similar to the main ones we have presented. There is a strong relationship between orders calculated with separation-year variables and orders calculated with contemporaneous variables—the first stage coefficient is 0.84 with an F-statistic of over $2,600$—implying that much of the variation in obligations is driven by non-linearities and changes in the guidelines rather than changes in paternal income or number of children. However, the first stage relationship is not 1-to-1, suggesting that the paternal changes in income and family size play a role in altering post-separation obligations.

Assigning Child Support Obligations Based on the Father's Income in Year *Before* Separation One possible concern with assigning treatment based on the father's income in the year of separation is that fathers may respond to child support obligations by changing their income immediately (i.e., in the year of separation), thus making our treatment variable potentially endogenous. This concern is mitigated by the fact that we do not see any statistically significant correlations between our assigned child support orders and a variety of parental characteristics measured in the year of separation, and by the fact that labor supply responses do not materialize until 3-4 years post-separation, as discussed above. Nevertheless, in Appendix Table 16, we also present results for our main outcomes where we instead assign child support obligations based on the father's income measured in the year *before* separation. These results are similar to the main ones described above, suggesting that endogenous income changes in the year of separation are unlikely to generate substantial biases in our analysis.

[41] We also want to highlight that child support orders should not be used as instruments for actual child support payments that we do observe in our data. As we have shown, child support obligations can affect family outcomes through a number of channels (e.g., changes to custody arrangements or transitions between formal and informal agreements) in addition to their impacts on the actual payments. In other words, the "exclusion restriction" assumption would likely not be satisfied.

Simpler "Double-Difference" Models Our main specification is a type of "triple-difference" model that exploits variation across paternal incomes, number of children, and separation years. We test the sensitivity of this specification by considering one- and two-child families separately in analyses that only exploit variation in child support guidelines by year of separation and the father's income. These regressions still include the controls in vector X_{it} described above, as well as fixed effects for the year of separation and 20,000DKK bins in father's income.[42] Appendix Tables 17 and 18 present the results from these simpler "double-difference" type specifications. While we lose some power and variation in these analyses, the effects are broadly consistent with the main results reported above. Additionally, these results suggest that the effects of child support orders on parental outcomes are similar across one- and two-child families.

7 Conclusion

As growing numbers of children in the United States and many Western European countries have parents who are divorced or separated, understanding the causal effects of government interventions into their families is important. Since unmarried and divorced mothers have historically retained physical custody of their children and had full parental rights, most of these government interventions are centered around encouraging father involvement. These policies share the underlying assumption that father involvement is essential to child well-being and seek to reduce public spending by shifting the burden of support of single-mother households from government programs to the children's fathers.

However, the implications of such policies for both child well-being and public budgets depend crucially on their causal impacts on parental behavior. This type of research has thus far been infeasible on a large scale in the United States primarily due to data constraints, and the Danish context provides a unique opportunity to study these issues. We exploit Danish administrative data together with non-linearities in child support guidelines that assign non-custodial parents different obligations according to their incomes, numbers of children, and separation years to study the causal effects of child support mandates on parental outcomes. We estimate that among parents with a formal agreement, a 1,000DKK increase in a father's average annual child support obligation is associated with about a 573DKK increase in the average annual child support payment.

We also show parental responses on other margins. In particular, higher orders reduce the

[42] We also control for children aging out of child support by turning 18 by including fixed effects for the number of children still under age 18 in each year post-separation (not including any new children born post-separation), as in our main regression equation.

likelihood that fathers live with their children in at least one year post-separation, providing some evidence of substitution between monetary and non-pecuniary paternal investments. Additionally, we find that child support mandates increase post-separation fertility for both parents. While both parents are more likely to have additional children while married to or cohabiting with new partners, mothers are also more likely to have children outside these unions. The fertility effects for mothers are consistent with a positive income-fertility relationship, while the fertility effects for fathers are consistent with increased demand for new offspring as a result of reduced contact with existing children. Finally, we find evidence that among higher-income fathers for whom child support obligations represent taxes on earnings, higher orders are associated with reductions in labor force participation and transitions into disability insurance and early retirement programs.

The findings in this paper point to important parental behavioral responses to redistributive policies meant to address the needs of children growing up in so-called "broken homes". By placing mandates on non-custodial parents to make financial transfers to their children, these policies can disincentivize other forms of non-pecuniary involvement. Moreover, these obligations generate shocks to parental income and time allocation, and can thus impact their subsequent family formation decisions and the division of resources across children. As such, the net impacts on child investment levels and overall child well-being are complicated and ambiguous. Our results cannot directly speak to these implications, although future research might shed light on these issues by exploring the effects of child support mandates on children's cognitive and health outcomes.

The net effects on public spending are also potentially unclear. For example, the fact that some fathers respond to obligations by exiting the labor force and taking up disability insurance or early retirement benefits reveals a possible increase in public sector costs. In 2008, public expenditure on disability pensions amounted to about 16.5 billion DKK ($3.1 billion) in Denmark.[43] Given that there were about $240,000$ recipients in that year, this translates to approximately $69,000$DKK ($\$13,000$) per recipient.[44] Our estimated positive effect on the take-up of disability insurance alone can thus be valued at approximately 21 million DKK ($4 million).[45] Of course these increases in public spending costs have to be weighed against any savings, such as those due to potential reductions in maternal welfare benefit take-up, which we do not observe. Nevertheless, our findings point to the possible unintended consequences of child support mandates on public budgets.

[43]See OECD.Stat for more details: http://stats.oecd.org/Index.aspx?DataSetCode=SOCX_AGG.

[44]In 2008, the Danish age 18-64 population was 3,418,273 according to Statistics Denmark, and approximately 7 percent of them were receiving disability income (Bingley *et al.*, 2011). This amounts to $0.07 * 3,418,273 = 239,279$ recipients.

[45]This value is calculated as follows: We estimate a 0.00126 increase in the likelihood of disability insurance take-up, which translates to $0.00126 * 240,000 = 302$ additional recipients. This means that costs are increased by $302 * 69,000$DKK$= 20,838,000$DKK.

References

Aizer, A. and McLanahan, S. (2006). The impact of child support enforcement on fertility, parental investments, and child well-being. *Journal of Human Resources*, **41** (1), 28–45.

Autor, D. and Duggan, M. (2003). The rise in the disability rolls and the decline in unemployment. *The Quarterly Journal of Economics*, **118** (1), 157–206.

Bingley, P., Gupta, N. D. and Pedersen, P. J. (2011). *Disability Programs, Health and Retirement in Denmark since 1960*. Working Paper 17138, National Bureau of Economic Research.

Bjarnason, T. and Arnarsson, A. M. (2011). Joint physical custody and communication with parents: a cross-national study of children in 36 western countries. *Journal of Comparative Family Studies*, pp. 871–890.

Black, D., Daniel, K. and Sanders, S. (2002). The impact of economic conditions on participation in disability programs: Evidence from the coal boom and bust. *American Economic Review*, pp. 27–50.

Bloom, D. E., Conrad, C. and Miller, C. (1998). Child support and fathers' remarriage and fertility. In I. Garfinkel, S. McLanahan, D. Meyer and J. Seltzer (eds.), *Fathers Under Fire: The Revolution in Child Support Enforcement*, New York: Russell Sage Foundation, pp. 128–150.

Bratsberg, B., Fevang, E. and Røed, K. (2010). *Disability in the welfare state: An unemployment problem in disguise?* Tech. Rep. 4897, Institute for the Study of Labor (IZA).

Brewer, M., Ratcliffe, A. and Smith, S. (2012). Does welfare reform affect fertility? evidence from the uk. *Journal of Population Economics*, **25** (1), 245–266.

Brown, M. and Flinn, C. J. (2011). Family law effects on divorce, fertility and child investment, New York University, unpublished manuscript.

Cancian, M., Heinrich, C. and Chung, Y. (2013). Discouraging disadvantaged fathers' employment: An unintended consequence of policies designed to support families. *Journal of Policy Analysis and Management*, **32** (4), 758–784.

—, Meyer, D. and Roff, J. (2007). *Testing New Ways to Increase the Economic Well-Being of Single-Parent Families: The Effects of Child Support Policies on Welfare Participants*. Discussion Paper 1330-07, Institute for Research on Poverty.

— and Meyer, D. R. (2014). Testing the economic independence hypothesis: The effect of an exogenous increase in child support on subsequent marriage and cohabitation. *Demography*, **51** (3), 857–880.

—, — and Han, E. (2011). Child support: responsible fatherhood and the quid pro quo. *The ANNALS of the American Academy of Political and Social Science*, **635** (1), 140–162.

Case, A. (1998). The effects of stronger child support enforcement on nonmarital fertility. In I. Garfinkel, S. McLanahan, D. Meyer and J. Seltzer (eds.), *Fathers under fire: The revolution in child support enforcement*, New York: Russell Sage Foundation, pp. 191–215.

Dahl, G. B. and Lochner, L. (2012). The impact of family income on child achievement: Evidence from the earned income tax credit. *American Economic Review*, **102** (5), 1927–1956.

Del Boca, D. (2003). Mothers, fathers, and children after divorce: The role of institutions. *Journal of Population Economics*, **16**, 399–422.

— and Flinn, C. J. (1995). Rationalizing child-support decisions. *The American Economic Review*, pp. 1241–1262.

— and Ribero, R. (2003). Visitations and transfers after divorce. *Review of the Economics of the Household*, **1**, 187–204.

Flinn, C. J. (2000). Modes of interaction between divorced parents. *International Economic Review*, **41** (3), 545–578.

Freeman, R. B. and Waldfogel, J. (1998). Does child support enforcement policy affect male labor supply. In I. Garfinkel, S. McLanahan, D. Meyer and J. Seltzer (eds.), *Fathers Under Fire: The Revolution in Child Support Enforcement*, New York: Russell Sage Foundation, pp. 94–127.

— and — (2001). Dunning delinquent dads: The effects of child support enforcement policy on child support receipt by never married women. *Journal of Human Resources*, **36** (2), 207–225.

Garfinkel, I., Mclanahan, S., Meyer, D. and Seltzer, J. (1998). *Fathers under fire: The revolution in child support enforcement*. Russell Sage Foundation Publications.

—, Melli, M. S. and Robertson, J. G. (1994). Child support orders: A perspective on reform. *The Future of Children*, pp. 84–100.

Gruber, J. (2000). Disability insurance benefits and labor supply. *The Journal of Political Economy*, **108** (6), 1162–1183.

— and Saez, E. (2002). The elasticity of taxable income: evidence and implications. *Journal of public Economics*, **84** (1), 1–32.

— and Wise, D. A. (2004). *Social Security Programs and Retirement around the World: Micro-Estimation*. University of Chicago press.

— and — (2009). *Social security programs and retirement around the world: Fiscal implications of reform*. University of Chicago press.

Gunter, S. P. (2013). Effects of child support pass-through and disregard policies on in-kind child support. *Review of Economics of the Household*, **11** (2), 193–209.

Halla, M. (2013). The effect of joint custody on family outcomes. *Journal of the European Economic Association*, **11** (2), 278–315.

Holzer, H. J., Offner, P. and Sorensen, E. (2005). Declining employment among young black less-educated men: The role of incarceration and child support. *Journal of Policy Analysis and Management*, **24** (2), 329–350.

Hoynes, H. W. (1997). Work, welfare, and family structure: What have we learned? In A. Auerbach (ed.), *Fiscal Policy: Lessons from Economic Research*, MIT Press, pp. 101–146.

Huang, C.-C. (2002). The impact of child support enforcement on nonmarital and marital births: Does it differ by racial and age groups? *Social Service Review*, **76** (2), 275–301.

Kampmann, J. and Nielsen, H. W. (2004). Socialized childhood: Children's childhoods in Denmark. In A.-M. Jensen, A. Ben-Arieh, C. Conti, M. N. Ghiolla Phadraig and H. W. Nielsen (eds.), *Children's Welfare in Ageing Europe*, vol. 2, pp. 649–702.

Laroque, G. and Salanié, B. (2008). *Does fertility respond to financial incentives?* Discussion Paper 3575, Institute for the Study of Labor (IZA).

Larsen, M. and Pedersen, P. J. (2012). *Paid Work after Retirement: Recent Trends in Denmark*. Discussion Paper 6537.

Lerman, R. I. and Sorenson, E. (2003). Child support: Interactions between private and public transfers. In *Means-tested transfer programs in the United States*, University of Chicago Press, pp. 587–628.

Milligan, K. (2005). Subsidizing the stork: New evidence on tax incentives and fertility. *Review of Economics and Statistics*, **87** (3), 539–555.

— and Stabile, M. (2011). Do child tax benefits affect the well-being of children? evidence from canadian child benefit expansions. *American Economic Journal: Economic Policy*, **3** (3), 175–205.

Moffitt, R. (2002). Welfare programs and labor supply. In A. Auerbach and M. Feldstein (eds.), *Handbook of Public Economics*, vol. 4, Elsevier, pp. 2393–2430.

Moffitt, R. A. (1998). The effect of welfare on marriage and fertility. In R. A. Moffitt (ed.), *Welfare, the Family, and Reproductive Behavior:: Research Perspectives*, National Academies Press, p. 50.

Neal, D. (2004). The relationship between marriage market prospects and never-married motherhood. *Journal of Human Resources*, **39** (4), 938–957.

Nepomnyaschy, L. (2007). Child support and father-child contact: Testing reciprocal pathways. *Demography*, **44** (1), 93–112.

— and Garfinkel, I. (2010). Child support enforcement and fathers' contributions to their nonmarital children. *The Social service review*, **84** (3), 341.

Piketty, T. and Saez, E. (2013). Optimal labor income taxation. In A. J. Auerbach, R. Chetty, M. Feldstein and E. Saez (eds.), *Handbook of Public Economics*, vol. 5, pp. 391–474.

Plotnick, R. D., Garfinkel, I., McLanahan, S. S. and Ku, I. (2004). Better child support enforcement can it reduce teenage premarital childbearing? *Journal of Family Issues*, **25** (5), 634–657.

Roff, J. and Lugo-Gil, J. (2012). A model of child support and the underground economy. *Labour Economics*, **19** (5), 668–681.

Saez, E., Slemrod, J. and Giertz, S. H. (2012). The elasticity of taxable income with respect to marginal tax rates: A critical review. *Journal of Economic Literature*, **50** (1), 3–50.

Schoeni, R. and Blank, R. (2000). *What has welfare reform accomplished? Impacts on welfare participation, employment, income, poverty, and family structure*. Working Paper 7627, National Bureau of Economic Research.

Skinner, C., Bradshaw, J. and Davidson, J. (2007). *Child Support Policy: An International Perspective*. Research report, Department for Work and Pensions.

Sorensen, E. and Halpern, A. (1999). *Child support enforcement: How well is it doing?* Discussion Paper 99-11, The Urban Institute.

— and Olivier, H. (2002). *Child support reforms in PRWORA: Initial impacts*. Discussion Paper 02-02, The Urban Institute.

Stevenson, B. and Wolfers, J. (2006). Bargaining in the shadow of the law: Divorce laws and family distress. *The Quarterly Journal of Economics*, **121** (1), 267–288.

Tartari, M. (2014). Divorce and the cognitive achievement of children, University of Chicago, unpublished manuscript.

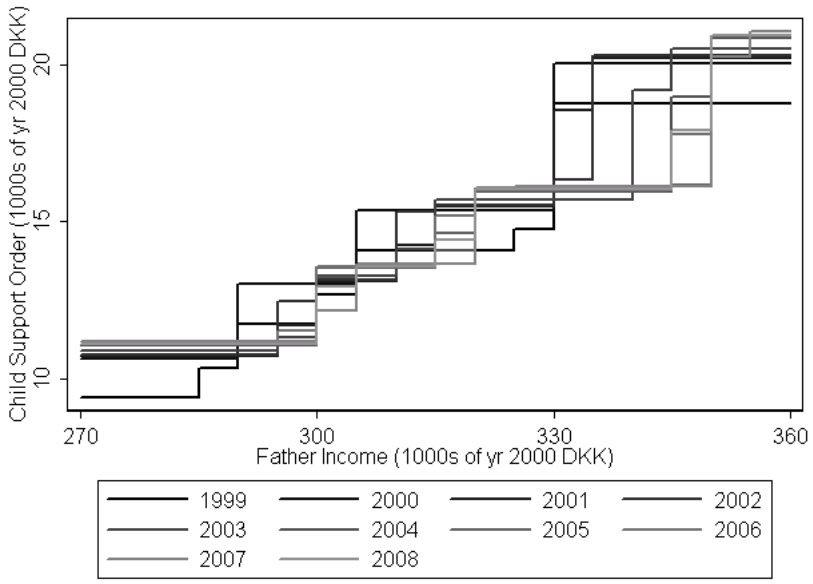
Weinberg, D. H. (2006). Income data quality issues in the CPS. *Monthly Labor Review*, **129**, 38.

Weiss, Y. and Willis, R. (1985). Children as collective goods and divorce settlements. *Journal of Labor Economics*, **3** (3), 268–292.

Willis, R. J. (1999). A theory of out-of-wedlock childbearing. *Journal of Political Economy*, **107** (S6), S33–S64.

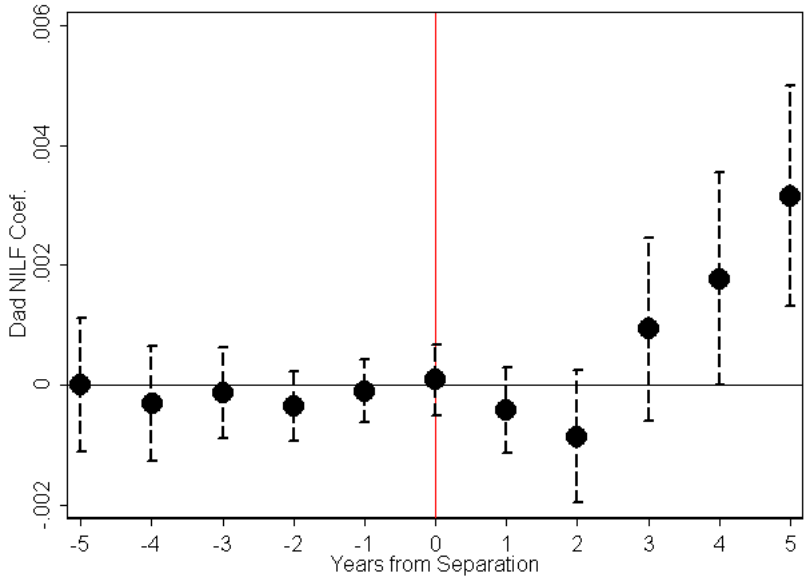
Wolfers, J. (2006). Did unilateral divorce laws raise divorce rates? a reconciliation and new results. *The American Economic Review*, **96** (5), 1802–1820.

Figure 1: Government-Mandated Child Support Orders, 1 Child Families, Year 2000 DKK



Notes: This figure shows the relationship between a non-custodial father's income and the required amount of child support by year for families with one child. Units are 1000s of real year 2000 DKK.

Figure 2: The Effects of Child Support Orders on Fathers Being Not in the Labor Force (NILF): By Year Before and After Separation



Notes: This figure presents the coefficients and 95% confidence intervals from 11 separate regressions. For years $x \in [1, 5]$, each regression has an indicator for the father being not in the labor force (NILF) in year $x + 1$ post-separation as the dependent variable and the average annual obligation over the preceding post-separation years (0 to x) as the explanatory variable. For years $x \in [-5, 0]$, each regression has an indicator for the father being not in the labor force (NILF) in year x pre-separation as the dependent variable and the obligation in the year of separation as the explanatory variable. See notes under Table 2 for more information on the sample.

Table 1: Effects of Child Support Orders on the Likelihood of Parental Separation

	Dep. Var.: Parents Separated or Had Out-of-Wedlock/Cohabitation Birth				
	(1) Poly 1	(2) Poly 2	(3) Poly 3	(4) Poly 4	(5) 20K Bins
Child Support Order	0.000214*** [0.0000318]	0.000161*** [0.0000399]	-0.000130** [0.0000523]	-0.0000551 [0.0000628]	-0.000100 [0.000341]
Dad income	-0.0000505*** [0.00000615]	-0.000118*** [0.0000436]	-0.000510** [0.000237]	0.000331 [0.00114]	
Dad inc. squared		0.000000104 [6.41e-08]	0.00000139* [0.000000726]	-0.00000282 [0.00000531]	
Dad inc. cubed			-1.29e-09* [7.19e-10]	7.65e-09 [1.07e-08]	
Dad inc. quartic				-6.88e-12 [7.90e-12]	
Mean, dept. var.	0.0297	0.0297	0.0297	0.0297	0.0206
Obs. (father-years)	2451720	2451720	2451720	2451720	2451720
Number cells					330

Notes: In columns 1-4, units of analysis are father-year observations. In column 5, the units of analysis are cells according to the interactions of 20,000 DKK father income bins, year, and number of children. The regression in column 5 is weighted by the number of father-year observations in each cell. The sample is a panel of fathers of children born in 1985-2010, who appear in the register data in every year over 1998-2010, and who were either married to, cohabiting with, or never-married/non-cohabiting with their oldest child's mother at the time of childbirth for children born in 1998 or later or in 1998 for children born before. Only father-year observations until the year of separation (if it occurs) are kept. The sample is further limited to father-year observations with nominal incomes between 175,000 and 505,000 DKK. (100,000 DKK surrounding the range of the first three cutoffs), and who have either one or two children aged less than 18. In columns 1-4 (column 5), the outcome of interest is an indicator for (fraction of) the parents either separating, divorcing, or have an out-of-wedlock/cohabitation child. All income variables are in year 2000 real units of 1,000 DKK. In columns 1-4, standard errors are robust to heteroskedasticity; in column 5, robust standard errors are clustered on the cell level.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Table 2: Correlation between Average Child Support Order and Parental Characteristics

	(1) F.Age	(2) M.Age	(3) F.Ed:Uni	(4) F.Ed:Voc	(5) F.Ed:HS	(6) M.Ed:Uni	(7) M.Ed:Voc	(8) M.Ed:HS	(9) M.Inc.
Average child	0.0123	-0.0130	0.00204	-0.00246	0.0000646	0.00214	-0.000157	0.000350	0.394
support order after sep.	[0.0214]	[0.0190]	[0.00149]	[0.00178]	[0.000678]	[0.00160]	[0.00178]	[0.000678]	[0.284]
Mean, dept. var.	36.33	34.14	0.133	0.551	0.0345	0.197	0.432	0.0528	205.6
Obs.	73325	73272	73325	73325	73325	73325	73325	73325	70639

Notes: "F." refers to fathers' characteristics, while "M." refers to mothers' characteristics. The sample is limited to fathers of children born in 1985-2010, who appear in the register data in every year over 1998-2010, and who were either married to, cohabiting with, or never-married/non-cohabiting with their oldest child's mother at the time of childbirth for children born in 1998 or later or in 1998 for children born before. For parents who were never-married/non-cohabiting, the year of separation refers to the year of their oldest child's birth. The sample is further limited to fathers who were either never-married/non-cohabiting and had a child between 1998 and 2008 or who separated or divorced from their oldest child's mother between 1999 and 2008, who had nominal incomes between 175,000 and 505,000 DKK in the year of separation (100,000 DKK surrounding the range of the first three cutoffs), and who had either one or two children aged less than 18 at the time of separation. The average child support order in years after separation is calculated using the father's income in the year of separation, the number of chidren under 18 in each year post-separation (i.e., accounting for children who age out when they 18), and the formula in each year. All regressions include a full set of fixed effects and interactions for number of children, year, and 20,000 DKK income bins. Additionally, the regressions include indicators for the number of children still under age 18 in each year post-separation that the parents had (not including any new children born post-separation). Standard errors robust to heteroskedasticity.

Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Table 3: Effects of Average Child Support Orders on Fathers' Child Support Payments and Father-Child Co-Residence

	(1) Average CS	(2) Zero CS Ever	(3) Ever live w/child
Average child support order after sep.	0.427*** [0.0317]	-0.0112*** [0.00123]	-0.00494*** [0.00171]
Mean, dept. var.	9.252	0.737	0.278
Obs.	70639	70639	70639

Notes: The outcomes are defined as follows: 1) "Average CS" refers to the average annual child support paid by the father in the years post-separation; 2) "Zero CS Ever" refers to an indicator for zero child support paid by the father in at least one year post-separation; 3) "Ever live w/child" refers to an indicator for the father living with the child at least one year post-separation. All income variables are in year 2000 real units of 1,000 DKK. See notes under Table 2 for more information on the sample. All regressions include fixed effects for 20,000 DKK bins in father's income, number of children, year of separation, and their double interactions. All regressions include controls (measured in the year of separation) for the father's age and age squared, dummies for the father's education (less than high school, high school, vocational/short-term higher ed, college/university, and missing), an indicator for the father being from Western Europe, mother's age and age squared, dummies for the mother's education (less than high school, high school, vocational/short-term higher ed, college/university, and missing), an indicator for the mother being from Western Europe, mother's total income in year 2000 DKK, oldest child's age and age squared, youngest child's age and age squared, and indicators for original parental relationship status (married, cohabiting, never-married/non-cohabiting). Additionally, the regressions include indicators for the number of children still under age 18 in each year post-separation that the parents had (not including any new children born post-separation). Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Table 4: Effects of Average Child Support Orders on Mothers' Post-Separation Fertility Outcomes

	Mother Has More Kids After Sep.			
	(1) Overall	(2) Mar.	(3) Coh.	(4) Not Mar./Coh.
Average child support order after sep.	0.00505*** [0.000844]	0.00318*** [0.000593]	0.00123** [0.000625]	0.000699** [0.000314]
Mean, dept. var.	0.185	0.0657	0.0921	0.0287
Obs.	68941	68941	68941	68941

Notes: The outcomes are defined as follows: 1) "Overall" refers to an indicator for the mother having any children post-separation (regardless of relationship status); 2) "Mar." refers to an indicator for the mother having more children post-separation while married to a new partner; 3) "Coh." refers to an indicator for the mother having more children post-separation while cohabiting with a new partner; 4) "Not Mar./Coh." refers to an indicator for the mother having more children post-separation while neither married or cohabiting. All income variables are in year 2000 real units of 1,000 DKK. See notes under Tables 2 and 3 for more information on the sample, specifications, and controls. Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Table 5: Effects of Average Child Support Orders on Fathers' Post-Separation Fertility Outcomes

	Father Has More Kids After Sep.				
	(1) Overall	(2) Mar.	(3) Coh.	(4) Not Mar./Coh.	(5) Not living w/ older child
Average child support order after sep.	0.00582*** [0.00102]	0.00273*** [0.000753]	0.00279*** [0.000709]	0.000234 [0.000384]	0.00640*** [0.000914]
Mean, dept. var.	0.186	0.0804	0.0830	0.0238	0.148
Obs.	70639	70639	70639	70639	70639

Notes: The outcomes are defined as follows: 1) "Overall" refers to an indicator for the father having any children post-separation (regardless of relationship status); 2) "Mar." refers to an indicator for the father having more children post-separation while married to a new partner; 3) "Coh." refers to an indicator for the father having more children post-separation while cohabiting with a new partner; 4) "Not Mar./Coh." refers to an indicator for the father having more children post-separation while neither married or cohabiting; 5) "Not living w/ older child" refers to an indicator for the father having more children post-separation while not living with his oldest child. All income variables are in year 2000 real units of 1,000 DKK. See notes under Tables 2 and 3 for more information on the sample, specifications, and controls. Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Table 6: Effects of Average Child Support Orders on Fathers' Post-Separation Labor Market Outcomes

	(1) Any Wage	(2) Log Wage	(3) Emp.	(4) Self-Emp.	(5) NILF	(6) Dis.	(7) Welf.	(8) Ret.
Average child support order after sep.	-0.00139*	-0.00106	-0.000639	-0.000335	0.00176***	0.00103***	-0.000116	0.00102***
	[0.000827]	[0.00390]	[0.000996]	[0.000842]	[0.000458]	[0.000298]	[0.000263]	[0.000256]
Mean, dept. var.	0.915	12.26	0.832	0.0611	0.0418	0.0113	0.0249	0.00364
Obs.	70626	69184	70639	70639	70639	70639	70639	70639

Notes: The outcomes are defined as follows: 1) "Any Wage" refers to the proportion of years the father has any wage income post-separation, 2) "Log Wage" refers to the log of the father's average annual wage income in the years post-separation, 3) "Emp." refers to the proportion of years the father is employed in the private or public sector (not self-employed) post-separation, 4) "Self-Emp." refers to the proportion of years the father is self-employed post-separation, 5) "NILF" refers to the proportion of years the father is not in the labor force post-separation, 6) "Dis." refers to the proportion of years the father is not in the labor force due to disability leave post-separation, 7) "Welf." refers to the proportion of years the father is not in the labor force and receiving welfare benefits, and 8) "Ret." refers to the proportion of years the father is not in the labor force due to retirement (including early retirement) post-separation. All income variables are in year 2000 real units of 1,000 DKK. See notes under Tables 2 and 3 for more information on the sample, specifications, and controls. Standard errors robust to heteroskedasticity.

Significance levels: * p<0.1 ** p<0.05 *** p<0.01

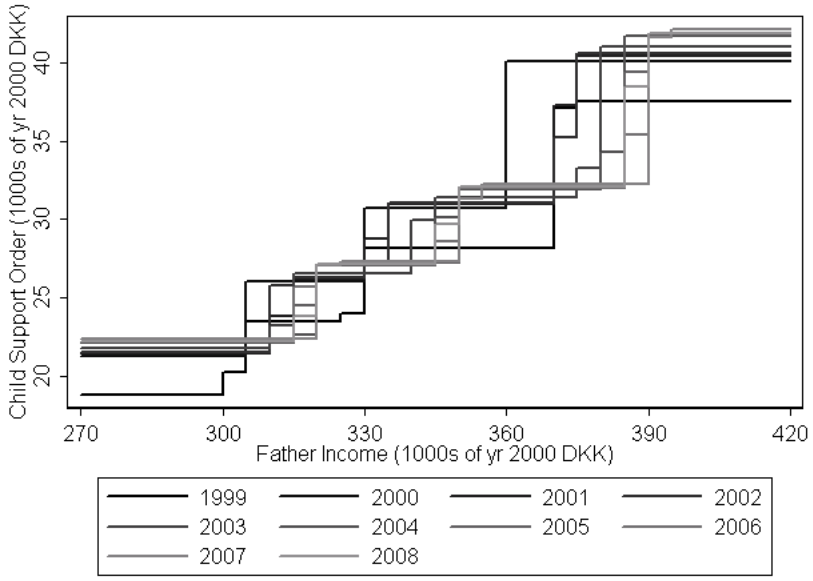
Table 7: Effects of Average Child Support Orders on Fathers' Post-Separation Labor Market Outcomes: Heterogeneity by Income Relative to the First Guideline Threshold

	(1) Any Wage	(2) Log Wage	(3) Emp.	(4) Self-Emp.	(5) NILF	(6) Dis.	(7) Welf.	(8) Ret.
Average child	0.00258**	0.0143***	0.00388***	-0.00187*	-0.00138**	-0.000901**	-0.000111	-0.000221
support order after sep.	[0.00104]	[0.00461]	[0.00127]	[0.00104]	[0.000602]	[0.000398]	[0.000355]	[0.000310]
Average Order *	-0.00282***	-0.0111***	-0.00322***	0.00108**	0.00223***	0.00137***	-0.0000128	0.000884***
Above Threshold 1	[0.000474]	[0.00214]	[0.000577]	[0.000447]	[0.000311]	[0.000229]	[0.000167]	[0.000146]
Above Threshold 1	0.0433***	0.207***	0.0516***	-0.0139*	-0.0322***	-0.0201***	0.00223	-0.0143***
	[0.00877]	[0.0401]	[0.0108]	[0.00844]	[0.00554]	[0.00400]	[0.00297]	[0.00261]
Mean, dept. var.	0.915	12.26	0.832	0.0611	0.0418	0.0113	0.0249	0.00364
Obs.	70626	69184	70639	70639	70639	70639	70639	70639

Notes: This table presents results from regressions that include an interaction with an indicator for the father's separation year nominal income being above the first threshold in the child support guidelines. The outcomes are defined as follows: 1) "Any Wage" refers to the proportion of years the father has any wage income post-separation, 2) "Log Wage" refers to the log of the father's average annual wage income in the years post-separation, 3) "Emp." refers to the proportion of years the father is employed in the private or public sector (not self-employed) post-separation, 4) "Self-Emp." refers to the proportion of years the father is self-employed post-separation, 5) "NILF" refers to the proportion of years the father is not in the labor force post-separation, 6) "Dis." refers to the proportion of years the father is not in the labor force due to disability leave post-separation, 7) "Welf." refers to the proportion of years the father is not in the labor force and receiving welfare benefits, and 8) "Ret." refers to the proportion of years the father is not in the labor force due to retirement (including early retirement) post-separation. All income variables are in year 2000 real units of 1,000 DKK. See notes under Tables 2 and 3 for more information on the sample, specifications, and controls. Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

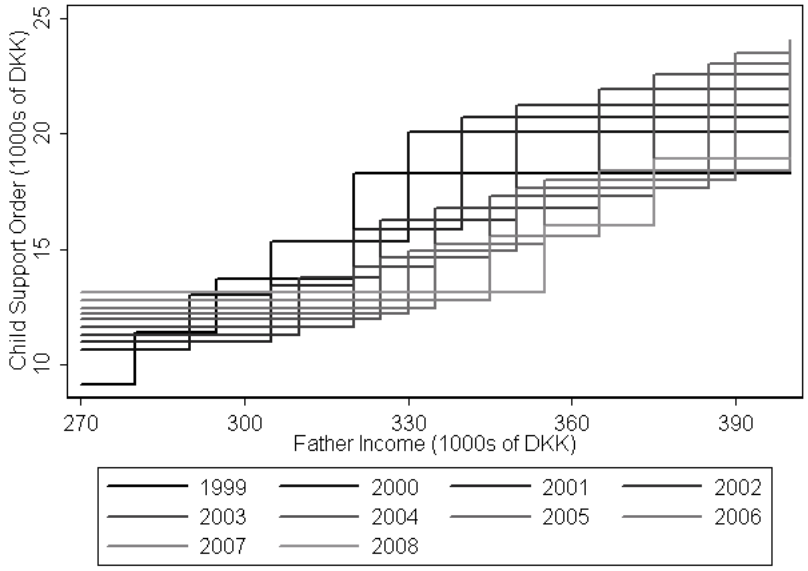
A Appendix Figures and Tables

Appendix Figure 1: Government-Mandated Child Support Orders, 2 Child Families, Year 2000 DKK



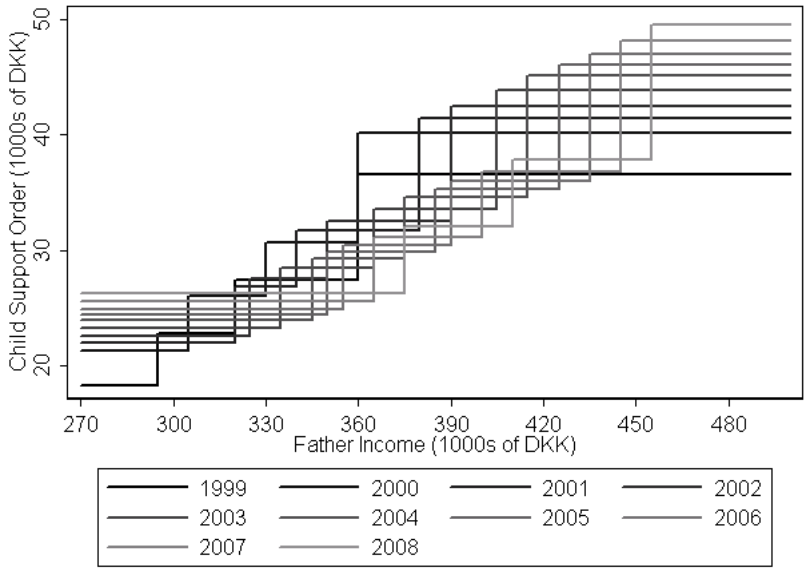
Notes: This figure shows the relationship between a non-custodial father's income and the required amount of child support by year for families with two children. Units are 1000s of real year 2000 DKK.

Appendix Figure 2: Government-Mandated Child Support Orders, 1 Child Families, Nominal DKK



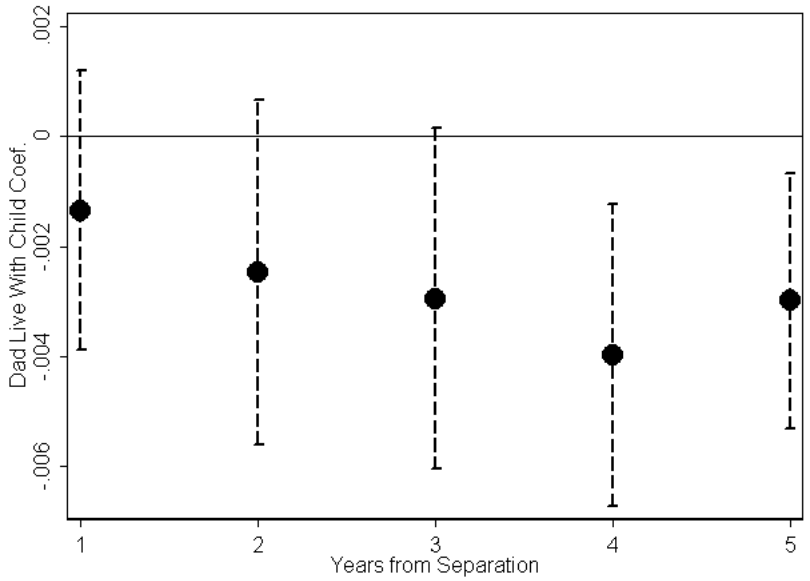
Notes: This figure shows the relationship between a non-custodial father's income and the required amount of child support by year for families with one child. Units are 1000s of nominal DKK.

Appendix Figure 3: Government-Mandated Child Support Orders, 2 Child Families, Nominal DKK



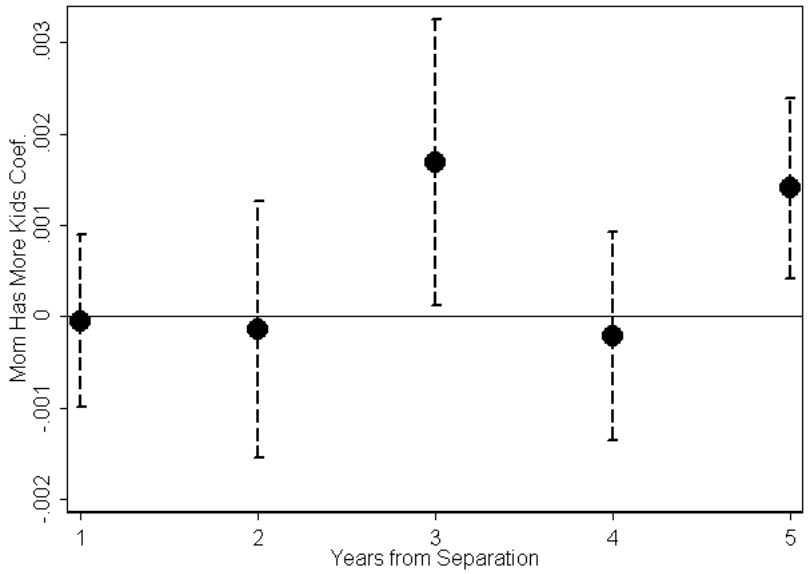
Notes: This figure shows the relationship between a non-custodial father's income and the required amount of child support by year for families with two children. Units are 1000s of nominal DKK.

Appendix Figure 4: The Effects of Child Support Orders on Paternal Physical Custody: By Year After Separation



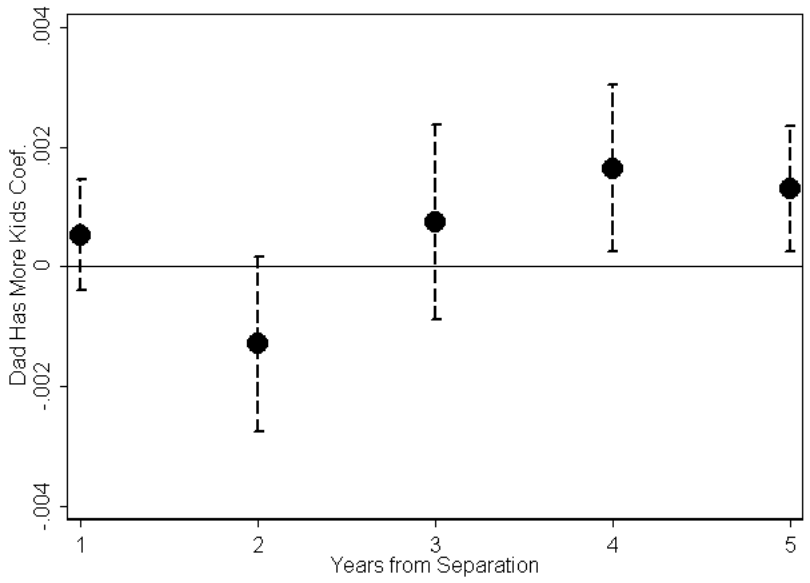
Notes: This figure presents the coefficients and 95% confidence intervals from five separate regressions. In particular, for years $x \in [1, 5]$—the first five years of separation displayed on the x-axis—each regression has an indicator for the father living with his oldest child in year $x + 1$ post-separation as the dependent variable and the average annual obligation over the preceding post-separation years (0 to x) as the explanatory variable. See notes under Table 2 for more information on the sample. All regressions include fixed effects for 20,000 DKK bins in father's income, number of children, year of separation, and their double interactions. All regressions include controls (measured in the year of separation) for the father's age and age squared, dummies for the father's education (less than high school, high school, vocational/short-term higher ed, college/university, and missing), an indicator for the father being from Western Europe, mother's age and age squared, dummies for the mother's education (less than high school, high school, vocational/short-term higher ed, college/university, and missing), an indicator for the mother being from Western Europe, mother's total income in year 2000 DKK, oldest child's age and age squared, youngest child's age and age squared, and indicators for original parental relationship status (married, cohabiting, never-married/non-cohabiting). Additionally, the regressions include indicators for the number of children still under age 18 in each year post-separation that the parents had (not including any new children born post-separation). Standard errors robust to heteroskedasticity.

Appendix Figure 5: The Effects of Child Support Orders on Mothers' Subsequent Fertility: By Year After Separation



Notes: This figure presents the coefficients and 95% confidence intervals from five separate regressions. In particular, for years $x \in [1, 5]$—the first five years of separation displayed on the x-axis—each regression has an indicator for the mother having more children in year $x + 1$ post-separation as the dependent variable and the average annual obligation over the preceding post-separation years (0 to x) as the explanatory variable. See notes under Table 2 for more information on the sample, and notes under Appendix Figure 4 for more information on the estimation and controls.

Appendix Figure 6: The Effects of Child Support Orders on Fathers' Subsequent Fertility: By Year After Separation



Notes: This figure presents the coefficients and 95% confidence intervals from five separate regressions. In particular, for years $x \in [1, 5]$—the first five years of separation displayed on the x-axis—each regression has an indicator for the father having more children in year $x+1$ post-separation as the dependent variable and the average annual obligation over the preceding post-separation years (0 to x) as the explanatory variable. See notes under Table 2 for more information on the sample, and notes under Appendix Figure 4 for more information on the estimation and controls.

Appendix Table 1: Child Support Obligation Schemes: 1999, 2005, 2008

1999: Normal Amount = 9,132 DKK; Extra Amount = 0 DKK

Obligation	Income Range (1 Child)	Income Range (2 Children)
Normal	<=275,000	<=290,000
Normal + 25% × Normal	275,001-290,000	290,001-315,000
Normal + 50% × Normal	290,001-315,000	315,001-355,000
Normal + 100% × Normal	>315,000	>355,000

2005: Normal Amount = 10,824 DKK; Extra Amount = 1,392 DKK

Obligation	Income Range (1 Child)	Income Range (2 Children)
Normal + Extra	<=325,000	<=345,000
Normal + Extra + 25% × Normal	325,001-345,000	345,001-380,000
Normal + Extra + 50% × Normal	345,001-380,000	380,001-420,000
Normal + Extra + 100% × Normal	380,001-500,000	420,001-600,000
Normal + Extra + 200% × Normal	500,001-900,000	600,001-1,100,000
Normal + Extra + 300% × Normal	>900,000	>1,100,000

2008: Normal Amount = 11,628 DKK; Extra Amount = 1,500 DKK

Obligation	Income Range (1 Child)	Income Range (2 Children)
Normal + Extra	<=350,000	<=370,000
Normal + Extra + 25% × Normal	350,001-370,000	370,001-405,000
Normal + Extra + 50% × Normal	370,001-405,000	405,001-450,000
Normal + Extra + 100% × Normal	405,001-600,000	450,001-700,000
Normal + Extra + 200% × Normal	600,001-1,000,000	700,001-1,200,000
Normal + Extra + 300% × Normal	>1,000,000	>1,200,000

Notes: Information on the child support schemes comes from from *Statsforvaltningen*. For more information, please see http://www.statsforvaltningen.dk/site.aspx?p=6404.

Appendix Table 2: Summary Statistics

	(1) All Sep.	(2) Prev. Mar.	(3) Prev. Coh.	(4) Never Mar/Coh
Average child support paid after sep.	9.211 (8.509)	10.19 (9.529)	9.025 (7.711)	5.735 (5.136)
Average child support order after sep.	16.83 (7.688)	17.54 (8.467)	17.22 (7.255)	12.42 (2.790)
Average tax-ded. child support order after sep.	15.18 (7.126)	15.86 (7.847)	15.48 (6.715)	11.15 (2.788)
1st child's age at sep.	6.922 (5.586)	9.647 (5.421)	5.682 (4.335)	0 (0)
Dad age at sep.	36.33 (7.581)	39.69 (7.060)	34.34 (6.532)	29.50 (5.972)
Dad inc. at sep.	286.3 (71.92)	298.6 (72.88)	279.7 (68.73)	258.6 (68.45)
Dad ed: uni/college	0.133 (0.339)	0.161 (0.368)	0.111 (0.314)	0.0939 (0.292)
Dad ed: short high-ed/vocational	0.551 (0.497)	0.565 (0.496)	0.554 (0.497)	0.476 (0.499)
Dad ed: high school	0.0345 (0.183)	0.0355 (0.185)	0.0303 (0.171)	0.0463 (0.210)
Dad from W. Europe	0.971 (0.169)	0.960 (0.197)	0.987 (0.114)	0.955 (0.206)
Mom age at sep.	34.14 (7.111)	37.17 (6.335)	32.40 (6.497)	27.78 (5.934)
Mom inc. at sep.	205.6 (73.19)	224.7 (73.07)	196.2 (68.48)	161.2 (63.97)
Mom ed: uni/college	0.197 (0.398)	0.231 (0.422)	0.176 (0.381)	0.133 (0.339)
Mom ed: short high-ed/vocational	0.432 (0.495)	0.481 (0.500)	0.416 (0.493)	0.287 (0.452)
Mom ed: high school	0.0528 (0.224)	0.0454 (0.208)	0.0547 (0.227)	0.0769 (0.266)
Mom from W. Europe	0.967 (0.178)	0.950 (0.218)	0.989 (0.102)	0.959 (0.197)
Obs.	73,325	34,663	30,481	8,181

Notes: All income variables are in year 2000 real units of 1,000 DKK. The sample is limited to fathers of children born in 1985-2010, who appear in the register data in every year over 1998-2010, and who were either married to, cohabiting with, or never-married/non-cohabiting with their oldest child's mother at the time of childbirth for children born in 1998 or later or in 1998 for children born before. For parents who were never-married/non-cohabiting, the year of separation refers to the year of their oldest child's birth. The sample is further limited to fathers who were either never-married/non-cohabiting and had a child between 1998 and 2008 or who separated or divorced from their oldest child's mother between 1999 and 2008, who had nominal incomes between 175,000 and 505,000 kr. in the year of separation (100,000 DKK surrounding the range of the first three cutoffs), and who had either one or two children aged less than 18 at the time of separation. The average child support order in years after separation is calculated using the father's income in the year of separation, the number of chidren under 18 in each year post-separation (i.e., accounting for children who age out when they 18), and the formula in each year.

Appendix Table 3: Child Support Payment Variables, More Details

	(1) All Sep.	(2) Prev. Mar.	(3) Prev. Coh.	(4) Never Mar/Coh
CS Paid as Pct. of Order	0.613	0.656	0.587	0.528
Zero CS Paid	0.193	0.190	0.176	0.272
CS Paid as Pct. of Order, no 0s	0.760	0.810	0.713	0.726
0 < CS Paid < Order	0.647	0.617	0.692	0.608
CS Paid >= Order	0.159	0.192	0.133	0.120
Obs.	73,325	34,663	30,481	8,181

Notes: This table reports the fraction of all individuals in each column that are in each of the categories denoted on the left-hand side. See notes under Appendix Table 2 for more information on the sample.

Appendix Table 4: Effect of Average Child Support Orders on Average Child Support Paid in the Years After Separation, Different Polynomial Specifications

	Dep. Var.: Average Child Support Paid in Years After Sep.				
	(1) Poly 1	(2) Poly 2	(3) Poly 3	(4) Poly 4	(5) 20K Bins
Average child support order after sep.	0.262*** [0.0154]	0.365*** [0.0253]	0.364*** [0.0260]	0.400*** [0.0304]	0.427*** [0.0317]
Dad inc. at sep.	0.0149*** [0.00158]	0.00550 [0.00956]	-0.0163 [0.0530]	0.372 [0.254]	
Dad inc. squared		0.0000111 [0.0000160]	0.0000774 [0.000173]	-0.00181 [0.00125]	
Dad inc. cubed			-6.39e-08 [0.000000181]	0.00000388 [0.00000264]	
Dad inc. quartic				-2.98e-09 [2.03e-09]	
Mean, dept. var.	9.252	9.252	9.252	9.252	9.252
Obs.	70639	70639	70639	70639	70639
R-squared	0.314	0.315	0.315	0.315	0.317

Notes: All income variables are in year 2000 real units of 1,000 DKK. See notes under Appendix Table 2 and Table 3 for more information on the sample and controls. The following functions of the father's real income in the year of separation are included: column 1 — linear polynomial, column 2 — quadratic polynomial, column 3 — cubic polynomial, column 4 — quartic polynomial, column 5 — indicators for 20,000 DKK bins. All regressions include the controls listed in the notes under Table 3 as well as a full set of fixed effects and interactions for number of children, year of separation, and the interactions between them and the father's income function. Additionally, the regressions include indicators for the number of children still under age 18 in each year post-separation that the parents had (not including any new children born post-separation). Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 5: Effect of Average Child Support Orders on the Incidence of Fathers Ever Living with Their Children After Separation, Different Polynomial Specifications

	Dep. Var.: Father Ever Lives w/ Child After Sep.				
	(1) Poly 1	(2) Poly 2	(3) Poly 3	(4) Poly 4	(5) 20K Bins
Average child support order after sep.	-0.000987 [0.000731]	-0.00477*** [0.00129]	-0.00403*** [0.00136]	-0.00565*** [0.00167]	-0.00494*** [0.00171]
Dad inc. at sep.	-0.000151* [0.0000823]	-0.000298 [0.000559]	-0.00151 [0.00310]	-0.0127 [0.0149]	
Dad inc. squared		0.000000373 [0.000000872]	0.00000427 [0.00000979]	0.0000594 [0.0000712]	
Dad inc. cubed			-4.07e-09 [9.91e-09]	-0.000000120 [0.000000147]	
Dad inc. quartic				8.86e-11 [1.10e-10]	
Mean, dept. var.	0.278	0.278	0.278	0.278	0.278
Obs.	70639	70639	70639	70639	70639
R-squared	0.0759	0.0762	0.0765	0.0767	0.0783

Notes: All income variables are in year 2000 real units of 1,000 DKK. See notes under Appendix Table 2 and Table 3 for more information on the sample and controls. The following functions of the father's real income in the year of separation are included: column 1 — linear polynomial, column 2 — quadratic polynomial, column 3 — cubic polynomial, column 4 — quartic polynomial, column 5 — indicators for 20,000 DKK bins. All regressions include the controls listed in the notes under Table 3 as well as a full set of fixed effects and interactions for number of children, year of separation, and the interactions between them and the father's income function. Additionally, the regressions include indicators for the number of children still under age 18 in each year post-separation that the parents had (not including any new children born post-separation). Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 6: Effect of Average Child Support Orders on Average Child Support Paid in the Years After Separation, Different Bin Specifications

	Dep. Var.: Average Child Support Paid in Years After Sep.				
	(1) 50K Bins	(2) 25K Bins	(3) 20K Bins	(4) 15K Bins	(5) 10K Bins
Average child support order after sep.	0.405*** [0.0268]	0.428*** [0.0309]	0.427*** [0.0317]	0.436*** [0.0324]	0.450*** [0.0334]
Mean, dept. var.	9.252	9.252	9.252	9.252	9.252
Obs.	70639	70639	70639	70639	70639
R-squared	0.315	0.317	0.317	0.318	0.320

Notes: All income variables are in year 2000 real units of 1,000 DKK. See notes under Appendix Table 2 and Table 3 for more information on the sample and controls. The following functions of the father's real income in the year of separation are included: column 1 — indicators for 50,000 DKK bins, column 2 — indicators for 25,000 DKK bins, column 3 — indicators for 20,000 DKK bins, column 4 — indicators for 15,000 DKK bins, column 5 — indicators for 10,000 DKK bins. All regressions include the controls listed in the notes under Table 3 as well as a full set of fixed effects and interactions for number of children, year of separation, and the interactions between them and the father's income function. Additionally, the regressions include indicators for the number of children still under age 18 in each year post-separation that the parents had (not including any new children born post-separation). Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 7: Effect of Average Child Support Orders on the Incidence of Fathers Ever Living with Their Children After Separation, Different Bin Specifications

	Dep. Var.: Father Ever Lives w/ Child After Sep.				
	(1) 50K Bins	(2) 25K Bins	(3) 20K Bins	(4) 15K Bins	(5) 10K Bins
Average child support order after sep.	-0.00364*** [0.00130]	-0.00485*** [0.00164]	-0.00494*** [0.00171]	-0.00631*** [0.00178]	-0.00531*** [0.00183]
Mean, dept. var.	0.278	0.278	0.278	0.278	0.278
Obs.	70639	70639	70639	70639	70639
R-squared	0.0770	0.0779	0.0783	0.0789	0.0805

Notes: All income variables are in year 2000 real units of 1,000 DKK. See notes under Appendix Table 2 and Table 3 for more information on the sample and controls. The following functions of the father's real income in the year of separation are included: column 1 — indicators for 50,000 DKK bins, column 2 — indicators for 25,000 DKK bins, column 3 — indicators for 20,000 DKK bins, column 4 — indicators for 15,000 DKK bins, column 5 — indicators for 10,000 DKK bins. All regressions include the controls listed in the notes under Table 3 as well as a full set of fixed effects and interactions for number of children, year of separation, and the interactions between them and the father's income function. Additionally, the regressions include indicators for the number of children still under age 18 in each year post-separation that the parents had (not including any new children born post-separation). Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 8: Effect of Average Child Support Orders on Average Child Support Paid in the Years After Separation, Different Windows

	Dep. Var.: Average Child Support Paid in Years After Sep.				
	(1) 20K	(2) 40K	(3) 60K	(4) 80K	(5) 100K
Average child support order after sep.	0.498*** [0.0430]	0.461*** [0.0374]	0.429*** [0.0346]	0.433*** [0.0330]	0.427*** [0.0317]
Mean, dept. var.	9.369	9.357	9.320	9.302	9.252
Obs.	45585	54002	60634	66002	70639
R-squared	0.307	0.313	0.314	0.316	0.317

Notes: All income variables are in year 2000 real units of 1,000 DKK. See notes under Appendix Table 2 and Table 3 for more information on the sample, specifications, and controls. Samples of analysis are chosen based on the following income windows surrounding the first three thresholds: column 1 — 20,000 DKK, column 2 — 40,000 DKK, column 3 — 60,000 DKK, column 4 — 80,000 DKK column 5 — 100,000 DKK. Standard errors robust to heteroskedasticity. Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 9: Effect of Average Child Support Orders on the Incidence of Fathers Ever Living with Their Children After Separation, Different Windows

	Dep. Var.: Father Ever Lives w/ Child After Sep.				
	(1) 20K	(2) 40K	(3) 60K	(4) 80K	(5) 100K
Average child support order after sep.	-0.00396 [0.00267]	-0.00317 [0.00229]	-0.00288 [0.00204]	-0.00418** [0.00187]	-0.00494*** [0.00171]
Mean, dept. var.	0.277	0.278	0.278	0.278	0.278
Obs.	45585	54002	60634	66002	70639
R-squared	0.0765	0.0773	0.0781	0.0789	0.0783

Notes: All income variables are in year 2000 real units of 1,000 DKK. See notes under Appendix Table 2 and Table 3 for more information on the sample, specifications, and controls. Samples of analysis are chosen based on the following income windows surrounding the first three thresholds: column 1 — 20,000 DKK, column 2 — 40,000 DKK, column 3 — 60,000 DKK, column 4 — 80,000 DKK column 5 — 100,000 DKK. Standard errors robust to heteroskedasticity. Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 10: Effect of Average Child Support Orders on the Likelihood of Mothers Having Children After Separation, Different Polynomial Specifications

	Dep. Var.: Mother Has More Kids in Years After Sep.				
	(1) Poly 1	(2) Poly 2	(3) Poly 3	(4) Poly 4	(5) 20K Bins
Average child support order after sep.	0.000799 [0.000543]	0.00287*** [0.000787]	0.00293*** [0.000812]	0.00505*** [0.000857]	0.00505*** [0.000844]
Dad inc. at sep.	-0.0000799 [0.0000702]	-0.000521 [0.000482]	-0.00166 [0.00267]	-0.0178 [0.0130]	
Dad inc. squared		0.000000554 [0.000000734]	0.00000411 [0.00000834]	0.0000832 [0.0000615]	
Dad inc. cubed			-3.53e-09 [8.37e-09]	-0.000000170 [0.000000126]	
Dad inc. quartic				1.27e-10 [9.37e-11]	
Mean, dept. var.	0.185	0.185	0.185	0.185	0.185
Obs.	68941	68941	68941	68941	68941
R-squared	0.213	0.213	0.213	0.213	0.215

Notes: All income variables are in year 2000 real units of 1,000 DKK. See notes under Appendix Table 2 and Table 3 for more information on the sample and controls. The following functions of the father's real income in the year of separation are included: column 1 — linear polynomial, column 2 — quadratic polynomial, column 3 — cubic polynomial, column 4 — quartic polynomial, column 5 — indicators for 20,000 DKK bins. All regressions include the controls listed in the notes under Table 3 as well as a full set of fixed effects and interactions for number of children, year of separation, and the interactions between them and the father's income function. Additionally, the regressions include indicators for the number of children still under age 18 in each year post-separation that the parents had (not including any new children born post-separation). Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 11: Effect of Average Child Support Orders on the Likelihood of Fathers Having Children After Separation, Different Polynomial Specifications

	Dep. Var.: Father Has More Kids in Years After Sep.				
	(1) Poly 1	(2) Poly 2	(3) Poly 3	(4) Poly 4	(5) 20K Bins
Average child support order after sep.	0.000386 [0.000577]	0.00272*** [0.000912]	0.00243*** [0.000934]	0.00569*** [0.00101]	0.00582*** [0.00102]
Dad inc. at sep.	0.000181** [0.0000763]	0.000202 [0.000520]	-0.00431 [0.00288]	0.00282 [0.0139]	
Dad inc. squared		-0.000000174 [0.000000801]	0.0000143 [0.00000904]	-0.0000194 [0.0000662]	
Dad inc. cubed			-1.47e-08 [9.11e-09]	5.32e-08 [0.000000136]	
Dad inc. quartic				-5.00e-11 [1.01e-10]	
Mean, dept. var.	0.186	0.186	0.186	0.186	0.186
Obs.	70639	70639	70639	70639	70639
R-squared	0.140	0.140	0.140	0.141	0.143

Notes: All income variables are in year 2000 real units of 1,000 DKK. See notes under Appendix Table 2 and Table 3 for more information on the sample and controls. The following functions of the father's real income in the year of separation are included: column 1 — linear polynomial, column 2 — quadratic polynomial, column 3 — cubic polynomial, column 4 — quartic polynomial, column 5 — indicators for 20,000 DKK bins. All regressions include the controls listed in the notes under Table 3 as well as a full set of fixed effects and interactions for number of children, year of separation, and the interactions between them and the father's income function. Additionally, the regressions include indicators for the number of children still under age 18 in each year post-separation that the parents had (not including any new children born post-separation). Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 12: Effects of Average Child Support Orders on Mothers' Post-Separation Labor Market Outcomes

	(1) Any Wage	(2) Log Wage	(3) Emp.	(4) Self-Emp.	(5) NILF
Average child support order after sep.	0.000723 [0.000860]	0.00734* [0.00387]	0.00102 [0.000998]	0.000335 [0.000498]	0.000561 [0.000699]
Mean, dept. var.	0.847	11.82	0.753	0.0237	0.0691
Obs.	68869	65525	68941	68941	68941

Notes: The outcomes are defined as follows: 1) "Any Wage" refers to the proportion of years the mother has any wage income post-separation, 2) "Log Wage" refers to the log of the mother's average annual wage income in the years post-separation, 3) "Emp." refers to the proportion of years the mother is employed in the private or public sector (not self-employed) post-separation, 4) "Self-Emp." refers to the proportion of years the mother is self-employed post-separation, and 5) "NILF" refers to the proportion of years the mother is not in the labor force post-separation. All income variables are in year 2000 real units of 1,000 DKK. See notes under Tables 2 and 3 for more information on the sample, specifications, and controls. Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 13: Effect of Average Child Support Orders on the Fraction of Years Fathers are Not in the Labor Force After Separation, Different Polynomial Specifications

	Dep. Var.: Proportion of Time NILF in Years After Sep.				
	(1) Poly 1	(2) Poly 2	(3) Poly 3	(4) Poly 4	(5) 20K Bins
Average child support order after sep.	0.00626*** [0.000241]	0.000439 [0.000359]	-0.000513 [0.000383]	0.00204*** [0.000477]	0.00176*** [0.000458]
Dad inc. at sep.	-0.000406*** [0.0000250]	-0.00143*** [0.000171]	-0.00415*** [0.000928]	-0.00684 [0.00450]	
Dad inc. squared		0.00000192*** [0.000000254]	0.0000106*** [0.00000280]	0.0000249 [0.0000208]	
Dad inc. cubed			-8.68e-09*** [2.72e-09]	-4.15e-08 [4.15e-08]	
Dad inc. quartic				2.65e-11 [3.02e-11]	
Mean, dept. var.	0.0418	0.0418	0.0418	0.0418	0.0418
Obs.	70639	70639	70639	70639	70639
R-squared	0.0941	0.102	0.107	0.109	0.109

Notes: All income variables are in year 2000 real units of 1,000 DKK. See notes under Appendix Table 2 and Table 3 for more information on the sample and controls. The following functions of the father's real income in the year of separation are included: column 1 — linear polynomial, column 2 — quadratic polynomial, column 3 — cubic polynomial, column 4 — quartic polynomial, column 5 — indicators for 20,000 DKK bins. All regressions include the controls listed in the notes under Table 3 as well as a full set of fixed effects and interactions for number of children, year of separation, and the interactions between them and the father's income function. Additionally, the regressions include indicators for the number of children still under age 18 in each year post-separation that the parents had (not including any new children born post-separation). Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 14: Effects of Expected Savings in Child Support Obligations from Having an Income Below the 1st Threshold on Fathers' Post-Separation Labor Market Outcomes

	(1) Any Wage	(2) Log Wage	(3) Emp.	(4) Self-Emp.	(5) NILF	(6) Dis.	(7) Welf.	(8) Ret.
Value of moving	-0.00763**	-0.00621	-0.00533	-0.00113	0.0101***	0.00531***	-0.000235	0.00556***
below thres. 1 as pct of income	[0.00377]	[0.0185]	[0.00454]	[0.00391]	[0.00200]	[0.00131]	[0.00114]	[0.00106]
Mean, dept. var.	0.915	12.26	0.832	0.0611	0.0418	0.0113	0.0249	0.00364
Obs.	70626	69184	70639	70639	70639	70639	70639	70639

Notes: This table presents results from regressions where the key explanatory variable is the average annual real savings in child support obligations, as a percentage of the father's separation year real income, that would accrue if the father had an income below the 1st guideline threshold. This variable is expressed in percentage point units. The outcomes are defined as follows: 1) "Any Wage" refers to the proportion of years the father has any wage income post-separation, 2) "Log Wage" refers to the log of the father's average annual wage income in the years post-separation, 3) "Emp." refers to the proportion of years the father is employed in the private or public sector (not self-employed) post-separation, 4) "Self-Emp." refers to the proportion of years the father is self-employed post-separation, 5) "NILF" refers to the proportion of years the father is not in the labor force post-separation, 6) "Dis." refers to the proportion of years the father is not in the labor force due to disability leave post-separation, 7) "Welf." refers to the proportion of years the father is not in the labor force and receiving welfare benefits, and 8) "Ret." refers to the proportion of years the father is not in the labor force due to retirement (including early retirement) post-separation. All income variables are in year 2000 real units of 1,000 DKK. See notes under Appendix Table 2 and Table 3 for more information on the sample, specifications, and controls. Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 15: Instrumental Variables Results

	(1) Avg. CS Paid	(2) F. Live w/Child	(3) F. More Kids	(4) M. More Kids	(5) F. NILF
Average child support order, using current inc. and num kids	0.507*** [0.0369]	-0.00594*** [0.00203]	0.00692*** [0.00116]	0.00600*** [0.000997]	0.00209*** [0.000547]
Mean, dept. var.	9.251	0.278	0.186	0.185	0.0418
Fst. stage coef.	0.841	0.841	0.841	0.843	0.841
Fst. stage F-stat	2619.5	2619.5	2619.5	2612.7	2619.5
Obs.	70637	70637	70637	68940	70637

Notes: "F." refers to fathers' outcomes, while "M." refers to mothers' outcomes. In these specifications, we calculate child support obligations based on fathers' actual current incomes and numbers of children in each year post-separation, and then use our main treatment variable (based on income and number of children in the year of separation) as an instrument. All income variables are in year 2000 real units of 1,000 DKK. See notes under Appendix Table 2 and Table 3 for more information on the sample, specifications, and controls. Standard errors robust to heteroskedasticity.

Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 16: Results Using Father's Income in Year *Before* Separation to Calculate Child Support Obligations

	(1) Avg. CS Paid	(2) F. Live w/Child	(3) F. More Kids	(4) M. More Kids	(5) F. NILF
Average child support order after sep.	0.469*** [0.0348]	-0.00312* [0.00176]	0.00837*** [0.00106]	0.00599*** [0.000853]	0.00162*** [0.000506]
Mean, dept. var.	9.452	0.278	0.184	0.181	0.0435
Obs.	70532	70532	70532	68910	70532

Notes: "F." refers to fathers' outcomes, while "M." refers to mothers' outcomes. The results reported here are from specifications where child support obligations are assigned based on the father's income measured in the year *before* separation. All income variables are in year 2000 real units of 1,000 DKK. See notes under Appendix Table 2 and Table 3 for more information on the sample, specifications, and controls. Standard errors robust to heteroskedasticity. Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 17: Effects of Average Child Support Orders, 1-Child Families

	(1) Avg. CS Paid	(2) F. Live w/Child	(3) F. More Kids	(4) M. More Kids	(5) F. NILF
Average child support order after sep.	0.333*** [0.0368]	-0.00219 [0.00240]	0.00900*** [0.00144]	0.0130*** [0.00120]	0.00232*** [0.000766]
Mean, dept. var.	6.313	0.253	0.209	0.221	0.0470
Obs.	39021	39021	39021	37466	39021

Notes: "F." refers to fathers' outcomes, while "M." refers to mothers' outcomes. See notes under Appendix Table 2 on the sample. Here, the sample is further limited to parents who had one child at the time of separation. All income variables are in year 2000 real units of 1,000 DKK. All regressions include fixed effects for 20,000 DKK bins in father's income and the year of separation. All regressions include controls (measured in the year of separation) for the father's age and age squared, dummies for the father's education (less than high school, high school, vocational/short-term higher ed, college/university, and missing), an indicator for the father being from Western Europe, mother's age and age squared, dummies for the mother's education (less than high school, high school, vocational/short-term higher ed, college/university, and missing), an indicator for the mother being from Western Europe, mother's total income in year 2000 DKK, the child's age and age squared, and indicators for original parental relationship status (married, cohabiting, never-married/non-cohabiting). Additionally, the regressions include indicators for the number of children still under age 18 in each year post-separation that the parents had (not including any new children born post-separation). Standard errors robust to heteroskedasticity.
Significance levels: * p<0.1 ** p<0.05 *** p<0.01

Appendix Table 18: Effects of Average Child Support Orders, 2-Child Families

	(1) Avg. CS Paid	(2) F. Live w/Child	(3) F. More Kids	(4) M. More Kids	(5) F. NILF
Average child support order after sep.	0.261*** [0.0443]	-0.00347* [0.00207]	0.00335*** [0.00129]	0.00356*** [0.00107]	-0.000107 [0.000470]
Mean, dept. var.	12.88	0.309	0.157	0.142	0.0354
Obs.	31618	31618	31618	31475	31618

Notes: "F." refers to fathers' outcomes, while "M." refers to mothers' outcomes. See notes under Appendix Table 2 on the sample. Here, the sample is further limited to parents who had two children at the time of separation. All income variables are in year 2000 real units of 1,000 DKK. All regressions include fixed effects for 20,000 DKK bins in father's income and the year of separation. All regressions include controls (measured in the year of separation) for the father's age and age squared, dummies for the father's education (less than high school, high school, vocational/short-term higher ed, college/university, and missing), an indicator for the father being from Western Europe, mother's age and age squared, dummies for the mother's education (less than high school, high school, vocational/short-term higher ed, college/university, and missing), an indicator for the mother being from Western Europe, mother's total income in year 2000 DKK, the oldest child's age and age squared, the youngest child's age and age squared, and indicators for original parental relationship status (married, cohabiting, never-married/non-cohabiting). Additionally, the regressions include indicators for the number of children still under age 18 in each year post-separation that the parents had (not including any new children born post-separation). Standard errors robust to heteroskedasticity. Significance levels: * p<0.1 ** p<0.05 *** p<0.01

B Evidence on Custody Arrangements from Survey Data

In Section 4, we argue that an important factor driving the zero payments we observe in our data is joint physical custody arrangements. Unfortunately, the administrative data we use contain an imperfect measure of physical custody based on whether the child is registered at the same address as the parent. As children can only have one address in our data (irrespective of their custody arrangement), we underestimate joint physical custody arrangements by looking at children who are registered at the same address as their fathers.

To further examine the relationship between physical custody arrangements and child support payments, we link our administrative data to survey data from Denmark. As sample sizes for children living in non-intact families in available surveys are small, we pool data from two sources: first, the 2007 wave of the *Danish longitudinal survey of children (DALSC)*, and second, the 2009 wave of the *Children and Youth in Denmark (CYD)* survey.[46] The DALSC is a panel study of all children born in Denmark in one week of October 1995. The CYD is a survey conducted among random samples of seven cohorts aged 3-19 in 2009 and 2013. Both panel studies examine a broad set of topics related to children's living conditions, including custody arrangements.

We link the survey information to the administrative data on child support payments. Similar to our sample construction described in Section 4, we keep children whose fathers are in the administrative data in all years after 1995 (the initiation year of the DALSC). We match 5,738 DALSC and 5,988 CYU children to the administrative data (99/95% of the children with completed survey questionnaires). In 2007, the DALSC children were 12 years old and thus we have a relatively large share of children who have experienced a parental separation: After conditioning on the fathers being in the data for all years after 1995 and experiencing a separation at any time during the period, we end up with 2,024 separated fathers with (singleton) children. For the CYD data, we end up with 1,428 fathers.

As we use parental reports on physical custody arrangements (the vast majority of questionnaires were completed by mothers), we further condition on the parents having answered questions on the custody arrangements (i.e., separated before the surveys in 2007/2009). Finally, we only look at one- and two-children families with fathers in the relevant income range (around the guideline thresholds), as in the main analysis. Our final survey sample consists of parents of 843 (DALSC)/765 (CYD) children.

Appendix Table 19 divides this sample of children into three groups: Column 1 reports summary

[46] For details on the DALSC and CYU please see http://www.sfi.dk/about_the_research-11402.aspx and http://www.sfi.dk/children_and_young_people_in_denmark-7395.aspx.

statistics for the full survey sample of separated parents. Columns 2 and 3 show summary statistics for the two sub-groups: children with sole-mother and children with either joint or sole-father physical custody arrangements as reported in the respective survey years (2007 for DALSC and 2009 for CYD). Joint physical custody is defined as the child spending approximately half of the time with each parent (in the survey year). Given that we only have 49 fathers with sole physical custody in our data, and as paternal child support obligations do not apply to both joint and sole physical custody fathers, we pool the two groups.

In the top panel, we report means and standard deviations of some of the child support variables from the administrative data. While our main analysis focuses on fathers' child support obligations and payments, we also describe maternal child support payments here as they are especially relevant for the joint and sole-father physical custody arrangements.

We find that fathers who share in the physical custody in the survey year (and especially if they have sole custody) pay less child support over the separation time relative to fathers who do not. The percentage of fathers with zero payments is higher among fathers who have sole or joint physical custody in the survey year: 46 percent of sole- or joint-custody fathers make zero payments in that year (relative to 35 percent of fathers whose children live in sole-mother custody arrangements). These figures illustrate that a large share of the zeros we observe in our administrative data is likely driven by fathers who share in physical custody of their children.

Additionally, while the 21 percent of fathers with joint or sole physical custody in the survey year pay less than their non-custody counterparts, the survey data also show that mothers pay more in these cases: Mothers of children in sole-father or joint physical custody arrangements pay more than four times as much as sole-custody mothers, and are less likely to ever have zero payments after separation. However, the relatively low level of average post-separation mother payments reflects that mothers are most likely to have physical custody of their children in some (if not all) of the pre-survey separation years.

The last row in the top panel shows that our measure of father-child co-residence—an indicator for the father having the same address as the child in any year post-separation—is reasonable (although imperfect). Fathers who have joint or sole physical custody are more likely to be registered at the same address as their child relative to fathers of children in sole-mother custody arrangements.

Finally, the lower panel focuses on a variable only available in the DALSC data. We look at our 2007 DALSC sample of parents and their reports from any of the survey years (1996, 1999, 2003, 2007, 2011). These data show that joint physical custody arrangements are relatively fluid over separation time: among parents who have a sole-mother arrangement in 2007, 13 percent have joint

custody in any of the survey years. Overall, 33 percent of parents have a joint custody arrangement in at least one of the survey years.

In sum, using the available survey data (linked to our administrative data), we find that joint (and sole-father) physical custody arrangements (which we underestimate when using only administrative data on addresses) coincide with lower average father child support payments, higher prevalence of zero payments by fathers, and higher average mother payments. Moreover, as around 33 percent of parents have a joint physical custody arrangement at some point post-separation, and as parents sharing physical custody do not face child support mandates, we conclude that a large percentage of the observed zero-payments in our main analysis data set is attributable to the prevalence of these arrangements.

Appendix Table 19: Physical Custody Arrangements and Child Support Payments: Evidence from Administrative Data Linked to Survey Data from 2007 (DALSC) and 2009 (CYD)

	DALSC and CYD samples, admin. data		
	(1) All parents	(2) Sole-Mother	(3) Joint and Sole-Father
Father: Child support payments in survey year	11298.4 (12099.7)	11666.8 (12237.5)	9893.0 (11468.1)
Father: Zero child support in survey year	0.368 (0.482)	0.345 (0.476)	0.455 (0.499)
Father: Average child support paid after sep.	11398.0 (9746.5)	11846.5 (9697.4)	9687.1 (9758.0)
Father: Ever zero child support after sep.	0.704 (0.457)	0.684 (0.465)	0.781 (0.414)
Father: Always zero child support after sep.	0.160 (0.367)	0.141 (0.348)	0.237 (0.426)
Father: Average child support order after sep.	21750.6 (9440.8)	21438.9 (9321.1)	22941.2 (9808.2)
Mother: Average child support paid after sep.	1035.9 (3210.9)	599.8 (2330.9)	2699.4 (5047.6)
Mother: Ever zero child support after sep.	0.973 (0.163)	0.986 (0.118)	0.922 (0.268)
Father: Ever lives with the child after sep.	0.249 (0.433)	0.239 (0.427)	0.287 (0.453)
Obs.	1,608	1,274	334
	Survey data, DALSC		
	(1)	(2)	(3)
Joint physical custody, any survey year	0.325 (0.469)	0.130 (0.336)	0.840 (0.367)
Obs.	843	618	225

Notes: Columns 2-4 divide the sample by the physical custody arrangement (sole-mother, sole-father, joint) in the survey year (2007/2009).