Does the Welfare State Destroy the Family? Evidence from OECD Member Countries

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Abstract

We study the effect of the size of the welfare state on family outcomes in OECD member countries. Exploiting exogenous variation in public social spending, due to varying degrees of political fractionalization (i.e. the number of relevant parties involved in the legislative process), we show that an expansion in the welfare state increases the fertility, marriage, and divorce rates with a quantitatively stronger effect on the marriage rate. We conclude that the welfare state supports family formation. Nevertheless, we also find that the welfare state decouples marriage and fertility, and therefore, alters the organization of the family.

JEL Classification: J12, J13, J18, D1, D62, H31, H53.
Keywords: Marriage, divorce, fertility, welfare state, risk sharing.

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1 Introduction

Family and kinship traditionally provided services such as care for the young and the elderly and provided insurance against unforeseen events such as illness and unemployment. Nowadays, governments in industrialized countries provide or at least subsidize these services, for instance, through public health and unemployment insurance. Thus, the role of the family may have become less important in this respect (Anderberg, 2007), and the incentives to form a family may have decreased along with the introduction of comprehensive welfare state arrangements. Nevertheless, the implementation of welfare state arrangements may incorporate (implicit or explicit) subsidies of certain family arrangements. If, for instance, welfare state regulations promote marriage and fertility, then the welfare state may also exert a crowding-in effect on families. Consequently, the overall effect is less clear.

Does the welfare state destroy or support the family? We study this issue by examining OECD member countries in the period from 1980 until 2007. Thus, in contrast to the existing literature, which examines specific welfare arrangements and reforms, we study the impact of welfare state arrangements on an aggregated level. To measure the extent of the welfare state, we mainly use public social spending as a percentage of GDP. Thus, we evaluate the effect of the average implementation of the welfare state in the sample of OECD member countries in the given time period. Family behavior is captured by marriage, divorce, and fertility rates.

To obtain exogenous variation in the size of the welfare state, we turn to the literature on the political economy of public spending. This literature stresses the importance of political fractionalization for the level of public spending.[1] We exploit varying degrees of political fractionalization—in particular, the number of relevant parties involved in the legislative process—as an instrumental variable. Our first stage estimations show a highly significant effect of within-country variation in political fractionalization on public (social) spending. The identifying assumption of our instrumental variable strategy is that the number of political parties in the parliament affects family behavior only through the channel of public social spending. While this assumption is not testable, it is hard to think of another determinant of family behavior that is reasonably correlated with the number of political parties. We show that our estimated effects are very robust to alternative specifications where we control for the few other potential mediating links (such as the government's ideology or polarization). In sum, we argue that using political fractionalization as an instrument for public social spending is a useful identification strategy in our context.

We find evidence indicating that a larger welfare state increases the turnover in the

[1] See, for example, Volkerink and de Haan (2001) and Pettersson-Lidbom (2012) for empirical evidence on the role of fractionalization.

marriage market by increasing both marriage and divorce rates. Since the effect on marriage is stronger than that on divorce, an increase in the size of the welfare state increases the stock of married individuals. Further, we observe an increase in the fertility rate, which is particularly pronounced for non-marital fertility (compared to marital fertility). Hence, while the welfare state supports the formation of families, it crowds-out the traditional organization of the family by increasing the divorce rate and the number of children born out of wedlock. All the estimated effects are highly statistically significant and their quantitative importance increases when we use a narrower measurement of the welfare state.

Three guideposts can be used to put this analysis in the context of existing literature. First, we add to the literature that studies the consequences of the welfare state in a general sense (Castles *et al.*, 2010). Second, we add to the literature on demographic trends (Stevenson and Wolfers, 2007).[2] With the exception of the out-of-wedlock ratio, comparably little attention has been paid to the influence of the welfare state on demographic outcomes.[3] In the public debate, the dominant view is that the welfare state has to adjust to changing demographic patterns (as for instance, in the case of an aging society with extensive pensions systems). Our finding points to the reversed link, where the welfare state has the capacity to shape demographic outcomes. Finally, we provide empirical support for Gary S. Becker's claim that the organization of the family changes as the state supplements or replaces traditional family functions. In this regard, our empirical evidence complements the large literature examining the effects of specific U.S. welfare arrangements on family outcomes.[4]

Typically, scholars use variations in welfare benefit levels across time and states to identify the effects on family outcomes. By and large, micro analyses confirm theoretical expectations. Moffitt (1997) concludes that many existing studies find a negative effect of public transfers on marriage, and a positive effect on fertility. However, the estimated effects are generally small, sensitive to alternative econometric specifications, and a sizable minority of the papers find no effects at all.[5] A possible explanation for the conflicting empirical evidence is a lack of econometric identification. Moffitt (1998) argues that many

[2]Economic scholars have studied the role of the economic independence of women (Isen and Stevenson, 2011), access to abortion and oral contraception (Akerlof, Yellen and Katz, 1996; Goldin and Katz, 2000, 2002), changes in divorce law (Wolfers, 2006; Rasul, 2006; Matouschek and Rasul, 2008), and reforms of custody law (Halla, 2013).

[3]A notable exception is Björklund (2006) who identifies a positive effect of the Swedish family policy on the overall fertility level.

[4]Earlier papers evaluate the effect of *Aid to Families with Dependent Children* (AFDC) and more recent papers look at *Temporary Assistance for Needy Families*. In the case of AFDC—where the disposable income of recipients increases with children and decreases with marriage—one expects a decrease in marriage, an increase in divorce, and an increase in fertility, especially out of wedlock (Becker, 1993). TANF replaced AFDC (in 1996) and reversed some of the incentives of welfare arrangements. In fact, the major stated goals of this legislation included reducing out-of-wedlock births and increasing marriage.

[5]For a survey of this literature, see Moffitt (1992); Murray (1993); Moffitt (1998); Blank (2002); Grogger and Karoly (2005).

papers potentially suffer from endogeneity bias resulting from the use of endogenous variables measuring welfare benefits, and from control variables that are themselves outcome variables.[6]

The remainder of the paper is structured as follows. The next section provides a theoretical discussion of the effects of the welfare state on family behavior. Following that, we describe our empirical strategy and the data. Then, we present the results and a number of robustness checks. The final section summarizes and concludes the paper. All data sources are described in the Data Appendix. A Web Appendix includes additional estimation results.

2 Theoretical Considerations

Typical real-world welfare state arrangements incorporate explicit subsidies for certain family arrangements. Besides explicit marriage-promoting polices (Gardiner *et al.*, 2002; Brotherson and Duncan, 2004), many transfer programs and tax codes include implicit incentives to adjust marital status. In other words, the (welfare) state may directly influence the utility of being married versus being single, by either subsidizing or excising such statuses. Similarly, the welfare state may exert a direct influence on fertility by providing subsidies that at least partly compensate the costs of child care by providing, for instance, subsidized health care for children and education (Cigno, 1986). We refer to these effects of the welfare state as the *direct effects*, since a change in either marital status or fertility directly results in a change in disposable income that varies across different welfare state arrangements. If the welfare state predominately subsidies marriage, then we expect the direct effect to result in an increase in marriage and a decrease in divorce, everything else equal. If, in contrast, welfare state arrangements are dominated by marriage-penalizing regulations, we should observe a decrease in marriage and an increase in divorce.[7] Concerning fertility, we expect that the welfare state exerts an unambiguously positive direct effect since welfare state arrangements reduce the cost of child care. The direct effect on the distribution of births in and out of wedlock is, however, unclear. It depends on whether certain benefits (such as child support) vary across different martial statuses.

In addition to these direct effects, the welfare state is also likely to exert *indirect effects* on family formation and dissolution by providing services that were traditionally provided

[6] Among more recent papers, there exist a handful of random assignment studies (see, for instance, Hu, 2003). Another related strand of literature focuses on the effects of tax law on the incidence of marriage (Alm, Dickert-Conlin and Whittington, 1999) and divorce.

[7] It seems practically impossible to categorize a country's welfare state as either having a marriage-promoting or a marriage-penalizing effect. The number of relevant regulations is very high. For instance, U.S. General Accounting Office (2004) has identified 1,138 U.S. federal statutory provisions—comprising such categories as social security, taxation, employment benefits, military service benefits, and veterans' benefits—in which marital status is a factor. It is unclear how to weigh different regulations, since their quantitative impact may vary across individuals and across time.

by families. While these arrangements also alter the utility of being married versus being single, as well as the net benefits of having children, their effects do not necessarily lead to a change in disposable income directly. According to the seminal analysis of family formation and dissolution presented in Becker (1973, 1974) and Becker, Landes and Michael (1977), marriage is viewed as a voluntary partnership for joint production, joint consumption, and risk sharing. Joint production refers to the idea that by specializing in market and non-market work, spouses can exploit their relative comparative advantages to maximize joint output. Joint consumption of household public goods allows spouses to reduce expenditure (compared to singles) for a given level of utility. Risk sharing means that voluntary transfers between spouses help to smooth out fluctuations in individual income streams.

By providing services such as care for the young and the elderly, the welfare state reduces the need for intra-family specialization and for the production of household public goods, which, ultimately, changes the relative utility of being married. Similarly, the role of children as an investment, in the sense that they provide care for aging parents, has lost importance due to the development of public pension systems, implying less incentives for having children.

In addition to influencing the overall level of fertility, the welfare state may lead to a decoupling of marriage and child bearing. According to Becker, marriage is an arrangement that allows for efficient joint production, especially in the case of children. However, by providing child care services and financial support, the welfare state reduces the need to exploit the efficiency gains associated with marriage. Thus, the welfare state may alter the distribution of births in and out of wedlock.

The welfare state also provides insurance against unforeseen events, and thus competes with risk sharing provided within families. In the absence of functioning insurance markets (as in developing countries today, or in the developed world in the past), marriage, or more generally the family and kinship, provides individuals with unique risk-sharing opportunities. Spouses with imperfectly correlated income streams can smooth their consumption over time by engaging in risk sharing through voluntary transfers. In the presence of a comprehensive welfare state that provides, or at least subsidizes, insurance, for example, against illness, unemployment, or unexpected longevity, the role of the family as an informal risk-sharing arrangement may become less important. These indirect effects associated with the welfare state lower the utility of being married relative to being single, and reduce the incentive to marry and stay married. Essentially, the welfare state may act as a substitute for the family, crowd-out its formation, and increase divorce.[8]

There are at least two additional channels through which the welfare state may in-

[8]Note that the influence of these marriage-discouraging indirect effects of the welfare state may be mitigated by the fact that marriage has some features that makes it superior relative to the welfare state such as trust and information advantages (Kotlikoff and Spivak, 1981).

fluence the incidence of divorce, either through the matching function on the marriage market or through assortative mating. In either case, the idea that the welfare state subsidizes or penalizes marriage, either directly or indirectly, is also relevant. Consider first the influence on the matching function: suppose that the welfare state predominantly promotes marriage. Then the individuals' reservation match quality should go down and we should observe an increase in marriages. However, since the marginal marriages are less well matched, the likelihood of divorce also increases. If, in contrast, the welfare state imposes a marriage penalty, we should observe less marriages of better matched spouses, and a decrease in divorce rates.

Consider next the influence on assortative mating. Since the welfare state generally acts as a substitute for the family, considerations such as the ability to share risks among spouses, for instance, become less prevalent. Consequently, other matching criteria may gain more importance. As suggested by Coontz (2005), this may increase the importance of love and companionship as a basis for marriage, which may reduce the match quality if these alternative matching criteria are less stable. In fact, Hess (2004) models individuals on a marriage market who face a (potential) trade-off between partners who provide risk-sharing opportunities and others who fit better in terms of love. The model predicts that if love is permanent and risk-sharing opportunities diminish over time, then emotionally well-matched couples are less likely to divorce (compared to couples who married due to the hedging role of marriage). In contrast, if love is only temporary and risk-sharing opportunities remain persistent, then emotionally well-matched couples are more likely to divorce. The empirical evidence supports the second case; couples with a relatively high potential to share risks, that is spouses with negatively correlated incomes, are characterized by a significantly lower probability of divorce.[9] In short, under the assumption that other matching criteria are temporary, we expect the quality of marriages to suffer when extensive welfare state arrangements exist.

To summarize, in a welfare state that penalizes marriages, the direct and indirect effects of an expansion in the welfare state work in the same direction. Thus, we unambiguously expect a lower incidence of marriage and a higher incidence of divorce.[10] In contrast, in a welfare state setting that promotes marriage, the effect of an expansion is unclear. If the marriage-promoting direct effect dominates the indirect effect, the incidence of marriages should go up, and the number of divorces down. Whereas if the indirect effect is more important than the direct effect, we expect marriages to decrease and divorces to increase. In the latter case, the effect may be reinforced by a lower match quality of marginal marriages and less-stable assortative mating patterns.

The effect on fertility is also *a priori* ambiguous and depends on whether any direct

[9]This result is also in line with the observation by Becker (1993) that "*modern societies have what may appear to be a paradoxical combination of many love-marriages and high rates of divorce.*"

[10]Marginal marriages may have in this situation a lower divorce likelihood due to a comparable higher match quality.

subsidy effects are strong enough to compensate for the negative indirect effects, such as reduced incentives to have children being associated with extensive public pension systems. Finally, an extension in the welfare state should increase the incidence of out of wedlock births (marriage becomes less important for child care under an extensive welfare state), unless the welfare state has pronounced subsidies for marital birth.

3 Empirical Strategy and Data

Our discussion of a potential effect of the welfare state on family behavior translates into a regression framework of the following type:

$$F_{i,t} = \alpha_r \cdot \mathrm{WS}_{i,t-r} + \sum_i \beta_i \cdot \mathrm{Country}_i + \sum_t \gamma_t \cdot \mathrm{Year}_t + \delta \cdot \mathbf{X}_{i,t} + \varepsilon_{i,t}, \tag{1}$$

where the dependent variable $F_{i,t}$ captures different family outcomes in country i in year t: either the incidence of marriage, divorce, or fertility. In the latter case, we distinguish between total fertility, marital fertility, and non-marital fertility. We also consider the ratio of children born out of wedlock as an additional outcome. The variable $\mathrm{WS}_{i,t-r}$ denotes a proxy for the extent of the welfare state (potentially lagged by r years), and β_i and γ_t denote country and year fixed-effects. In our baseline specification, we include a set of covariates $\mathbf{X}_{i,t}$, that comprise the sex-age distribution and the prevalent divorce laws.[11] In further specifications, we will expand our set of covariates.

3.1 Measuring Family Behavior

The standard in the literature to quantify the incidence of marriage and divorce seems to be crude marriage and divorce rates: the number of marriages (divorces, respectively) per 1,000 of the total population (e. g. Friedberg, 1998; Wolfers, 2006). While this approach is potentially problematic, since it does not properly consider the population "at risk," and may therefore hide some of the underlying variation in interest, data restrictions impede better approaches in most situations. In the case of marriage, the best measure would be the ratio of the number of marriages in a given year to the stock of the non-married adult population.[12] In order to quantify the incidence of divorce, one would prefer to calculate the ratio of the number of divorces in a given year to the stock of the married population. Unfortunately, the stock of (non-)married people is not available for majority

[11] In particular, we capture the sex-age distribution based on the share of the total population of sex s in age group a where a is $0-14, 15-19, \ldots, 60-64, 65+$ (12 groups). Regarding the divorce law, we distinguish between regimes where (i) divorce is not possible at all, (ii) where only mutual consent divorce is available, and (iii) where unilateral divorce (González and Viitanen, 2009) is also possible. The U.S. is the only country with within-country variation in divorce law, with states switching to unilateral divorce law in different years. For the analysis, we impute the median-introduction year (1973) for the U.S.

[12] Alternatively, one could also argue that married people are at risk to divorce and re-marry.

of the country-years; exceptions are the years in which a population census was conducted. As a second-best solution, we calculate the marriage rate, $M_{i,t}$, and the divorce rate, $D_{i,t}$, based on the number of cases per 1,000 of the population between 15 and 64 years of age (henceforth adults).

To measure fertility, the literature discusses cohort and period indicators. Cohort indicators evaluate the birth rate of women born in a given year as they attain the end of their reproductive cycle, while period indicators asses the rate of birth to women of different ages in a given year, and implicitly assume that they behave according to hypothetical schedules of specific cohorts. Though cohort indicators are clearly more precise, the literature usually uses period indicators, since they are easily available and allow examination of recent changes (d'Addio and d'Ercole, 2005). We employ the most commonly used period indicator, the birth rate $F_{i,t}$, which represents the absolute number of births (to either all, married, or unmarried mothers) per 1,000 women of child-bearing age. Information on births by mothers' marital status is available for comparably less country-years (see the Data Appendix for more information).[13]

3.2 Measuring the Extent of the Welfare State

To quantify the extent of the welfare state, we mainly use public social spending as a percentage of GDP. Averaged across OECD member countries, total public social spending increased from 17.6 percent of GDP in 1980 to 21.4 percent in 2007 (see Figure 1). Since the launch of the *OECD Public Social Expenditure Database* in 1980, this quantity is consistently measured for all OECD member countries and captures expenditure categories such as old age, health, incapacity-related benefits, family, unemployment, survivors, active labor market policies, and other (including housing).[14] Quantitatively the most important functional categories are old age, health, incapacity-related benefits, and family benefits. In each category, public social spending comprise cash benefits, direct "in-kind" provision of goods and services, and tax breaks with social purposes.[15] On average, cash benefits account for 61.8 percent of total public social spending. Although, this relation has been relatively stable over time, a slight decrease can be observed since the early 1990s. For further information, see OECD (2007).

To check the robustness of our results, we use two alternative measures of the size of

[13]For a large sub-sample, we have the total fertility rate (TFR) available. We find quantitatively very comparable results (see Table B.1 in the Web Appendix). Note that while TFR is a preferred measure, since it is not affected by the age distribution of the population, it does not allow us to distinguish between marital and non-marital fertility.

[14]OECD also provides information on public social spending before 1980; however, there is an obvious break in the series.

[15]Tax breaks intended to support married couples are *not* considered to serve a "social purpose", and are therefore not included in the calculations (regardless of whether or not such measures are part of the basic tax structure). Thus, the category "family" will capture only the effect of the welfare state and not the effect of the tax law (on family behavior).

the welfare state, a wider measure and a narrower measure. First, we use the size of the government sector as measured by total public spending as a percentage of GDP. This series is available since 1970 (see Figure 1). Given that the size of the government sector is clearly very broad and includes spending items that may be only remotely related to family behavior, one may expect a weaker effect. Second, we use public social spending on the family as a percentage of GDP. This series is available since 1980 (see Figure 1). This subcategory of total public social spending comprises welfare state arrangements directly related to families, such as child allowances and credits, child-care support, income support during leave, and sole parent payments. Public social spending on the family has increased (averaged across OECD member countries) from 1.7 percent of GDP in 1980 to 2.2 percent in 2007; this is equal to an increase of about 30 percent.

Note that although total public spending is available since 1970, we still focus on the data from 1980 to 2007 in our main analysis since (i) this sample guarantees comparability of the estimation results across measures and (ii) we can avoid the rapid expansion of the welfare state during the 1970s from influencing our results. Regardless, we report the results based on longer sample periods in Section 4.3.

3.3 Endogeneity of the Size of the Welfare State

The size of the welfare state may be endogenous in equation (1) for at least two reasons. First, causality may run from existing or evolving family behavior to the size of the welfare state. For instance, the welfare state may have expanded to compensate for declining marriage rates and provide services no longer provided within families. For instance, Edlund and Pande (2002); Edlund, Haider and Pande (2005) argue that the decline in marriage has increased the demand for redistribution by females (resulting in a political gender gap), which increased the size of the welfare state. In this case, changing family formation patterns causally affects the size of the welfare state. Second, there may have been changes in other observable or unobservable factors—such as changes in (sex-specific) economic opportunities, in the organization of the marriage market, or in social norms—affecting the incentive to form or dissolve a family that are also correlated with the extent of the welfare state.

3.4 Political Fractionalization as a Source of Exogenous Variation

To allow for a causal interpretation, we adopt an instrumental variable strategy to isolate exogenous variation in the size of the welfare state. We suggest to instrument $\mathrm{WS}_{i,t-r}$ in equation (1) by a measure of political fractionalization, which refers to the number of relevant parties involved in policy decisions. The choice of this instrumental variable

is motivated by the political economy theories of public finance. According to the so-called *common pool theory*, highly fractionalized systems are prone to increase spending since individual groups do not fully internalize the costs (see e.g. Weingast, Shepsle and Johnsen, 1981; Velasco, 2000). The larger the number of parties involved—that is, the more fractionalized the system—the stronger is the incentive to over-spend.[16] Primo and Snyder (2008), in contrast, argue that fractionalization may lead to lower spending, especially with respect to total public spending. Intuitively, suppose that legislators have a choice of one large project that benefits all groups to some extent, or several small projects where each project benefits only an individual group. Even though the large and more expensive project might be more appropriate, individual groups may push for smaller and cheaper projects that allow them to internalize group-specific benefits to a greater extent. In this case, total public spending may be lower, albeit each group pushes for an inefficiently expensive project.

The empirical evidence is also mixed. A number of studies (see e. g. Roubini and Sachs, 1989,b; Persson and Tabellini, 2004, among others) find that more fragmented governments lead to higher spending and deficits. However, as pointed out by Acemoglu (2005), these results may be subject to a substantial endogeneity bias, which is typically not addressed in a proper way. Most recently, Pettersson-Lidbom (2012) exploits the fact that the council size of local governments in Finland and Sweden is a discontinuous function of population size and the number of eligible voters, respectively. It turns out that—in contrast to previous evidence—the larger the council size, the smaller is the size of the government in both settings. This finding is supported by our first-stage estimation results.

Different measurements for party fractionalization exist. We primarily use an index proposed by Rae (1968) that focuses on the degree of legislative fractionalization of the party-system. In particular, the *Rae-Index* is defined as $1 - \sum_{i=1}^{n} s_i^2$, where s_i is the share of parliamentary seats for party i and n is the number of parties. This means that a higher value of the Rae-Index indicates a more fractionalized system. We find a very stable relationship between legislative fractionalization and public spending in our data. The cross-sectional correlation between the Rae-Index and the level of public spending is positive (see the upper panel in Figure 2). Hence, it appears that a more fragmented legislative is associated with higher public spending. This relation also holds in a regression framework (with a large set of covariates).[17] However, if we augment the regression equation with country fixed-effects—which account for unobserved time-

[16]The use of the terms fractionalization and fragmentation is not unambiguous in the literature. Although it usually refers to the number of parties participating in fiscal policy decision making, it is also used to describe the ideological coherence of groups involved in policy making (see Volkerink and de Haan, 2001).

[17]For instance, a regression of public spending on the Rae-Index and year fixed-effects suggests that an increase in the Rae-Index by one standard deviation increases public spending by 0.4 standard deviation. The estimated coefficient is highly statistically significant (t-statistic is about 10).

invariant heterogeneity—the estimated coefficient is still highly significant, albeit with a negative sign (see the lower panel in Figure 2). Here, a one standard deviation increase in the Rae-Index decreases public spending by 0.4 standard deviation. Importantly, the same patterns are observable for public social spending, which is our main proxy for the size of the welfare state, as well as for public social spending on the family. Overall, it seems that the degree of party fractionalization is correlated with unobserved country-specific time-invariant heterogeneity in a way that disregarding country fixed-effects can diametrically reverse results. Clearly, the model with country fixed-effects is superior, and we conclude that a higher degree of legislative fractionalization in the party system leads to lower public (social) spending in OECD member countries. This finding is consistent with the theoretical prediction of Primo and Snyder (2008), and corroborates the result put forward by Pettersson-Lidbom (2012).

Note, however, whether a higher degree of fractionalization increases or decreases public social spending does not affect the validity of our key identifying assumptions. We presume that the number of relevant political parties involved in the parliament is not correlated with unobserved factors determining family behavior. In other words, our measure of political fractionalization must affect family behavior only through the channel of public social spending. Thus, political fractionalization can be excluded from the second-stage regression displayed in equation (1).

While this identifying assumption is not testable, we argue that this assumption is highly plausible, especially, given the set of included covariates. To understand why political fractionalization can serve as a valid instrument, it is useful to consider the few potential mediating links (i.e., variables that are potentially correlated with political fractionalization and family behavior). One might be concerned that there is a systematic relationship between the degree of fractionalization and the government's ideological orientation. For instance, if highly fractionalized parliaments tend to have more left- or right-wing governments, then our instrumental variable may be correlated with unobserved governments' characteristics that also affect family outcomes. However, the inclusion of a comprehensive set of covariates to capture the government's ideological orientation does not affect our estimation results. Equivalently, one might speculate about a link between polarization within the government and family behavior. Controlling for different measurements of polarization does not change our results. Finally, we can also think of immigration as a potentially mediating link. For whatever reasons, more (or less) fractionalized governments may have a different immigration policies; which in turn might affect family behavior. Again, our results are robust to the inclusion of the share of immigrants.

4 Estimation Results

4.1 Main Results

Table 1 presents the main results of this paper, where we use public social spending to capture the size of the welfare state.[18] To facilitate an easier interpretation of the quantitative importance of our estimation results, we provide in the upper panel besides the coefficients, elasticities (using the unweighted mean as the base) and standardized (beta) coefficients. The lower panel summarizes our first stage results. The Rae-Index is highly significant in all specifications and the Kleinbergen-Paap F-statistic indicates that the Rae-Index can be considered to be a very strong instrument.

The first three columns show that an expansion in the welfare state increases the incidence of marriage, divorce, and fertility. The extent of the welfare state is not only a statistically significant but also a quantitatively important predictor of these rates. The estimates imply that an increase in public social spending by one percentage point of GDP increases the marriage rate by 2.6 percent, the divorce rate by 3.8 percent, and the fertility rate by 2.2 percent.[19] This is equivalent to the beta coefficients of approximately 0.6, 0.4, and 0.5, respectively.

These results suggest that welfare state regulations contain a strong marriage-promoting component (direct effect) that overcompensates any crowding-out due to substitutability between the family and the welfare state (indirect effect). An equivalent relationship seems to hold between the welfare state and overall fertility. Thus, the welfare state clearly promotes the formation of families. However, at the same time, a larger welfare state also facilitates the dissolution of families. The positive effect on the incidence of divorce may result from different causal channels. First, a more pronounced welfare state may facilitate divorce by providing or subsidizing goods and services to divorced spouses that would be otherwise only available within marriage (e.g., risk sharing). Put differently, in the case of divorce, the indirect effect may dominate the direct effect. Second, marginal marriages—those which would have not been formed without the marriage-promoting component of the welfare state—may have a lower match quality, which increases marital instability. Third, the welfare state may alter assortative mating patterns such that less stable marriages are formed.[20]

[18] We use the subset of 570 country-years with non-missing information on the marriage, divorce, and overall fertility rates in the first three columns. In the remaining three columns, we use the 538 country-years with information on fertility rates by marital status.

[19] Interestingly, endogeneity seems to play a more important role in the case of marriage and fertility. Here, OLS and instrument variable estimates are of opposite signs, whereas in the case of divorce, both estimators provide the same qualitative conclusion (see Table B.2 in the Web Appendix).

[20] In principle, it is possible that the increased incidence of divorce drives some of the positive effect on the marriage rate (i.e., divorces increase the supply of potential partners in the marriage market). This could be tested with data on first (and further) marriages. However, this information is not available for the majority of country-years.

Given that our measurements of the incidence of marriage and divorce are both flow measurements, our results allow the interpretation that a large welfare state increases activity in the marriage market. This result is in line with the theoretical predication by Anderberg (2007). A larger welfare state seems to facilitate the transitions between different family status. This result seems plausible since such transitions are usually associated with high cost and uncertainty. Comparing the two estimated coefficients, we see that the flow into marriage (plus 224 marriages per 1,000 adults) is higher than the flow out of marriage (plus 116 divorces per 1,000 adults). Thus, the overall effect of an expansion of the welfare state on the stock of married people is positive.[21]

The result that countries characterized by extensive welfare states tend to have higher fertility rates is consistent with the interpretation that the welfare state increases the demand for children (crowding-in effect), for instance, by subsidizing children via benefits or tax deductions.[22] This direct effect seems larger than any negative indirect effect. A more detailed investigation of fertility patterns shows that an expansion of the welfare state also alters the distribution of births in and out of wedlock. The fourth and fifth columns show that an expansion of the welfare state increases fertility rates among married mothers (1.6 percent) and non-married mothers (4.4 percent). Despite the fact that an expansion increases the incidence of marriage—and therefore, increases the population at risk for married fertility—we observe a comparably larger relative increase in out-of-wedlock births. This is also reflected in the final column, where we see that an increase in public social spending by one percentage point of GDP increases the share of children born out of wedlock by approximately 0.8 percent. This finding is consistent with the view that the welfare state creates incentives by providing higher support for single mothers (direct effect, as for instance in the case of AFDC), and with the idea that the welfare state acts as a substitute for a stable union (indirect effect).

4.2 Alternative Measurements of the Welfare State

While we rely on public social spending to measure the size of the welfare state in our main analysis, we find very comparable results for public social spending on the family (see Table 2) and public spending (see Table 3); both spending variables are measured as a percentage of GDP. Using public social spending on the family has the advantage that it is the most narrowly defined spending category and contains spending that is closely related to families. Given this close link to family formation and dissolution, we expect larger effects with this spending category. Nevertheless, relating public spending categories to

[21] A more direct test of the effect of the welfare state on the stock of married population, would be to use the stock of married population as an outcome variable. However, due to limited data availability, such an analysis is not feasible for a large panel of countries. The stock of population by family status is usually only available for the census years.

[22] The estimation results based on the total fertility rate give the same qualitative results; suggest, however, larger effects (compare the beta coefficients listed in Table B.1 in the Web Appendix).

family formation and family structure remains a complicated task. For instance, public expenditure on education is included in public spending, but not in public social spending (on the family). Since education spending is presumably an important determinant of family structure, we also look at public spending as a broader measure of the welfare state.

We see from Tables 2 and 3 that the same qualitative conclusions emerge regardless of the proxy for the size of the welfare state. Using public social spending on the family, the magnitudes of the effect of the welfare state generally increase as beta coefficients roughly double. Note, that in the case of the martial fertility rate the standard errors increase and the effect is no longer significant at conventional levels.[23] For public social spending (the broadest category), based on strong first-stage regression, all effects remain statistically significant and magnitudes tend to be somewhat smaller.

4.3 Sensitivity Analysis

To check the robustness of our results, we ran a number of alternative specifications. The results are summarized in Figure 6, where the panels are organized by the different outcome variables.[24] Each panel also shows the respective estimates from the baseline specifications. First, we use lagged public social spending. We obtain very similar effects on the marriage, divorce, and fertility rate.

Second, we augment the specification with real GDP growth rate as the overall-level economic activity may also have a potential impact on demographic outcomes (Hellerstein and Morrill, 2011). We obtain highly similar results. Third, we consider the government's ideological orientation. One might be concerned that there is a systematic relationship between the degree of fractionalization and the government's ideological orientation. For instance, if highly fractionalized parliaments tend to have more left- or right-wing governments, then our instrument variable may be correlated with unobserved governmental characteristics that affect demographic outcomes. To measure the government's ideological orientation, we use the ideological composition of the cabinet. In particular, we have the percentage share of cabinet posts held by left-wing, center, and right-wing parties (each weighted by days) available. The correlations between these percentage shares and the Rae-Index are in fact partly statistically significant different from zero. Therefore, we include the percentage share of cabinet posts held by left-wing and center parties in our 2SLS estimation. The percentage share of cabinet posts held by right-wing parties (and independents) serves as base group. Again, we obtain highly similar results. Fourth, we include a three-valued indicator of polarization in the government.[25] Again, the results

[23]Relatedly, the Kleinbergen-Paap F-statistics are generally not overwhelming.

[24]For our two alternative measurements we performed the same set of alternative specifications. The Figures B.1 and B.2 in the Web Appendix show that also these estimates are very robust.

[25]A government is least polarized (41.8 percent of our observations) if it consists only of either left-

do not change. Finally, in untabulated results we controlled for the share of immigrants, which does not change our results either.[26]

We examined longer sample periods since the data on public spending and public social spending are available since 1970.[27] With the longer series starting from 1970, we obtain the same qualitative results for both measurements (see Tables B.3 and B.4 in the Web Appendix). The only exception is marriage, where the effects are less precisely estimated. Quantitatively, we observe a small increase (across all outcomes) in the case of public social spending, while we see some comparably smaller effects for public spending.

5 Concluding Remarks

Based on country-level data from OECD member countries from the past three decades, we conclude that a larger welfare state increases the turn-over in the marriage market. Since the effect on the incidence of marriage dominates the effect on divorce, the stock of married population increases. In addition, a larger welfare state also raises overall fertility. Thus, the welfare state supports the formation of families. Yet, we find that the welfare state crowds-out the traditional organization of the family. The comparable stronger impact on non-marital fertility (compared to marital fertility) increases the share of children born out of wedlock.

This can be explained by the economic theory of the family, which also partly corroborates earlier results. It is consistent with the interpretation that the average welfare state in OECD member countries entails a positive direct effect that outweighs any negative indirect effect. The positive effect on divorce may result from a reduction in the (economic) cost of divorce by improvements in the post-divorce income situation (for average and marginal marriages). Put differently, the welfare state facilitates the formation and the dissolution of families. Whether these family transitions (triggered by the welfare state) are welfare enhancing or not, cannot be answered and remains an open question. However, since the welfare state reduces the cost of divorce, it seems plausible that surviving marriages are of better quality and exhibit higher marital satisfaction. Consequently, we would expect a lower level of extreme forms of marital distress in countries with a larger welfare state.[28]

To which degree can our findings be generalized? As in the case of every instrumental

wing, center, or right-wing parties. It is most polarized if it consists of both left and right-wing parties (33.3 percent). Medium polarized governments are a mix of left-wing and center parties or right-wing and center parties (24.9 percent).

[26]The best available data on the number of foreign-born population we are aware of is included in the *World Development Indicators Database* provided by the *World Bank*. Since information is only available for every fifth year, we linearly interpolated the series to impute for missing years.

[27]A caveat is that the public social spending series show a break in 1980.

[28]Along similar lines, Stevenson and Wolfers (2007) argue that the introduction of unilateral divorce law, which can also be interpreted as a reduction in the cost of divorce, substantially reduced female suicide, domestic violence (for both men and women), and females murdered by their partners.

variable estimation our estimates provide a local average treatment effect. In particular, they capture the effect of a change in the extent of the welfare state due to a varying degree of political fractionalization. While it is generally hard to assess the external validity, it seems attractive that our exogenous variation results from a political process. A final caveat is that our results measure the impact of marginal changes in the extent of the welfare state (at the intensive margin) in developed countries, and it is unclear whether the introduction of a welfare state (a variation at the extensive margin) has the same effect on the formation and dissolution of families.

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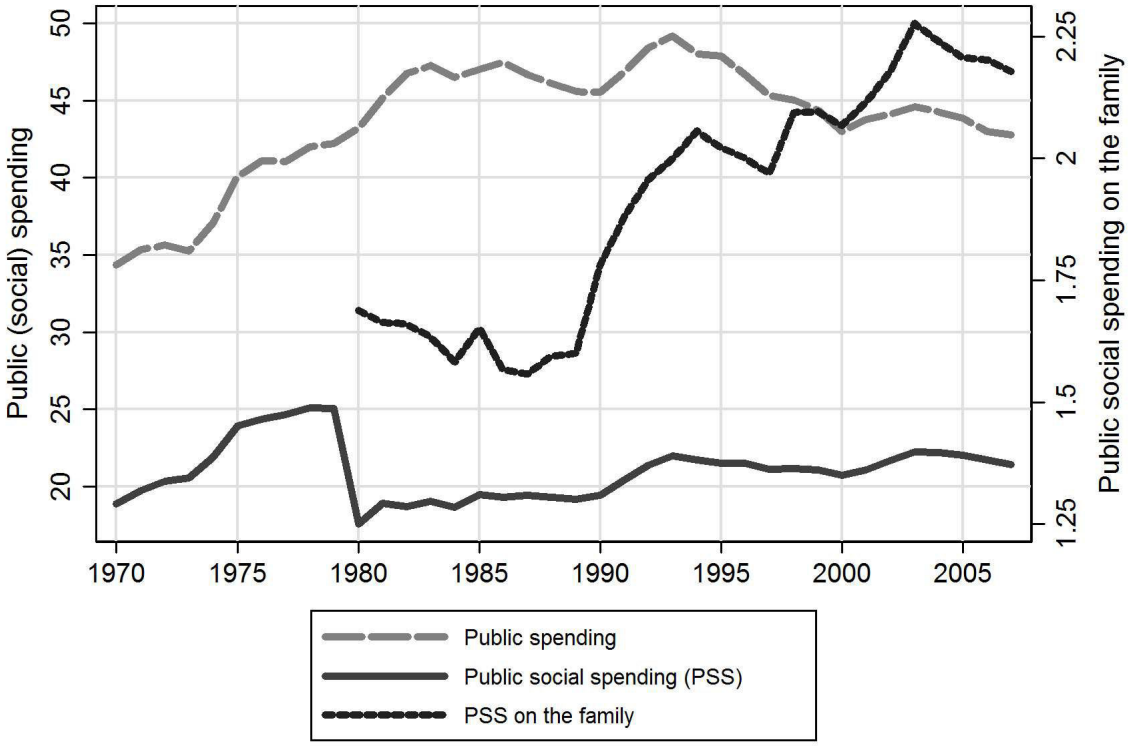
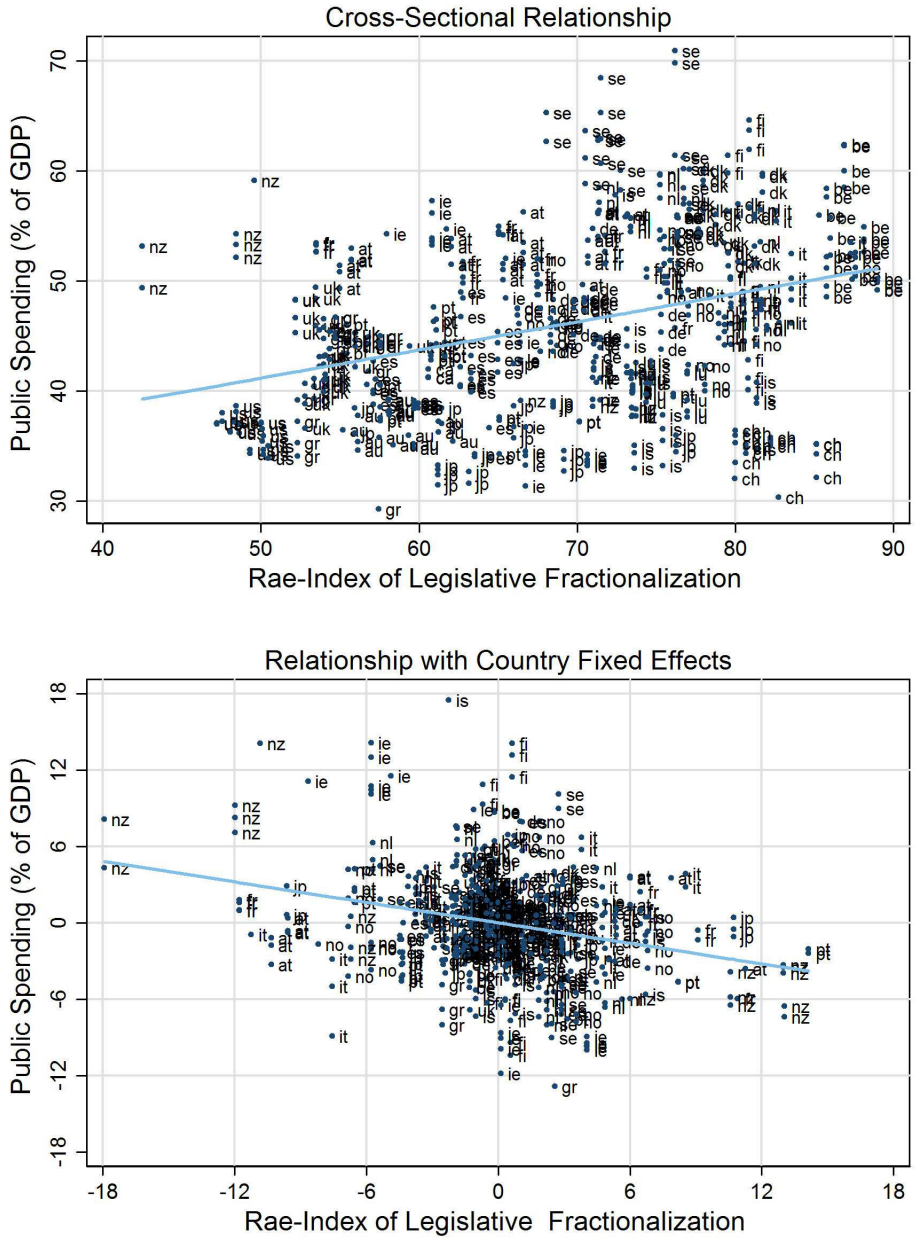
6 Tables and Figures

Figure 1: Development of Public Spending Categories[a]



[a] This graph shows the development of pubic spending, public social spending, and public social spending on the family averaged across OECD member states from 1970 through 2007. Data on public social spending on the family is only available since 1980. All public spending categories are measured as percentage of GDP. Further details are provided in the Data Appendix.

Figure 2: Public Spending and Legislative Fractionalization in OECD Member Countries (1980-2007)[a]



[a] These graphs show the relationship between public spending (measured as percentage of GDP) and the Rae-Index of legislative fractionalization of the party-system. A higher value of the Rae-Index indicates a more fragmented system. For further details please refer to the Data Appendix. The upper panel shows the simple cross-sectional relationship. The lower panel accounts (via demeaning) for country fixed effects

Table 1: The Effect of Public Social Spending on the Formation and Dissolution of Families[a]

	Marriage rate[b]	Divorce rate[c]	Fertility rate[d]	Marital fertility rate[e]	Non-marital fertility rate[f]	Out-of-wedlock ratio[g]
Public social spending[h]						
Coefficient[i]	0.224**	0.116***	1.192***	0.667*	0.655***	0.802**
Standard error[j]	(0.090)	(0.033)	(0.404)	(0.387)	(0.222)	(0.323)
Elasticity[k]	[0.026]	[0.038]	[0.022]	[0.016]	[0.044]	[0.032]
Beta coefficient[l]	{0.563}	{0.385}	{0.478}	{0.325}	{0.319}	{0.254}
Sex-age-distribution[m]	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	570	570	570	538	538	538
Mean of dependent variable	8.59	3.05	55.21	42.54	14.94	25.23
Summary of first stages:						
Rae-Index[n]	-0.102***	-0.102***	-0.102***	-0.105***	-0.105***	-0.105***
	(0.018)	(0.018)	(0.018)	(0.020)	(0.020)	(0.020)
F-statistic[o]	30.81	30.81	30.81	27.19	27.19	27.19

[a] This table summarizes results from a 2SLS estimation of the effect of public social spending on marriage, divorce and fertility behavior. Data from OECD-member countries from the years 1980 through 2007 is used. Note, some country-years are missing (see Data Appendix). The instrumental variable is equal to the a measure of government fractionalization (see below). [b] The marriage rate is the absolute number of marriages per 1,000 of the population between 15 and 64 years (henceforth adults). [c] The divorce rate is the absolute number of divorces per 1,000 adults. [d] The fertility rate is the absolute number of live births to all females per 1,000 female population of childbearing age (i. e. between 15 and 44 years of age). [e] The marital fertility rate is the absolute number of live births to all married females per 1,000 female population of childbearing age. [f] The non-marital fertility rate is defined as the absolute number of live births to all unmarried females per 1,000 female population of childbearing age. [g] The out-of-wedlock ratio is defined as the number of non-marital births divided by all births multiplied by 100. [h] Public social spending is measured as percentage of GDP. [i] Listed coefficients are reported as the change in the specific rate (ratio) due to an one percentage point increase in public social spending measured as percentage of GDP. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level, respectively. [j] Robust standard errors (allowing for heteroskedasticity of unknown form) in round parentheses. [k] This elasticity (calculated using the unweighted mean as the base) multiplied by 100 gives the percentage change in the specific rate (ratio) due to an one percentage point increase in public social spending measured as percentage of GDP. [l] This standardized (beta) coefficient gives the standard deviation increase in the specific rate (ratio) due to a one standard deviation increases in public social spending. [m] This includes variables capturing the share of the total population of sex s in age group a where a is $0-14$, $15-19$, ..., $60-64$ and 65+ (12 groups). [n] The Rae-Index (Rae, 1968) is a measure of the degree of legislative fractionalization of the party-system; a higher value of the Rae-Index indicates a more fragmented system. [o] Kleibergen-Paap F-statistic (Kleibergen and Paap, 2006); null-hypothesis is that instrument is weak.

Table 2: The Effect of Public Social Spending on the Family on the Formation and Dissolution of Families[a]

	Marriage rate[b]	Divorce rate[c]	Fertility rate[d]	Marital fertility rate[e]	Non-marital fertility rate[f]	Out-of-wedlock ratio[g]
Public social spend. on the family[h]						
Coefficient[i]	2.558**	1.367**	13.623**	7.460	8.085**	10.205**
Standard error[j]	(1.285)	(0.592)	(5.897)	(5.144)	(3.207)	(4.752)
Elasticity[k]	[0.298]	[0.448]	[0.247]	[0.175]	[0.541]	[0.404]
Beta coefficient[l]	{1.292}	{0.910}	{1.092}	{0.730}	{0.790}	{0.650}
Sex-age-distribution[m]	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	568	568	568	536	536	536
Mean of dependent variable	8.59	3.05	55.19	42.52	14.96	25.26
Summary of first stages:						
Rae-Index[n]	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
F-statistic[o]	6.74	6.74	6.74	6.23	6.23	6.23

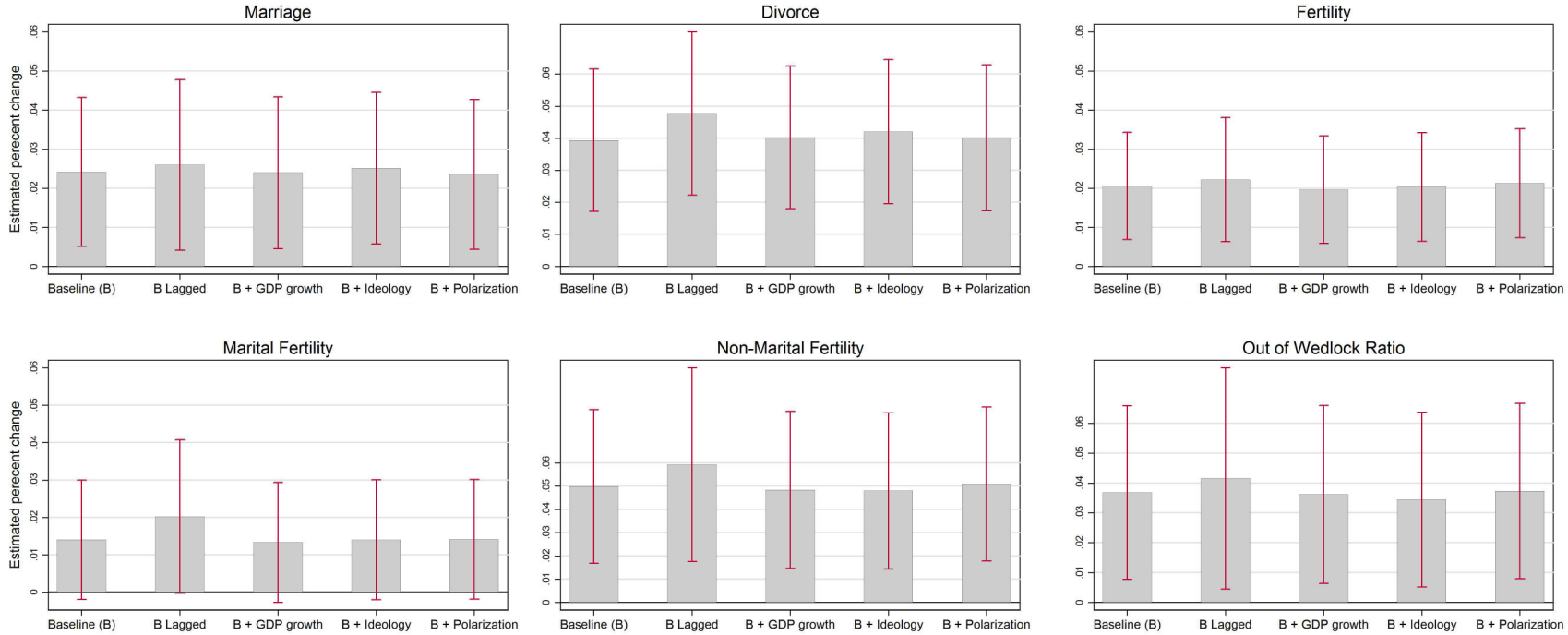
[a] This table summarizes results from a 2SLS estimation of the effect of public social spending on the family on marriage, divorce and fertility behavior. Data from OECD-member countries from the years 1980 through 2007 is used. Note, some country-years are missing (see Data Appendix). The instrumental variable is equal to the a measure of fractionalization (see below). [b] The marriage rate is the absolute number of marriages per 1,000 of the population between 15 and 64 years (henceforth adults). [c] The divorce rate is the absolute number of divorces per 1,000 adults. [d] The fertility rate is the absolute number of live births to all females per 1,000 female population of childbearing age (i. e. between 15 and 44 years of age). [e] The marital fertility rate is the absolute number of live births to all married females per 1,000 female population of childbearing age. [f] The non-marital fertility rate is defined as the absolute number of live births to all unmarried females per 1,000 female population of childbearing age. [g] The out-of-wedlock ratio is defined as the number of non-marital births divided by all births multiplied by 100. [h] Public social spending on the family is measured as percentage of GDP. [i] Listed coefficients are reported as the change in the specific rate (ratio) due to an one percentage point increase in public social spending on the family measured as percentage of GDP. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level, respectively. [j] Robust standard errors (allowing for heteroskedasticity of unknown form) in round parentheses. [k] This elasticity (calculated using the unweighted mean as the base) multiplied by 100 gives the percentage change in the specific rate (ratio) due to an one percentage point increase in public social spending on the family measured as percentage of GDP. [l] This standardized (beta) coefficient gives the standard deviation increase in the specific rate (ratio) due to a one standard deviation increases in public social spending on the family. [m] This includes variables capturing the share of the total population of sex s in age group a where a is $0-14$, $15-19$, $\ldots$, $60-64$ and 65+ (12 groups). [n] The Rae-Index (Rae, 1968) is a measure of the degree of legislative fractionalization of the party-system; a higher value of the Rae-Index indicates a more fragmented system. [o] Kleibergen-Paap F-statistic (Kleibergen and Paap, 2006); null-hypothesis is that instrument is weak.

Table 3: The Effect of Public Spending on the Formation and Dissolution of Families[a]

	Marriage rate[b]	Divorce rate[c]	Fertility rate[d]	Marital fertility rate[e]	Non-marital fertility rate[f]	Out-of-wedlock ratio[g]
Public spending[h]						
Coefficient[i]	0.104***	0.032**	0.607***	0.385**	0.245**	0.319**
Standard error[j]	(0.040)	(0.015)	(0.186)	(0.185)	(0.108)	(0.156)
Elasticity[k]	[0.012]	[0.010]	[0.011]	[0.009]	[0.015]	[0.012]
Beta coefficient[l]	{0.405}	{0.163}	{0.365}	{0.290}	{0.179}	{0.156}
Sex-age-distribution[m]	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	580	580	580	547	547	547
Mean of dependent variable	8.45	3.06	55.67	42.05	15.88	26.55
Summary of first stages:						
Rae-Index[n]	-0.202***	-0.202***	-0.202***	-0.201***	-0.201***	-0.201***
	(0.034)	(0.034)	(0.034)	(0.036)	(0.036)	(0.036)
F-statistic[o]	35.82	35.82	35.82	31.42	31.42	31.42

[a] This table summarizes results from a 2SLS estimation of the effect of public spending on marriage, divorce and fertility behavior. Data from OECD-member countries from the years 1980 through 2008 is used. Note, some country-years are missing (see Data Appendix). The instrumental variable is equal to the a measure of government fractionalization (see below). [b] The marriage rate is the absolute number of marriages per $1,000$ of the population between 15 and 64 years (henceforth adults). [c] The divorce rate is the absolute number of divorces per $1,000$ adults. [d] The fertility rate is the absolute number of live births to all females per $1,000$ female population of childbearing age (i. e. between 15 and 44 years of age). [e] The marital fertility rate is the absolute number of live births to all married females per $1,000$ female population of childbearing age. [f] The non-marital fertility rate is defined as the absolute number of live births to all unmarried females per $1,000$ female population of childbearing age. [g] The out-of-wedlock ratio is defined as the number of non-marital births divided by all births multiplied by 100. [h] Public spending is measured as percentage of GDP. [i] Listed coefficients are reported as the change in the specific rate (ratio) due to an one percentage point increase in public spending measured as percentage of GDP. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level, respectively. [j] Robust standard errors (allowing for heteroskedasticity of unknown form) in round parentheses. [k] This elasticity (calculated using the unweighted mean as the base) multiplied by 100 gives the percentage change in the specific rate (ratio) due to an one percentage point increase in public spending measured as percentage of GDP. [l] This standardized (beta) coefficient gives the standard deviation increase in the specific rate (ratio) due to a one standard deviation increases in public spending. [m] This includes variables capturing the share of the total population of sex s in age group a where a is $0-14$, $15-19$, $\ldots$, $60-64$ and 65+ (12 groups). [n] The Rae-Index (Rae, 1968) is a measure of the degree of legislative fractionalization of the party-system; a higher value of the Rae-Index indicates a more fragmented system. [p] Kleibergen-Paap F-statistic (Kleibergen and Paap, 2006); null-hypothesis is that instrument is weak.

Figure 3: Sensitivity Analysis of the Effect of Public Social Spending on the Formation and Dissolution of Families



[a] These graphs summarize several robustness checks of the 2SLS estimations results of the effect of the welfare state on different family outcomes presented in Table 1. The estimated coefficients are reported with the bars. In particular, they represent the respective elasticities (calculated using the unweighted mean as the base), which give (multiplied by 100) the percentage change in the specific rate (ratio) due to an one percentage point increase in public social spending measured as percentage of GDP. The whiskers in each bar show 95 percent confidence intervals based on robust standard errors (allowing for heteroskedasticity of unknown form). Each panel shows first the baseline specification presented in Table 1. The second specification uses lagged public social spending instead of the contemporaneous value. The third specification extends the baseline specification by a measures of government's ideological orientation (i. e. percentage share of cabinets posts held by left-wing, center, and right-wing parties; each weighted by days). The fourth specification extends extends the baseline specification by a three-valued indicator of polarization in the government.

A. Data Appendix

Our analysis includes all OECD-member states (which joined the organization before 1974) with the exception of Turkey. That means, our estimation sample comprises Australia (AU), Austria (AT), Belgium (BE), Canada (CA), Denmark (DK), Finland (FI), France (FR), Germany (DE), Greece (GR), Iceland (IS), Ireland (IE), Italy (IT), Japan (JP), Luxembourg (LU), Netherlands (NL), New Zealand (NZ), Norway (NO), Portugal (PT), Spain (ES), Sweden (SE), Switzerland (CH), United Kingdom (UK), and the United States (US). We excluded Turkey from our analysis, since data on marriage, divorce and fertility behavior is not available for most of the years. For the other countries we have been successful to compile a data set based on official sources that covers almost all country-years for the period from 1970 through 2007. Public social expenditures on the family is not available before 1980.

Data on the absolute number of **marriages**, **divorces**, **births** (total, marital and non-marital) and **population** (by sex and age-groups) are obtained from different sources. For all EU Member States (as well as NO and CH) we use data provided by *Eurostat*. For the US the numbers of marriages, divorces and births are from annual editions of the *Vital Statistics*. US (sex-specific) adult population data is calculated from county-level data from the *Reading Survey of Epidemiology and End Results* provided by the *National Bureau of Economic Research*. Information for all other remaining non-EU Member States (AU, CA, and JP) is from the *United Nation Database*, supplemented with data from various national yearbooks and additional data provided by respective national statistical offices (upon request). This support is thankfully acknowledged. Further details are available upon request. Based on this data we defined the **marriage rate** as the absolute number of marriages per $1,000$ of the population between 15 and 64 years of age. This variable is missing for the following country-years: AU(1980-81, 1991-92, 2002-03, 2005-07), CA(1980, 1991-1992, 1999, 2000, 2005, 2007), JP(1980, 1991, 2007), NZ(1971-72, 1980-81, 1991, 2004, 2006-2007), and UK(1971, 2006). We exclude two country-years with exceptionally high number of marriages due to a policy intervention: AT(1987) and SE(1989). The **divorce rate** is defined as the absolute number of divorces per $1,000$ of the population between 15 and 64 years of age; and missing for AU(1980-81, 1991-92, 2002-03, 2005-07), CA(1980, 1991-1992, 1999, 2000, 2004-07), FR(2007), JP(1980, 1991, 2007), NZ(1971-72, 1980-81, 1991, 2004, 2006-2007), ES(2006), and UK(1971). The **fertility rate** is defined as the absolute number of live births to all females per $1,000$ female population of childbearing age (i. e. between 15 and 44 years of age); and missing for AU(1991-92, 2002-03, 2005-07), CA(1974-2000, 2005-07), JP(2007), NZ(1972, 2004, 2007), and US($2003-07$). The **marital fertility rate** is defined as the absolute number of live births to all married females per $1,000$ female population of childbearing age; and missing for AU(1991-92, 2002-03, 2005-07), BE(2001-02,) CA(1974-2007), IT(2004), JP(1971-2007), NZ(1972, 2004, 2007), UK(1981) and US(2003-07). The **non-marital fertility** rate is defined as the absolute number of live births to all unmarried females per $1,000$ female population of childbearing age; and missing for the same country-years as the marital fertility rate. The **out-of-wedlock ratio** is defined as the number of non-marital births divided by all births multiplied by 100; and missing for the same country-years as the marital fertility rate.

Data on **public social spending** (starting with 1980) and **public social spending on the family** is derived from the *OECD Social Expenditure Database*. This database classifies expenditure items as social if the benefits are intended to address one or more

social purposes, and if programs regulating the provision involve either inter-personal redistribution, or compulsory participation. Public social spending may arise from cash benefits, social services or tax breaks with a social purpose. Consult OECD (2011) for more details on the composition of public social expenditures as measured by the OECD. Information on both variables is available for all country-years from 1980 through 2007 with exception of AT(1981-84, 1986-89), IS(1981-89), and NO(1982-84, 1986-87). Information on public social spending is further missing for NO(1981). The OECD also provides information on public social spending before 1980; however, there is (as Figure 1 shows) an obvious break in the series.

Data on **public spending** is from different OECD sources. This variable measures total government spending as percentage of the gross domestic product (GDP). Note, the OECD refers to this variable as 'general government total outlays'. It consists of current outlays plus capital outlays. Current outlays are the sum of current consumption, transfer payments, subsidies and property income paid (including interest payments). Data refer to the general government sector, which is a consolidation of accounts for the central, state and local government plus social security. For further details on sources and methods refer to an issue of the *OECD Economic Outlook*. This variable is available for all country-years, with exception of IS(1970-79), LU(1970-89), NZ(1982-85), PT(1970-76) and CH(1976-89).

Data on the **Rae-Index** is obtained from the *Comparative Political Data Set I (*23 *OECD Countries)* provided by Klaus Armingeon, Sarah Engler, Panajotis Potolidis, Marléne Gerber and Philipp Leimgruber; see `http://www.ipw.unibe.ch/content/team/klaus_armingeon/comparative_political_data_sets/index_ger.html`. The Rae-Index is defined as $1-\sum_{i=1}^{n} s_i^2$, where s_i is the share of seats for party i and n the number of parties. That means, it is a index of legislative fractionalization of the party-system according to the formula proposed by (Rae, 1968). This variable is available for all country-years.

B. Web Appendix

Table B.1: The Effect of the Welfare State on the Total Fertility Rate[a]

	Public social spending	PSS on the family	Public spending
Welfare state[b]			
Coefficient[c]	0.046***	0.662**	0.023***
Standard error[d]	(0.013)	(0.304)	(0.006)
Elasticity[e]	[0.027]	[0.393]	[0.013]
Beta coefficient[f]	{0.876}	{2.535}	{0.655}
Sex-age-distribution[g]	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes
Number of observations	549	548	552
Mean of dependent variable	1.68	1.68	1.70
Summary of first stages:			
Rae-Index[h]	-0.103***	-0.007**	-0.206***
	(0.019)	(0.003)	(0.035)
F-statistic[i]	28.79	4.94	34.12

[a] This table summarizes results from a 2SLS estimation of the effect of the welfare state on fertility behavior which is captured by the total fertility rate. Data from OECD-member countries from the years 1980 through 2007 is used. Note, some country-years are missing. The instrumental variable is equal to the a measure of fractionalization (see below). The total fertility rate is defined as the total number of children that would be born to each woman if she were to live to the end of her child-bearing years and give birth to children in agreement with the prevailing age-specific fertility rates by the OECD. [b] In the first column the size of the welfare state is measured with public social spending, in the second column with public social spending on the family, and in the third column with total public spending. Each variables is scaled as percentage of GDP. [c] Listed coefficients are reported as the change in the specific rate (ratio) due to an one percentage point increase in the respective measure of the welfare state. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level, respectively. [d] Robust standard errors (allowing for heteroskedasticity of unknown form) in round parentheses. [e] This elasticity (calculated using the unweighted mean as the base) multiplied by 100 gives the percentage change in the specific rate (ratio) due to an one percentage point increase in the respective measure of the welfare state. [f] This standardized (beta) coefficient gives the standard deviation increase in the specific rate (ratio) due to a one standard deviation increases in the respective measure of the welfare state. [g] This includes variables capturing the share of the total population of sex s in age group a where a is $0-14$, $15-19$, ..., $60-64$ and $65+$ (12 groups). [h] The Rae-Index (Rae, 1968) is a measure of the degree of legislative fractionalization of the party-system; a higher value of the Rae-Index indicates a more fragmented system. [i] Kleibergen-Paap F-statistic (Kleibergen and Paap, 2006); null-hypothesis is that instrument is weak.

Table B.2: OLS Estimation of The Effect of Public Social Spending on the Formation and Dissolution of Families[a]

	Marriage rate[b]	**Divorce rate**[c]	**Fertility rate**[d]	**Marital fertility rate**[e]	**Non-marital fertility rate**[f]	**Out-of-wedlock ratio**[g]
Public social spending[h]						
Coefficient[i]	-0.053***	0.041***	-0.145	-0.208**	-0.008	-0.046
Standard error[j]	(0.018)	(0.009)	(0.096)	(0.096)	(0.066)	(0.104)
Elasticity[k]	[-0.006]	[0.014]	[-0.002]	[-0.004]	[-0.001]	[-0.002]
Beta coefficient[l]	{-0.134}	{0.137}	{-0.058}	{-0.101}	{-0.004}	{-0.015}
Sex-age-distribution[m]	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	570	570	570	538	538	538
Mean of dependent variable	8.59	3.05	55.21	42.54	14.94	25.23

[a] This table summarizes results from an OLS estimation of the effect of public social spending on marriage, divorce and fertility behavior. Data from OECD-member countries from the years 1980 through 2007 is used. Note, some country-years are missing (see Data Appendix). [b] The marriage rate is the absolute number of marriages per 1,000 of the population between 15 and 64 years (henceforth adults). [c] The divorce rate is the absolute number of divorces per 1,000 adults. [d] The fertility rate is the absolute number of live births to all females per 1,000 female population of childbearing age (i. e. between 15 and 44 years of age). [e] The marital fertility rate is the absolute number of live births to all married females per 1,000 female population of childbearing age. [f] The non-marital fertility rate is defined as the absolute number of live births to all unmarried females per 1,000 female population of childbearing age. [g] The out-of-wedlock ratio is defined as the number of non-marital births divided by all births multiplied by 100. [h] Public social spending is measured as percentage of GDP. [i] Listed coefficients are reported as the change in the specific rate (ratio) due to an one percentage point increase in public social spending measured as percentage of GDP. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level, and 1-percent level, respectively. [j] Robust standard errors (allowing for heteroskedasticity of unknown form) in round parentheses. [k] This elasticity (calculated using the unweighted mean as the base) multiplied by 100 gives the percentage change in the specific rate (ratio) due to an one percentage point increase in public social spending measured as percentage of GDP. [l] This standardized (beta) coefficient gives the standard deviation increase in the specific rate (ratio) due to a one standard deviation increases in public social spending. [m] The sex-ratio is defined as the number of adult males divided by the number of adult females. [m] This includes variables capturing the share of the total population of sex s in age group a where a is $0-14$, $15-19$, ..., $60-64$ and 65+ (12 groups).

Table B.3: The Effect of Public Social Spending on the Formation and Dissolution of Families: 1970–2007[a]

	Marriage rate[b]	**Divorce rate**[c]	**Fertility rate**[d]	**Marital fertility rate**[e]	**Non-marital fertility rate**[f]	**Out-of-wedlock ratio**[g]
Public social spending[h]						
Coefficient[i]	0.301	0.202**	4.807**	2.347**	1.594**	1.668**
Standard error[j]	(0.226)	(0.102)	(2.284)	(1.181)	(0.628)	(0.725)
Elasticity[k]	[0.033]	[0.069]	[0.083]	[0.049]	[0.121]	[0.077]
Beta coefficient[l]	{0.666}	{0.691}	{1.707}	{0.843}	{0.867}	{0.575}
Sex-age-distribution[m]	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	739	739	739	697	697	697
Mean of dependent variable	9.25	2.95	57.88	47.56	13.14	21.79
Summary of first stages:						
Rae-Index[n]	-0.042**	-0.042**	-0.042**	-0.051**	-0.051**	-0.051**
	(0.021)	(0.021)	(0.021)	(0.023)	(0.023)	(0.023)
F-statistic[o]	4.04	4.04	4.04	5.08	5.08	5.08

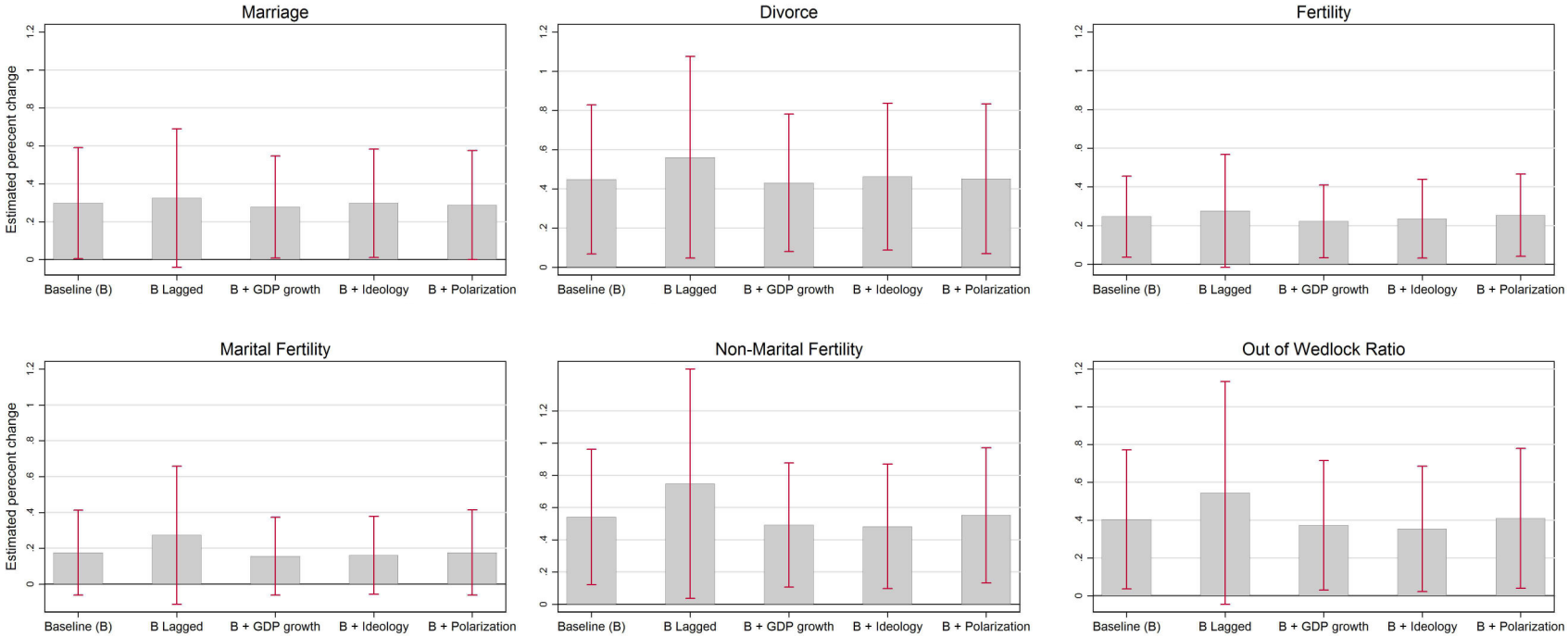
[a] The estimations presented in this table are equivalent to those presented in Table 1, however, use an extended sample covering the years 1970 through 2007. Note, some country-years are missing (see Data Appendix). See notes to Table 1.

Table B.4: The Effect of Public Spending on the Formation and Dissolution of Families: 1970–2007[a]

	Marriage rate[b]	**Divorce rate**[c]	**Fertility rate**[d]	**Marital fertility rate**[e]	**Non-marital fertility rate**[f]	**Out-of-wedlock ratio**[g]
Public spending[h]						
Coefficient[i]	0.081	0.049**	1.491***	0.703**	0.674***	0.854***
Standard error[j]	(0.059)	(0.024)	(0.450)	(0.319)	(0.195)	(0.270)
Elasticity[k]	[0.009]	[0.017]	[0.025]	[0.015]	[0.049]	[0.038]
Beta coefficient[l]	{0.272}	{ 0.254}	{0.791}	{0.373}	{ 0.541}	{0.443}
Sex-age-distribution[m]	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	756	756	756	713	713	713
Mean of dependent variable	9.25	2.93	58.59	47.57	13.82	22.71
Summary of first stages:						
Rae-Index[n]	-0.116***	-0.116***	-0.116***	-0.119***	-0.119***	-0.119***
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)
F-statistic[o]	14.54	14.54	14.54	14.59	14.59	14.59

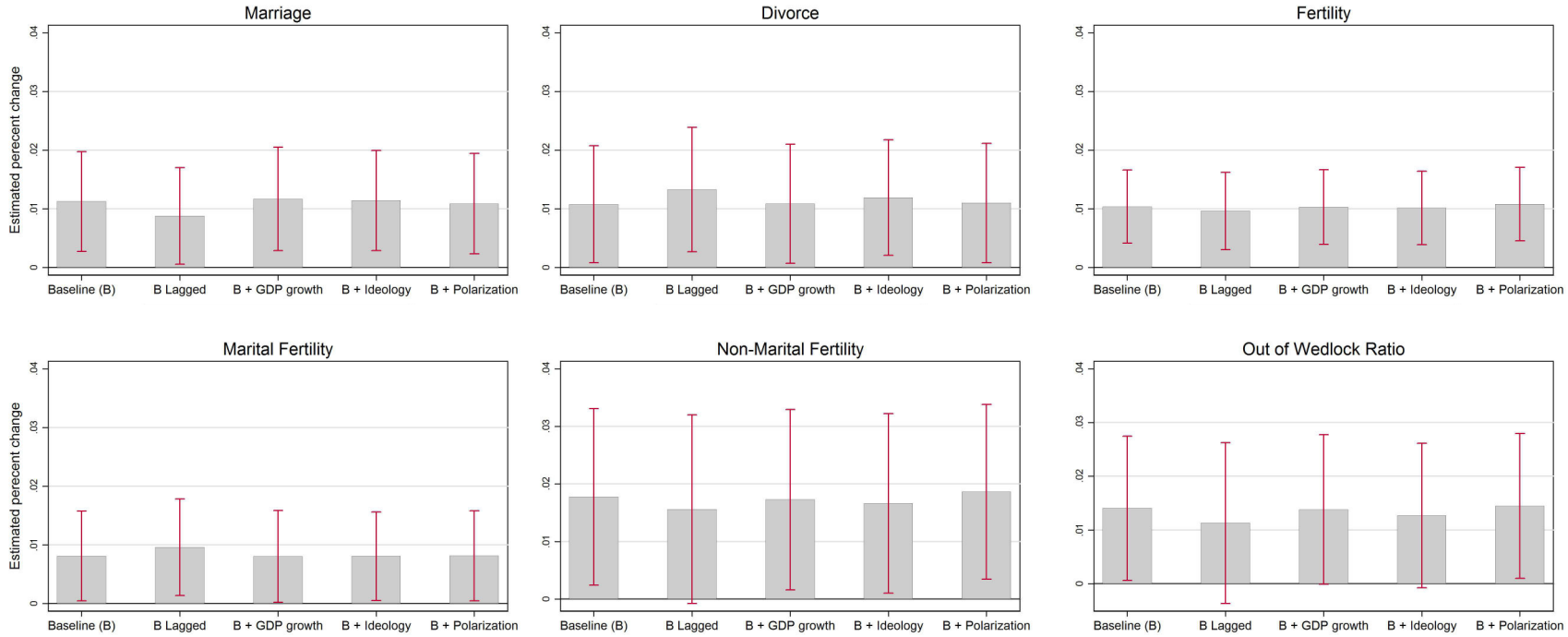
[a] The estimations presented in this table are equivalent to those presented in Table 3, however, use an extended sample covering the years 1970 through 2007. Note, some country-years are missing (see Data Appendix). See notes to Table 3.

Figure B.1: Sensitivity Analysis of the Effect of Public Social Spending on the Family on the Formation and Dissolution of Families



[a] These graphs summarize several robustness checks of the 2SLS estimations results of the effect of public social spending on the family on different family outcomes presented in Table 2. The estimated coefficients are reported with the bars. In particular, they represent the respective elasticities (calculated using the unweighted mean as the base), which give (multiplied by 100) the percentage change in the specific rate (ratio) due to an one percentage point increase in public social spending on the family measured as percentage of GDP. The whiskers in each bar show 95 percent confidence intervals based on robust standard errors (allowing for heteroskedasticity of unknown form). Each panel shows first the baseline specification presented in Table 2. The second specification uses lagged public social spending on the family instead of the contemporaneous value. The third specification extends the baseline specification by a measures of government's ideological orientation (i. e. percentage share of cabinets posts held by left-wing, center, and right-wing parties; each weighted by days). The fourth specification extends extends the baseline specification by a three-valued indicator of polarization in the government.

Figure B.2: Sensitivity Analysis of the Effect of Public Spending on the Formation and Dissolution of Families



[a] These graphs summarize several robustness checks of the 2SLS estimations results of the effect of public spending on different family outcomes presented in Table 3. The estimated coefficients are reported with the bars. In particular, they represent the respective elasticities (calculated using the unweighted mean as the base), which give (multiplied by 100) the percentage change in the specific rate (ratio) due to an one percentage point increase in public spending measured as percentage of GDP. The whiskers in each bar show 95 percent confidence intervals based on robust standard errors (allowing for heteroskedasticity of unknown form). Each panel shows first the baseline specification presented in Table 3. The second specification uses lagged public spending instead of the contemporaneous value. The third specification extends the baseline specification by a measures of government's ideological orientation (i. e. percentage share of cabinets posts held by left-wing, center, and right-wing parties; each weighted by days). The fourth specification extends extends the baseline specification by a three-valued indicator of polarization in the government.