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## Fixed-term employment and fertility: Evidence from German micro data

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on Multidisciplinary Panel Data Research

SOEP – The German Socio-Economic Panel Study at DIW Berlin

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# Fixed-Term Employment and Fertility: Evidence from German Micro Data

Wolfgang Auer and Natalia Danzer

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# **Fixed-Term Employment and Fertility: Evidence from German Micro Data**

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## **Abstract**

We study the short- to medium-run effects of starting a career on a fixed-term contract on subsequent fertility outcomes. We focus on the career start since we expect that temporary contracts and their inherent economic uncertainty imply a path dependency which might have spill-over effects on other domains of life. Our empirical analysis is based on rich data from the German Socio-Economic Panel which provides comprehensive information about individuals' labour market history as well as fertility behaviour. Our main results are: Women (i) tend to postpone their first birth due to fixed-term employment at labour market entry and (ii) reduce the number of children in the first 10 years after graduation. These associations are strongest in the subsample of native women with at least vocational training. (iii) In contrast, we find no significant correlations for men. We argue that these findings are robust to potential endogeneity threats.

**Keywords:** Career start, fixed-term employment, postponement of maternity, fertility, economic uncertainty

**JEL codes:** J13, J18, J41

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## 1. Introduction

One of the most striking facts about the labour market development of many European countries is the tremendous increase in the prevalence of fixed-term employment over the last decades. By 2012, the average share of temporary<sup>1</sup> employees among all 25 to 54 old employees made up around 12 per cent in Europe.<sup>2</sup> Germany has witnessed a particularly strong rise in fixed-term employment in recent years. By 2012 almost every second new job was of limited duration. As a consequence, fixed-term employment is particularly concentrated among young adults in their early careers – a period in life which is crucial at once for career progression and family formation.<sup>3</sup> Recent evidence has shown that adverse labour market conditions at the beginning of the career can lead to severe and persistent earnings losses (e.g., Oreopoulos, von Wachter and Heisz 2012). Temporary employment might cause a similarly negative labour market path dependency through repeated episodes of temporary employment, a decelerated wage progression and a higher likelihood of future unemployment (Hagen 2002; Bruno, Caroleo and Dessy 2012; Booth, Francesconi and Frank 2002; Pavlopoulos 2009). Yet, previous studies have mainly linked contemporaneous temporary employment and fertility responses at different stages of the lifecycle and have produced mixed evidence. Their approach neglects the potential endogeneity of fixed-term contracts as well as the supposed path dependency. The empirical literature on whether and how increased levels of economic uncertainty due to unstable working contracts at the beginning of a career have spill-over effects on other domains of life is still very scarce.

The main objective and contribution of this paper is to fill this gap by empirically assessing the implications of *entering* the labour market on a fixed-term contract on subsequent fertility outcomes. To this end, we focus on several cohorts of graduates from vocational training or

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<sup>1</sup> Throughout this paper, the terms fixed-term contract and temporary contract will be used interchangeably.

<sup>2</sup> The numbers refer to all European OECD countries (OECD 2014).

<sup>3</sup> For instance, while almost every fifth female worker in the age group 25 to 29 holds a fixed-term contract, this is only true for nine per cent of those aged 35 to 39.

tertiary education and follow them for their first 10 years on the labour market. We analyse the timing of first birth (tempo effect) as well as the number of children (quantum effect) in the short- to medium-run. We also contribute to the previous literature by carefully discussing and addressing the potential selection of individuals into different types of contracts. To reduce possible omitted variable bias we exploit our rich and unique data set and include a large set of new control variables (e.g., personality traits, family and career related attitudes, family background).

Based on the survey years 1995 to 2012 of the German Socio-Economic Panel (SOEP), we apply probit and poisson estimation methods on a pooled sample of women who are childless when they finish their education and enter the labour market. Our results for natives confirm that starting the career on a fixed-term contract is negatively associated with subsequent fertility outcomes: We find an increased postponement of first birth and a reduction in the number of children in the first 10 years after graduation. These results also hold when we expand the sample and include migrants in the analysis; however, the effects on the full sample are slightly less pronounced. Furthermore, we show that fixed-term employment seems to be particularly affecting fertility decisions of women with secondary education. We find no significant correlations between job uncertainty and fertility for the subsample of men. As fertility decisions as well as holding a fixed term contract may be driven by unobserved heterogeneity we address potential endogeneity concerns twofold: First, by including many important and previously neglected control variables and second, by showing that entering the labour market on a fixed-term contract is related neither to family nor to career preferences. Against this background we reckon that our results actually reflect a causal, negative effect of job uncertainty in the early career on the timing and number of children. Even though we are not able to examine the effect on completed fertility in this empirical set-up, our results suggest that completed fertility might be negatively affected as well.

In general, our research contributes to the growing literature of economic uncertainty and fertility. Several empirical studies suggest that fertility reacts pro-cyclically to macroeconomic conditions: higher unemployment rates are generally associated with reduced fertility rates and vice versa (e.g., Adsera 2005; Adsera and Menendez 2011; Goldstein et al. 2013). Analyses of how individual unemployment affects fertility yield mixed evidence (e.g., Del Bono, Weber and Winter-Ebmer 2012; Kreyenfeld 2010). Focusing on perceived economic uncertainty using German data, Bhaumik and Nugent (2011) and Hofmann and Hohmeyer (2013)<sup>4</sup> find a reduction in fertility while the study by Kreyenfeld (2010) indicates that this is only true for highly educated women.

Temporary employment is considered as one particular form of economic uncertainty. However, the empirical literature on fixed-term employment and fertility is inconclusive. For Germany, Gebel and Giesecke (2009) find no evidence for an influence of fixed-term contracts on the fertility decision of young couples, while the results by Schmitt (2012) suggest a negative impact. Tölke and Diewald (2003) find evidence for a postponement of first birth due to economic uncertainty for young men. Kind and Kleibrink (2013) disagree by concluding that time limited contracts postpone childbearing only for women but not for men. Studies from other European countries report more robust results. For Spain, the studies by Ahn and Mira (2001) and De la Rica and Iza (2005) conclude that fixed-term employment has a negative effect on the hazard of marriage and delays childbearing. Similarly, Sutela (2012) concludes that in Finland fixed-term employment is negatively associated with entering parenthood. All these studies have in common that they focus mostly on empirical associations between holding a fixed-term contract and fertility. They do neither consider the potential endogeneity problems of fixed-term contracts (which might be increasing in labour

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<sup>4</sup> The study by Hofmann and Hohmeyer (2013) stands out from the other studies by attempting to correct for the potential endogeneity of subjective economic uncertainty.

market experience as well as previous number of children) nor consider the potential path dependence of entering the labour market on a contract with limited duration.

The remainder of the paper is organized as follows. The following section discusses the theoretical background. Section 3 shows descriptive evidence for economic uncertainty associated with fixed-term employment as well as survey evidence on reported preconditions for entering parenthood. Section 4 introduces our data and our empirical approach. The main results as well as several sensitivity and subgroup analyses are presented in sections 5 and 6. Section 7 concludes and discusses potential policy implications.

## **2. Theoretical Background**

The main microeconomic theory of fertility goes back to Becker (1960; 1965; 1981). In this theory, children are modelled as normal consumption goods and fertility decisions are based on the relative costs and benefits of having children. These models are also referred to as opportunity cost models or price-of-time models since wage increases do not only induce a positive income effect (raising the demand for children), but also a negative opportunity cost effect (substitution effect). Direct opportunity costs arise due to foregone earnings during the time that parents take off from work or reduce their working hours to care for their children. Additionally, child-rearing evokes indirect opportunity costs or future career costs through human capital depreciation during employment interruptions which in turn negatively impacts the future earnings profile. The overall effect of income on fertility depends on the relative size of these opposing income and opportunity costs of time effects. However, as women in many countries traditionally devote more time to child-rearing than men, the opportunity costs argument is mainly applied to women. In contrast, wage increases of men supposedly exert a positive income effect.<sup>5</sup>

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<sup>5</sup> Becker and Lewis (1973) extend this framework by incorporating the possibility that parents trade-off the quantity and quality of children. In their model, a rise in income does not necessarily increase the number of children, but can instead raise the quality per child (e.g., through additional investments in education).

Against this theoretical framework, fixed-term employment could affect fertility in several opposing ways. First, demand for children should be reduced as wages of fixed-term employees are on average lower than those of their colleagues on permanent contracts (income effect). Second, lower wages also imply smaller direct opportunity costs of childbearing thus fostering the demand for children. Third, it is likely that fixed-term contracts further exacerbate the future career costs of children through increased economic uncertainty: Temporary employment is generally associated with a higher risk of future unemployment (Hagen 2002). In addition, unemployed women with children might be disadvantaged on the labour market and might find it more difficult to find a job than childless women (Del Bono, Weber and Winter-Ebmer 2012). Taken together, having children while on a temporary contract is likely to put women in an even more unfavourable situation. Moreover, fixed-term employment might additionally hamper the success of future job search as human capital accumulation in temporary jobs is generally decelerated due to smaller investments in firm or task-specific skills (Albert, García-Serrano and Hernanz 2005). Hence, these additional future career costs of children exclusively related to fixed-term contracts and their associated economic uncertainty should reduce the demand for children and might deter women from entering motherhood while on a fixed-term contract.

Overall though, the standard economic theory of fertility does not predict an unambiguous effect of fixed-term employment on fertility. Moreover, this static framework neither allows drawing any conclusions about the optimal timing of childbearing, nor does it *explicitly* account for the potential role of economic uncertainty.<sup>6</sup> These two aspects are jointly captured

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<sup>6</sup> The timing of fertility is addressed in so-called life-cycle or dynamic models of fertility. However, these models do not yield clear predictions and are also difficult to test econometrically (Hotz, Klerman and Willis 1997). Hotz, Klerman and Willis (1997) and Gustafsson (2001) provide comprehensive reviews of the theoretical and empirical literature on the postponement of maternity, but do not address the potential role of economic uncertainty.

in the economic models of fertility by Ranjan (1999) and Iyer and Velu (2006)<sup>7</sup>: in both models, childbirth decisions are considered as irreversible and parents have the option to postpone childbearing to future periods. The intuitive implication in both cases is that in the light of future uncertainties (about own income or the net benefit of children) it might be worthwhile for parents to postpone their childbearing decision to the (next) period when the uncertainty is resolved. This way parents can avoid entering parenthood and its associated irreversible costs in a bad state of the world when having children is not optimal. Against this background, fixed-term contracts should increase the option value of postponing the childbearing decision and thus cause a delay in parenthood. The main driver will be the economic uncertainty associated with fixed-term contracts due to a more unstable future employment and income path.

### **3. Descriptive Evidence**

This section aims at descriptively rationalizing economic uncertainty - the suggested channel through which starting a career on a fixed-term contract affects fertility decisions. We employ two large-scale and nationally representative German micro-data sources – the German Socio-Economic Panel<sup>8</sup> and the Panel Analysis of Intimate Relationships and Family Dynamics (pairfam)<sup>9</sup> – to shed light on a) the degree of economic uncertainty and the path dependency associated with a career start in a fixed-term employment and b) the role of economic security for the decision to have children.

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<sup>7</sup> Iyer and Velu (2006) incorporate a real options approach in their theoretical framework. Their model aims at explaining demographic processes in developing countries in which economic uncertainty increases the insurance motive for children (positive fertility effect) and at the same time the option to wait (negative fertility effect). However, as the insurance motive should be of little if any relevance in developed countries, the model predicts an unambiguous delay of childbearing due to economic uncertainty in the German context (Bhaumik and Nugent 2011).

<sup>8</sup> For more information regarding this data set see section 4.1.

<sup>9</sup> The pairfam study (Huinink et al., 2011) covers the complex processes of partnership development, family formation, childrearing as well as intergenerational relations. It was first conducted in 2008/2009, and consists of three birth cohorts. The first wave of the birth cohort 1981-1983 which is used in this section comprises 1,238 childless women and 1,659 childless men.

### 3.1 Fixed-term Contract and Economic Uncertainty

To capture economic uncertainty we employ several subjective as well as objective measures. Table 1 shows the individual perception of job security and general economic situation by type of contract.<sup>10</sup> Over 47 per cent of all employees on a regular, permanent contract report that they are not concerned at all about the security of their job, whereas only 29 per cent of the temporary employed individuals do not worry about job security. In contrast, while almost one third of all individuals on a fixed-term contract are very concerned about their job security, this is only true for 12 per cent of workers on permanent contracts. A similar picture emerges if we look at the assessment of the general economic situation. While only 18 per cent of all permanent employees report that they are very concerned, over 27 per cent of their temporary colleagues do so. Thus, self-reported job and economic uncertainty is indeed much more pronounced among temporary than among permanent employees.

**Table 1** Worries about job security and economic situation (in per cent)

	Very concerned	Somewhat concerned	Not concerned at all
<i>A. Worries about Job Security</i>			
Permanent Contract	11.9	41.0	47.1
Fixed-term Contract	29.1	42.4	28.6
<i>B. Worries about Economic Situation</i>			
Permanent Contract	17.8	56.0	26.3
Fixed-term Contract	27.3	54.1	18.6

**Note:** SOEP 1995-2012, employed men and women, 18-49 years.

We find a similar pattern when using several objective measures of economic uncertainty, namely income volatility, future unemployment risk and wages progression. Our first measure, income volatility, reflects the degree of uncertainty in wages attached to fixed-term employment. Following Bonin et al. (2007) we analyse the variance of the residual part of a Mincer wage regression using individual net and gross labour income. If the variance of the

<sup>10</sup> The corresponding survey questions in the SOEP are: “Are you concerned about job security” and “Are you concerned about your own economic situation”.

unexplained part for temporary employees exceeds the one for permanent workers income uncertainty is higher for the former.

**Table 2** Variance ratio test by type of contract

	Net wages	Gross wages
<i>Mean values</i>		
Permanent contract	1496.6	2341.5
Fixed-term contract	1195.2	1867.4
<i>Variance</i>		
Permanent contract	0.240	0.274
Fixed-term contract	0.346	0.387
<i>Variance Ratio Test</i>		
f-statistic	0.695	0.709
p-value	0.000	0.000

**Note:** SOEP 1995-2012, employed men and women, 18-49 years.

Table 2 shows variances, test statistics and p-values for the variance ratio test. On average, wages of temporary employees are smaller than those of their colleagues with permanent contracts. Furthermore, the earnings risk is more volatile and therefore more uncertain for temporary workers. The formal test confirms this result since the f-statistic leads to a rejection of the null hypothesis of equal variances (p-value<0.001). Individuals with a fixed-term contract experience significantly higher earnings uncertainty compared to individuals in permanent jobs.

Descriptive evidence regarding future unemployment risk and future wages related to fixed-term employment is provided in Table 3. We present future labour market outcomes for individuals whose first job in their career is on a temporary or on a permanent basis. The picture that emerges supports the notion of a negative path dependency of starting a career on a fixed-term contract. The risk of subsequent unemployment is substantially higher if the first job has a limited duration. During the first 10 years after labour market entry these individuals are more likely to have had at least one unemployment spell than their colleagues who started with a permanent contract. On average, they have also experienced more periods of unemployment. In contrast, conditional on employment the net wages of both groups are only

slightly different at the beginning of the career and converge over time (Table 3, Panel C). However, when including unemployed individuals in the wage calculations, the earnings gap widens (Table 3, Panel D).<sup>11</sup> Hence, while we do not find evidence for strong differences in actual wage profiles (see Booth, Francesconi, and Frank 2002; Pavlopoulos 2009), cumulative earnings and earnings' stability are much lower among those employees who entered the labour market on a fixed-term contract. Importantly, this seems to be mainly driven by an increased future unemployment risk.

**Table 3** Path dependency of starting a career with a FTC

Starting a career with...	3 years after graduation	5 years after graduation	7 years after graduation	10 years after graduation
<i>A. Incidence of at least 1 unemployment spell (in per cent)</i>				
Permanent contract	10.5	17.4	22.7	26.8
Fixed-term contract	18.7	26.3	29.9	35.6
<i>B. Number of unemployment spells</i>				
Permanent contract	0.12	0.26	0.41	0.65
Fixed-term contract	0.22	0.44	0.65	0.99
<i>C. Net wages</i>				
Permanent contract	1377.1	1494.9	1605.4	1791.6
Fixed-term contract	1284.1	1415.9	1584.6	1747.6
<i>D. Net wage (UE=0)</i>				
Permanent contract	1234.6	1268.6	1361.3	1514.2
Fixed-term contract	1036.9	1156.6	1297.8	1419.9

**Note:** SOEP 1995-2012, men and women, 18-49 years.

To sum up, descriptive statistics suggest that holding a fixed-term contract is indeed associated with a high degree of uncertainty and negative future-career consequences. This holds for subjective as well as objective measures of economic uncertainty.

### 3.2 Job Security and First Birth

How does the economic situation affect fertility decisions of young couples? Table 4 lists the two most often stated prerequisites for having children (pairfam data). Both most important prerequisites for family formation are related to work life: parenthood has to be financially

<sup>11</sup> We included unemployed and inactive individuals in these earnings calculations by assigning them a zero labour market income.

affordable and has to be compatible with work life.<sup>12</sup> The numbers differ only marginally by type of contract: for instance, 77 (77) per cent of the male (female) respondents in permanent employment report that the financial affordability must be satisfied before having a first child, while 78 (75) per cent with fixed-term contract do so. Hence, both groups do not differ in their desire for economic security and stability before having children. This suggests that young people do not self-select into fixed-term contracts with respect to these observable family and work related attitudes.

**Table 4** Prerequisites for having children (in per cent)

	Men	Women
<i>A. Financial affordability must be satisfied before first birth:</i>		
Permanent contract	76.9	76.9
Fixed-term contract	77.9	74.8
<i>B. Compatibility with work life must be satisfied before first birth:</i>		
Permanent contract	64.6	64.0
Fixed-term contract	64.2	67.8

**Note:** pairfam 2009, childless men and women, 24-29 years.

In contrary to this striking similarity are the differences in the answers on whether these prerequisites are satisfied or not (Table 5). The gaps between individuals with fixed-term and permanent contracts are substantial. Male respondents with a fixed-term contract are 11 (8) percentage points less likely to rate the financial (job-related) situation as good enough to become parents. Women with a fixed-term contract assess their financial preconditions to enter motherhood even worse than men: only 42 per cent report that the financial conditions allow them to have a baby. This is almost 20 percentage points less than women with a regular contract. This descriptive evidence indicates that job-related factors play a major role in young couples' decisions to have children. Independent of the type of the employment contract individuals prefer an economically secure situation for having children. However, the

<sup>12</sup> Examples for other, but less important prerequisites are the availability of child care or leisure-time interests.

prerequisites are significantly less often satisfied for temporary than for permanent employees.

**Table 5** Satisfaction of prerequisites for having children (in per cent)

	Men	Women
<i>A. Financial affordability is satisfied</i>		
Permanent contract	58.3	61.2
Fixed-term contract	47.3	41.5
<i>B. Compatibility with work life is satisfied</i>		
Permanent contract	59.8	54.9
Fixed-term contract	51.3	44.1

**Note:** pairfam 2009, childless men and women, 24-29 years.

The descriptive analysis in this section suggests that (a) fixed-term contracts are indeed associated with increased economic uncertainty and that (b) economic uncertainty seems to deter young couples from entering parenthood. The resulting hypothesis that temporary employment induces a postponement of first birth (or even a negative fertility effect) will be empirically assessed in a regression framework in the next section.

## 4. Data and Empirical Strategy

### 4.1 Data, Sample Restrictions, and Variables

We employ the German Socio-Economic Panel<sup>13</sup> which provides annual and nationally representative panel data since 1984 (Wagner, Frick and Schupp 2007). In 2012 it covered more than 20,000 individuals living in over 12,000 households. SOEP contains detailed information about a variety of individual as well as household specific socio-economic characteristics. Moreover, the respondents provide information about their labour market history as well as their current labour force status. Most importantly, we know whether their employment contract is permanent or temporary.

<sup>13</sup> Socio-Economic Panel (SOEP), data for years 1995-2012, version 29, SOEP, 2013, doi:10.5684/soep.v29.

We focus on the waves 1995 to 2012 since consistent information on the type of the employment contract for all working individuals was only collected from 1995 onwards.<sup>14</sup> Our main sample consists of native women who are childless, 18 to 30 years old at the time of graduation and for whom information on subsequent fertility outcomes for at least 10 years after graduation is available.<sup>15</sup> Furthermore, we restrict the main analysis to women who have obtained at least a vocational degree.<sup>16</sup> The restriction concerning the age at graduation is motivated by the fact that we want to make sure that the biological preconditions for becoming pregnant and giving births are not too different in the 10 years following graduation. Women who finish their education after their 31<sup>st</sup> birthday have a comparatively narrower biological time interval to postpone the birth of their first child. Furthermore, for these older women it seems more likely that fertility and education choices are made simultaneously. Finally, we end up with a balanced sample of 270 women whom we observe at the start of their career and at least once again 10 years after graduation.

The outcome variables are the following: First, to measure the timing of first births we create a set of dummy variables taking on the value 1 if a woman has had a first child in year  $z$  after graduation (we focus on the first 3 to 10 years after labour market entry). The dummy variable is 0 if the woman is still childless in that particular year  $z$ . Second, to analyse the quantum effect, i.e. whether a postponement of first birth also translates into a decline in the realized number of children, we generate a set of variables indicating the number of children, again in every single year 4 to 10 after career start.<sup>17</sup> The dependent variables thus reflect the

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<sup>14</sup> Respondents who have not reported a job change were excluded from this question. Thus, switching from temporary to permanent at the same employer was not part of the questionnaire up to 1995.

<sup>15</sup> To be precise, these women are childless and not pregnant when they enter the labour market. For those individuals who did not participate in each wave of the survey we filled in the missing fertility information retrospectively using the birth history reported in year 10 after graduation.

<sup>16</sup> We apply these restrictions to increase the homogeneity of our small sample and to drop outliers (e.g., there are only 9 observations with elementary education). However, our main results hold when we relax all sample restrictions (see Section 5.3)

<sup>17</sup> Due to the low number of first births 2 years after graduation (for the number-of-children estimations also 3 years after graduation), there is not enough variation to estimate the regression already at that point.

proportion of women who have had their first child after a certain amount of time after graduation as well as the average number of children.

The main explanatory variable is a binary variable indicating whether the first job after graduation is on a fixed-term employment contract or on a permanent contract (we also control for whether the respondent is unemployed after graduation).<sup>18</sup> A great advantage of the SOEP data is the variety of unique information about the respondent. It allows us to include a large set of controls for individual, background, personality and first job characteristics as well as partnership status at labour market entry. All control variables are either predetermined (determined before labour market entry) or measured in the year of career start. Individual control variables are age at graduation, years of education and being born in East Germany.<sup>19</sup> As a proxy for the respondent's pre-determined family and career related background we include variables indicating whether her mother has tertiary education, whether her mother was employed when she was 15 years old, whether she has siblings and her mother's age at her own birth. Personality traits and self-reported attitudes are captured by the 'Big 5' and Kluckhohn's importance of life areas. More precisely, five dummy variables reflect the respondent's openness to new experience, agreeableness, conscientiousness, extraversion as well as neuroticism. Four binary variables indicate individual career and family related attitudes and values. The latter take on the value 1 if a woman claims that having children, being in a happy partnership/marriage, the ability to afford something or

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<sup>18</sup> We use the expressions "year of graduation" and "year of labour market entry" interchangeably even though technically speaking we measure the information on the first job in the calendar year after graduation. The main reason for doing so is that we do not have information on the exact date of graduation. With our approach we want to make sure that the job information is indeed measured after graduation.

<sup>19</sup> In the robustness checks we include migrants in the sample and add a control variable for migration background.

making career is important or very important in her life.<sup>20</sup> In addition, a dummy variable indicates whether a woman is risk averse, i.e. reports a (very) low subjective willingness to take risks. As regards the characteristics of the first job, we include only very rough indicators, namely, dummy variables for blue versus white collar occupations and five industry dummies for the main economic sectors.<sup>21</sup> The prevalence of fixed-term employment differs across industries and occupational groups. Similarly, women with particular fertility preferences might self-select into particular industries and occupational groups. By controlling for these job characteristics we want to make sure that our results do not reflect spurious correlations between temporary jobs and fertility.<sup>22</sup> Finally, we include a dummy variable indicating whether the person is in a partnership at career start.

**Table 6** Descriptive statistics of outcome variables by type of contract and employment status

	First Job Permanent Contract			First Job Fixed-term Contract			Unemployed after Graduation		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
First Birth after 3 years	0.134	0.342	179	0.169	0.377	77	0	0	14
First Birth after 5 years	0.318	0.467	179	0.260	0.441	77	0.071	0.267	14
First Birth after 7 years	0.447	0.499	179	0.416	0.496	77	0.286	0.469	14
First Birth after 10 years	0.603	0.491	179	0.545	0.501	77	0.643	0.497	14
Number of Children after 5 years	0.374	0.590	179	0.325	0.595	77	0.071	0.267	14
Number of Children after 7 years	0.587	0.724	179	0.571	0.751	77	0.286	0.469	14
Number of Children after 10 year	0.922	0.890	179	0.857	0.928	77	0.714	0.611	14

**Note:** Main sample, including native women with at least secondary education, younger than 31 years old and childless at graduation.

Table 6 contains summary statistics of the fertility measures by type of contract and employment status after graduation. The share of women in regular jobs who enter parenthood increases from 13 per cent within the first 3 years after graduation to more than 60 per cent after 10 years. Already 4 years after graduation women starting on a permanent

<sup>20</sup> Questions on personality traits and attitudes are not included every wave of the survey. However, in order to exclude possible feedback effects of personal labour market or partnership experiences on personality traits and family and career attitudes, we only use the first available observation. According to the psychological literature personality traits are stable in adulthood. The majority of women answer this question around the age of 21 or younger.

<sup>21</sup> The 5 main industries are generated according to the classification of the Federal Statistical Office (destatis). These are manufacturing, construction, trade and transportation, financial services, and public and other services. We dropped the only respondent working in the agricultural sector.

<sup>22</sup> However, our main results are robust to excluding these industry and occupational dummy variables (see Table A3 in the Appendix).

contract have become mothers with a larger likelihood. The gap remains constantly around 4 percentage points. A similar, albeit much weaker, pattern emerges when we consider the total number of children (Table 6, lower panel).

## 4.2 Empirical Strategy

We examine the fertility effects of starting a career on a fixed-term contract more thoroughly in a regression framework. Our basic empirical strategy is to compare women entering the labour market on a fixed-term contract with their counterparts on permanent contracts in terms of their short- to medium-run fertility behaviour. The empirical set-up is comparable to the papers studying future effects of adverse labour market conditions at the beginning of the career (see e.g., Kahn 2010; Liu, Salvanes and Sørensen 2012; Stevens 2007). We take advantage of the fact that fixed-term employment tremendously increased over the last 15 years but not all regions and industry were equally affected. Thus, a substantial part of the variation in starting a career with a fixed-term contract is caused by this exogenous, labour demand driven increase in temporary employment. The underlying empirical model can be described in a very simple linear regression form as follows:

$$y_{it_0+z} = \beta FT_{it_0} + \gamma UE_{it_0} + \delta' X_{it_0} + \varphi_{st_0} + \mu_{t_0} + \varepsilon_{it_0} \quad (1)$$

$y_{it_0+z}$  denotes the outcome of interest for woman  $i$  in period  $t_0 + z$ , where  $z$  indicates the year after graduation or end of vocational training.  $FT_{it_0}$  is an indicator variable for starting a career in a fixed-term employment and  $UE_{it_0}$  indicates whether an individual experiences an unemployment spell after graduation. Therefore, the base category in our regressions will be starting the career with a permanent contract. Further,  $X_{it_0}$  are observed pre-determined individual and job characteristics measured in  $t_0$ ,  $\varphi_{st_0}$  is the federal state of the first job,  $\mu_{t_0}$  is the year of graduation, and finally  $\varepsilon_{it_0}$  is the unobserved error term.

It is crucial to include variables which influence the probability of holding a fixed-term contract and might simultaneously correlate with the fertility decision. Not controlling for these variables may leave them in the error term as confounding factors which may cause spurious correlations between fertility and holding a fixed-term contract at labour market entry. If workers with particular characteristics or preferences for children self-select into particular types of contracts, our estimates would be biased. This aspect has been mainly ignored in previous studies analysing the role of fixed-term employment on fertility outcomes. For example, one might think of an individual which is strongly risk averse and therefore will hardly accept a fixed-term contract. She will be searching for a job until she finds an adequate permanent employment. But at the same time risk aversion might make her less likely to have a child since entering parenthood is obviously related to a high degree of uncertainty. This would cause a positive bias and our results would underestimate the true effect. In contrast, we can expect a negative bias if, let's say, a freedom and flexibility loving woman is more likely to accept a fixed-term contract and also less likely to have a high preference for children. Fortunately, the SOEP data allows us to control for a variety of individual characteristics and preference indicators. Thus, all regressions include controls for the degree of risk aversion as well as personality traits and general attitudes. For instance, family preferences are controlled for by Kluckhohn's importance of life areas measures. Furthermore, we test whether any of the pre-determined observable characteristics significantly affects the likelihood of starting the career on a fixed-term contract (Table A1 in the Appendix): Almost none of the coefficients are significantly different from zero; the exception being age at graduation (weakly significant positive effect) and agreeableness (significantly negative coefficient). This result is re-assuring and important as it provides further supporting evidence against the possibility of fertility related self-selection into fixed-term contracts at labour market entry. Summing up, we cannot claim to estimate the causal of fixed-term employment on fertility outcomes as we lack truly exogenous variation in

temporary contracts. However, controlling for a large set of traits and attitudes and given the insignificance of predetermined characteristics for working under a specific type of contract we believe that our results are suggestive of a causal effect.

We run separate regressions for all outcome variables using a standard probit model to estimate the association between starting a career on a fixed-term contract and the probability of entering parenthood. Since women only have a nonnegative integer number of children we apply a maximum likelihood procedure with an underlying Poisson distribution for the estimations on the number of children. We use robust standard errors to account for potential heteroscedasticity.<sup>23</sup>

## **5. Main Results**

### **5.1 Probability of entering motherhood**

In this section we present the results of the regression analysis. Table 7 shows the main results of 8 separate probit regressions. Each cell reports the average marginal effect of starting the career with a fixed-term contract on the probability of having a first birth during the first ‘z’ years after graduation.<sup>24</sup> The first column reports the results from the specification including individual, background, and job characteristics. In the second column we add personality traits and attitudes. Finally, in the last column (III) we also add a control for partnership status. Column III is our preferred specification since it contains all relevant control variables.

The first finding is that the estimates are quite stable across the different specifications suggesting that the results are not purely driven by selection based on observable characteristics, personality traits and attitudes. Going from the top to the bottom of the table

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<sup>23</sup> Basically, we use the same sample of 270 women in all estimations. In practice, the number of observations slightly differs between the estimations in the main table since the maximum likelihood procedure cannot use all observations.

<sup>24</sup> Strictly speaking, we estimate the correlation between starting a career with a fixed-term contract and the probability of having had a first child within z years after graduation.

we proceed further in time. While the first row reports the average marginal effects on first birth probability 3 years after graduation, the last row reports the marginal effects after 10 years. The association between the first birth probability and starting the career on a fixed-term contract is zero up to 3 years after graduation since in these years the vast majority of women are still childless and work in their first job. But already after 4 years the size of the marginal effect increases considerably. 5 years after graduation onwards the relationship is negative and becomes significantly different from zero. For women entering the labour market with a fixed-term contract, the probability of having entered motherhood within 5 years after graduation is smaller by 16 percentage points. The gap in year 10 after graduation is still at 12 percentage points. Hence, after a starting phase women who started their career on a fixed-term contract are significantly less likely to have become mothers compared to women on permanent first contracts. We interpret this finding as a postponement effect due to temporary jobs.

**Table 7** Probability of first birth 3 to 10 years after graduation; average marginal effects for FTC (Probit)

	(I)	(II)	(III)
after 3 years	-0.019 (0.050)	0.000 (0.044)	-0.021 (0.044)
after 4 years	-0.087 (0.059)	-0.082 (0.050)	-0.096* (0.050)
after 5 years	-0.139** (0.060)	-0.159*** (0.052)	-0.164*** (0.052)
after 6 years	-0.105* (0.064)	-0.118** (0.055)	-0.121** (0.055)
after 7 years	-0.120* (0.066)	-0.130** (0.062)	-0.143** (0.060)
after 8 years	-0.145** (0.067)	-0.150** (0.064)	-0.156** (0.062)
after 9 years	-0.112* (0.067)	-0.106* (0.064)	-0.113* (0.062)
after 10 years	-0.121* (0.066)	-0.116* (0.063)	-0.122** (0.061)
Job characteristics	YES	YES	YES
Personality traits & attitudes	NO	YES	YES
Partnership status	NO	NO	YES

**Note:** Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; female sample, no migrants; all regressions contain controls for individual characteristics, background characteristics, state-of-first-job and year-of-graduation dummies.

All coefficients of the other explanatory variables not reported in Table 7 show the expected sign (see Table A2 in the appendix):<sup>25</sup> For instance, all else equal, older graduates are more likely, and better educated are less likely to enter parenthood within 5 years. Family background seems to play no role for the own decision to have a child, but personality does: open-minded and conscientious women are less likely to have a child 5 years after they finish their education. Furthermore, attitudes and values seem to matter. While women for whom the family is very important are significantly more likely to have entered motherhood during the 5-years period, women for whom career is very important are significantly less likely to do so. Finally, having a partner at the moment of labour market entry increases the probability of becoming mother in the first 5 years after graduation. According to economic theories of fertility temporary jobs could affect fertility decisions through reduced first-job income. In the main regression we do not control for individual's income explicitly since it might be endogenous. However, we include the most important predictors of average income such as education, age, occupation, industry, personality traits and attitudes. Hence, we implicitly control for an individual's earnings potential, but leave out all remaining idiosyncratic variation in earnings which is probably highly endogenous. For completeness, we present results controlling for net labour income (wages) at labour market entry in Section 5.3.<sup>26</sup>

## 5.2 Number of children

Does the delay in entering motherhood translate into a decline in the number of children? The evidence presented in Table 8 reveals significantly negative effects of entering the labour market on a fixed-term contract on number of children up to ten years after graduation. In comparison to the previous estimates, these results are slightly weaker and not as significant throughout all specification. Again, the effect does not kick in before year 5 after graduation.

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<sup>25</sup> Table A2 in the appendix provides an example of a complete regression table on first birth probability 5 years after graduation.

<sup>26</sup> Including net labour income (wages) as additional control variable does not change the coefficient of fixed-term employment.

In the full specification (column III), the estimated coefficient remains significantly different from zero (except for year 6) and increases continuously. For instance, starting a career in a fixed-term job reduces the number of children 5 years after graduation by 0.17 and after 10 years even by one quarter of a child. This indicates that the observed postponement does translate into lower fertility. Since we do not observe women until the end of their reproductive age our analysis does not allow us making any statements about completed fertility. However, the significant reduction in the number of children 10 years after graduation points to a potential reduction in total fertility as well.

**Table 8** Number of children 4 to 10 years after graduation; average marginal effects for FTC (Poisson)

	(I)	(II)	(III)
after 4 years	-0.061 (0.081)	-0.073 (0.067)	-0.101 (0.069)
after 5 years	-0.115 (0.093)	-0.150* (0.077)	-0.167** (0.077)
after 6 years	-0.046 (0.095)	-0.077 (0.080)	-0.099 (0.080)
after 7 years	-0.126 (0.106)	-0.155 (0.102)	-0.177* (0.094)
after 8 years	-0.205* (0.114)	-0.224** (0.107)	-0.225** (0.100)
after 9 years	-0.187 (0.123)	-0.204* (0.121)	-0.214* (0.116)
after 10 years	-0.222* (0.134)	-0.244* (0.132)	-0.247* (0.127)
Job characteristics	YES	YES	YES
Personality traits & attitudes	NO	YES	YES
Partnership status	NO	NO	YES

**Note:** Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; female sample, no migrants; all regressions contain controls for individual characteristics, background characteristics, state-of-first-job and year-of-graduation dummies.

### 5.3 Robustness Checks

In this section we test the sensitivity of our main results in several ways. First, we test whether our main results which were based on a homogenous population subsample (natives with at least secondary education) are affected when we include individuals with migratory background and primary education (full sample). Second, we relax the age at graduation

limitation to see whether our main results are robust to including women who finish their education or training after age 30. The results for both tests are shown in Table 9.

**Table 9** Sensitivity analysis; average marginal effects of Probit and Poisson regressions for FTC

Dependent variable	First Birth			Number of Children		
Sample	(I) Full sample	(II) Age at Graduation <35	(III) Age at Graduation <40	(IV) Full sample	(V) Age at Graduation <35	(VI) Age at Graduation <40
after 3 years	-0.007 (0.039)	-0.007 (0.042)	0.001 (0.043)			
after 4 years	-0.066 (0.044)	-0.092* (0.051)	-0.081 (0.052)	-0.050 (0.058)	-0.097*** (0.038)	-0.077 (0.059)
after 5 years	-0.129*** (0.048)	-0.149*** (0.052)	-0.138*** (0.053)	-0.119* (0.069)	-0.160*** (0.060)	-0.149* (0.090)
after 6 years	-0.118** (0.048)	-0.118** (0.053)	-0.097* (0.054)	-0.081 (0.082)	-0.069 (0.078)	-0.042 (0.080)
after 7 years	-0.137*** (0.052)	-0.129** (0.059)	-0.117** (0.059)	-0.147 (0.093)	-0.154 (0.096)	-0.131 (0.096)
after 8 years	-0.123** (0.053)	-0.146** (0.061)	-0.126** (0.061)	-0.138 (0.099)	-0.209** (0.099)	-0.176* (0.100)
after 9 years	-0.086 (0.054)	-0.088 (0.061)	-0.072 (0.062)	-0.117 (0.108)	-0.160 (0.113)	-0.131 (0.113)
after 10 years	-0.102* (0.052)	-0.094 (0.060)	-0.075 (0.061)	-0.167 (0.115)	-0.190 (0.124)	-0.156 (0.124)

**Note:** Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; female sample; all regressions contain controls for individual characteristics, background characteristics, job characteristics, personality traits and attitudes, partnership status, state-of-first-job and year-of-graduation dummies.

The first column reveals that the negative association between starting a career on a fixed-term contract on entering motherhood also holds for the full sample. The results seem particularly robust for years 5 to 8 and even 10. Overall, the estimated coefficients are slightly smaller than those in Table 7 and the significance levels for the early and late years are somewhat reduced. For instance, the average marginal effects on having had a first birth after 4 and 5 years after graduation decline by 2 percentage points but remain statistically significant. It seems as if fixed-term employment does not influence the fertility decisions of migrants to the same degree as it does affect the decision of non-migrants. A potential explanation might be cultural differences in fertility behaviour (Fernandez and Fogli 2006). Turning our attention to the effects on the number of children (Table 9, column IV), we see that the estimated marginal effects are smaller than in our main specification and are less

precisely estimated; the only significant coefficient is on the number of children in year 5 after graduation. Hence, in the full sample, including migrants and women with elementary education, the significant postponement effect of fertility does not seem to translate into a significant reduction in the number of children in the 10 years following graduation.<sup>27</sup>

Our main results are also generally robust to relaxing the age-at-graduation restriction. The average marginal effects for the main sample including childless women graduating up to age 34 and 39 are reported in Table 9, columns II and IV and III and V respectively.<sup>28</sup> 10 years after labour market entry these women are 44 and 49 years old and have probably completed their fertility plans. Furthermore, compared to younger women these older graduates might have a lower fecundity and might find it increasingly difficult to realize their fertility intentions.<sup>29</sup> Nevertheless, for both samples the significantly negative association between fixed-term contracts in the first job is associated with a lower probability of first birth up to the 8<sup>th</sup> year after graduation. The results for year 9 and 10 after graduation are not significantly different from zero anymore. This could indicate that older graduates are not able to postpone childbearing too much as they are closer to the end of their reproductive age. Overall, the postponement effects are slightly smaller than those in our main regressions but remain qualitatively almost equal. The results on number of children are also quite robust for the sample including women graduating up to age 34, but are smaller and less often significantly different from zero when including women graduating up to age 39. This could also be related to the reduced time window during which older graduates can realize their fertility intentions.

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<sup>27</sup> However, even though the estimates for the later years are about half the size of our main results they are not very close to zero. We cannot rule out the possibility that the estimates become insignificant as we lack precision due to our small sample size.

<sup>28</sup> In our sample, about 4% and 2% of women who are childless at graduation finish their education when they are older than 34 and 39.

<sup>29</sup> For example, in our sample, none of the women graduating at age 39 and older give birth.

In a third robustness test we analyse whether our results are biased by potentially selected sample attrition. Recall that our main analysis is based on a (generated) balanced sample of women whom we observe for at least 10 subsequent years after they finish their education. If dropping out of the survey is correlated with starting the career on a particular contract this might confound our results. Therefore, we construct a balanced sample including all women who stay in the survey at least for 5 years after graduation. This sample condition is less strict and helps to increase the sample size substantially. If our main results are driven by a confounding change in sample composition, the marginal effects in Table 10 should diverge from those in Table 7 and Table 8.

**Table 10** Sensitivity analysis II; 5 years balanced sample average marginal effects of Probit and Poisson regressions for FTC

Dependent Variable	First Birth		Number of Children	
	(I)	(II)	(III)	(IV)
after 3 years	-0.068** (0.033)	-0.078** (0.032)		
after 4 years	-0.087** (0.037)	-0.094*** (0.036)	-0.090* (0.048)	-0.100** (0.048)
after 5 years	-0.148*** (0.040)	-0.152*** (0.039)	-0.162*** (0.058)	-0.172*** (0.057)
Personality traits & attitudes	YES	YES	YES	YES
Partnership status	NO	YES	NO	YES

**Note:** Robust standard errors in parentheses; \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; female sample, no migrants; all regressions contain controls for individual characteristics, background characteristics, job characteristics, state-of-first-job and year-of-graduation dummies.

However, as the results in column I and II show, the estimated negative relationship between labour market entry on a fixed-term contract and our fertility outcomes remains very robust. In fact, the larger sample size helps to increase the precision of the estimates and the results are now all significantly different from zero. Already 3 years after graduation the likelihood of entering motherhood is around 8 percentage points lower among women who started on a fixed-term contract. This gap increases to 15 percentage points in year 5 after graduation. We observe a similar pattern for the results on the number of children: The marginal effects remain very similar to our main results while the standard errors become smaller. Hence,

these results reveal a significant reduction in the number of children (4 to 5 years after graduation) due to fixed-term employment at labour market entry.

**Table 11** Sensitivity analysis III; average marginal effects of Probit and Poisson regressions for FTC incl. wages

Dependent Variable	First Birth		Number of Children	
	(I)	(II)	(III)	(IV)
after 3 years	0.013 (0.044)	-0.007 (0.045)		
after 4 years	-0.082 (0.052)	-0.096* (0.053)	-0.076 (0.076)	-0.109 (0.144)
after 5 years	-0.157*** (0.054)	-0.161*** (0.054)	-0.148* (0.087)	-0.172** (0.077)
after 6 years	-0.123** (0.056)	-0.124** (0.056)	-0.067 (0.083)	-0.093 (0.087)
after 7 years	-0.132** (0.064)	-0.144** (0.062)	-0.131 (0.106)	-0.161 (0.099)
after 8 years	-0.160** (0.066)	-0.167*** (0.063)	-0.227** (0.113)	-0.235** (0.108)
after 9 years	-0.121* (0.066)	-0.127** (0.064)	-0.209 (0.128)	-0.225* (0.123)
after 10 years	-0.125* (0.065)	-0.131** (0.063)	-0.254* (0.137)	-0.260* (0.133)
Personality traits & attitudes	YES	YES	YES	YES
Partnership status	NO	YES	NO	YES

**Note:** Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; female sample, no migrants; all regressions contain controls for individual characteristics, background characteristics, job characteristics, state-of-first-job and year-of-graduation dummies.

Finally, we test whether the negative association of fixed-term employment at career start and fertility is driven by the lower wage of temporary jobs. So far, we have controlled for many wage predictors. We re-estimate our main specification controlling explicitly for monthly net wages of the first job.<sup>30</sup> If wages are the main channel through which fixed-term jobs affect fertility the coefficient of fixed-term employment should become much smaller. However, the results in Table 11 are closely comparable to our main estimates in Table 7 and Table 8. In fact, the point estimates are even slightly larger. This indicates that it is not the lower income per sé which induces women to postpone childbearing but probably the economic uncertainty associated with temporary contracts.

<sup>30</sup> Unemployed individuals are assigned a zero wage.

## 6. Further Heterogeneity Analysis and Results for Men

### 6.1 Results by Education

In this section we investigate whether starting a career on a fixed-term contract affects fertility outcomes of women differently depending on their level of education. In particular, we compare women with secondary education and tertiary education.<sup>31</sup> The main rationale behind this is that women with high educational attainment, such as a university degree, enter the labour market relatively late but face the same ‘biological age restrictions’ as women finishing their education at younger ages. Hence, the scope for a postponement is much more restricted for higher educated women. Furthermore, for older women it becomes comparatively more risky to postpone childbearing due to biological constraints. Thus, conditional on a particular intended number of children, we would expect a smaller postponement effect of fixed-term employment for women with higher education. Table 12 reports the average marginal effects by educational subgroup for selected years. As hypothesized, the postponement effects are stronger for women with secondary education: the coefficients are more negative and the estimates are highly significant. For instance, 5 years after graduation the first birth probability is reduced by more than 0.2 if the first contract had a limited duration. The magnitude of the effect declines over time but remains statistically significant, even 10 years after graduation (-0.14). In contrast, the point estimates for women with tertiary education are smaller and only weakly significant. Regarding the number of children we find a similar picture: starting the career on a fixed-term contract significantly reduces the realized number of children by about one quarter after 5 years (women with secondary education). However, we cannot estimate the 10-years effect precisely enough to be able to distinguish it from a zero-effect. For women with a university degree the economic uncertainty associated with starting a career on a fixed-term contract does not seem to play

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<sup>31</sup> Secondary education is classified as ISCED codes 3 and 4 (middle vocational training or vocational training and ‘Abitur’); tertiary education ISCED codes 5 and 6 (higher vocational training or university degree).

such a crucial role for the timing of the first child and the number of children in the first 10 years after their graduation.

**Table 12** Heterogeneity analysis; average marginal effects of Probit and Poisson regressions for FTC by education

Dependent Variable	First Birth		Number of Children	
	(I) Secondary Education	(II) Tertiary Education	(III) Secondary Education	(IV) Tertiary Education
after 5 years	-0.213*** (0.073)	-0.115 (0.074)	-0.246** (0.105)	-0.134 (0.134)
after 7 years	-0.185*** (0.068)	-0.126* (0.071)	-0.311** (0.137)	-0.051 (0.175)
after 10 years	-0.137* (0.072)	-0.011 (0.087)	-0.293 (0.191)	-0.056 (0.172)

**Note:** Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; female sample; all regressions contain controls for individual characteristics, background characteristics, job characteristics, personality traits and attitudes, partnership status, state-of-first-job and year-of-graduation dummies.

## 6.2 Results for Men

It is possible that entering the labour market on a fixed-term contract also affects fertility outcomes of men. The corresponding results are reported in Table 13.<sup>32</sup> Even though the association between temporary jobs and subsequent fertility is negative within 7 to 10 years after graduation, the marginal effects are never statistically distinguishable from zero. Hence, our results seem to indicate that men do not react as sensitive to this form of economic uncertainty as women.

<sup>32</sup> In the male sample the age at graduation cut-off is two years later than in the female sample since men on average graduate two years later and are not exposed to biological constraints regarding fertility. The male sample consists of 230 observations.

**Table 13** Heterogeneity analysis; average marginal effects of Probit and Poisson regressions for FTC

Dependent Variable	First Birth		Number of Children	
	(I)	(II)	(III)	(IV)
after 5 years	0.037 (0.065)	0.014 (0.061)	0.072 (0.088)	-0.004 (0.080)
after 7 years	-0.060 (0.078)	-0.084 (0.070)	-0.023 (0.125)	-0.082 (0.114)
after 10 years	-0.079 (0.080)	-0.094 (0.071)	-0.112 (0.152)	-0.171 (0.141)
Personality traits & attitudes	YES	YES	YES	YES
Partnership status	NO	YES	NO	YES

**Note:** Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; male sample, no migrants; all regressions contain controls for individual characteristics, background characteristics, job characteristics, state-of-first-job and year-of-graduation dummies.

## 7. Conclusion

In countries with strong employment protection legislations fixed-term contracts are meant to increase the flexibility of the recruitment process and are thought to foster employment in general. However, existing evidence suggests that fixed-term contracts lead to a dual labour market and casts doubt on the notion that temporary contracts help to foster employment and to reduce aggregate unemployment in the long-run (Cahuc and Postel-Vinay 2002; Bentolila and Dolado 1994; Boeri and Garibaldi 2007).

Our analysis sheds light on potential spill-over effects of fixed-term employment on fertility. Using data on young female graduates for Germany, we find a significant postponement of first birth and a reduction in the number of children in the first 10 years after graduation. These results are robust to several sensitivity tests. Furthermore, we show that fixed-term employment seems to be particularly affecting fertility decisions of women with secondary education. In contrast, our results do not reveal any significant correlations between job uncertainty at the beginning of a career and fertility for young men. We address potential endogeneity threats by including a large set of controls and by showing evidence against fertility related self-selection into temporary contracts at the beginning of a career. Hence, we

believe that the results do suggest a causally negative effect of fixed-term employment on fertility.

Our study has important implications for policy makers in low-fertility countries as our findings highlight negative spill-over effects of temporary employment on demographic outcomes. Fixed-term contracts might facilitate labour market entry of older persons and the long-term unemployed (stepping-stone hypothesis), but they seem to impede the integration of young graduates in the labour market and to negatively affect fertility outcomes. As such, this labour market policy imposes a disproportionate burden on the young generation. Against this background, policy makers should possibly reconsider the costs and benefits of this policy instrument and should strive for a more equal distribution of the costs associated with employment protection across population subgroups. A possible approach could be a broader reform of the employment protection legislation, i.e. a reduction in dismissal costs for all workers (Blanchard and Landier 2002).

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## Appendix

**Table A1** Probability of starting a career with a fixed-term contract; average marginal effects (Probit)

	(I)
Age at graduation	0.021* (0.012)
Years of education	0.009 (0.013)
Born in East Germany	0.045 (0.093)
High education mother	-0.096 (0.089)
Employment mother	-0.151 (0.123)
Age at birth mother	0.004 (0.006)
Number of siblings	0.060 (0.078)
Openness	0.013 (0.025)
Agreeableness	-0.072*** (0.027)
Conscientiousness	0.001 (0.032)
Extraversion	-0.017 (0.024)
Neuroticism	0.013 (0.035)
Risk aversion	-0.220* (0.130)
Importance of having children	0.086 (0.065)
Importance of partnership	0.096 (0.177)
Importance of career	-0.026 (0.091)
Importance of affording something	0.021 (0.084)
In Partnership after graduation	0.030 (0.060)
N	270
Pseudo R <sup>2</sup>	0.17

**Note:** Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; female sample, no migrants; all regressions contain controls for state-of-first-job and year-of-graduation dummies.

**Table A2** Probability of first birth 5 years after graduation; average marginal effects (Probit)

	(I)	(II)	(III)
First Job fixed-term contract	-0.158*** (0.060)	-0.176*** (0.052)	-0.183*** (0.052)
Unemployment after graduation	1.056*** (0.261)	0.974*** (0.248)	0.842*** (0.235)
Age at graduation	0.034*** (0.012)	0.045*** (0.011)	0.044*** (0.011)
Years of education	-0.037*** (0.013)	-0.046*** (0.012)	-0.045*** (0.012)
Born in East Germany	0.064 (0.099)	0.046 (0.087)	0.022 (0.088)
High education mother	-0.006 (0.091)	0.034 (0.089)	0.017 (0.087)
Employment mother	0.093 (0.127)	0.103 (0.110)	0.112 (0.107)
Age at birth (mother)	-0.004 (0.006)	-0.009* (0.005)	-0.008* (0.005)
Number of siblings	0.027 (0.077)	0.059 (0.076)	0.055 (0.073)
Openness		-0.066*** (0.023)	-0.060*** (0.023)
Agreeableness		0.021 (0.026)	0.018 (0.026)
Conscientiousness		-0.039 (0.029)	-0.041 (0.028)
Extraversion		0.082*** (0.023)	0.073*** (0.023)
Neuroticism		-0.001 (0.031)	-0.009 (0.031)
Risk aversion		0.105 (0.086)	0.105 (0.078)
Importance of having children		0.199*** (0.057)	0.201*** (0.058)
Importance of partnership		0.077 (0.153)	0.018 (0.165)
Importance of career		-0.175** (0.076)	-0.167** (0.074)
Importance of affording something		0.001 (0.084)	0.015 (0.084)
In Partnership after graduation			0.150*** (0.051)
First job blue collar	0.110 (0.102)	0.097 (0.092)	0.106 (0.093)
First job manufacturing	1.410*** (0.159)	1.378*** (0.159)	1.275*** (0.155)
First job trade and transportation	1.415*** (0.169)	1.356*** (0.170)	1.252*** (0.163)
First job financial services	1.390*** (0.168)	1.342*** (0.167)	1.216*** (0.162)
First job public and other services	1.556*** (0.166)	1.506*** (0.170)	1.373*** (0.165)
N	266	266	266

**Note:** Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; female sample, no migrants; all regressions contain state-of-first-job and year-of-graduation dummies.

**Table A3** Average marginal effects of Probit and Poisson regressions for FTC – different order of controls

	First Birth		Number of Children	
	(I) Main Specification	(II) w/o Job Characteristics	(III) Main Specification	(IV) w/o Job Characteristics
after 5 years	-0.183*** (0.052)	-0.138*** (0.052)	-0.196*** (0.060)	-0.137* (0.072)
after 6 years	-0.142*** (0.054)	-0.110** (0.054)	-0.123 (0.080)	-0.084 (0.076)
after 7 years	-0.152** (0.061)	-0.127** (0.058)	-0.194** (0.095)	-0.175* (0.092)
after 8 years	-0.165*** (0.062)	-0.118** (0.060)	-0.239** (0.101)	-0.200* (0.102)
after 9 years	-0.123** (0.063)	-0.090 (0.061)	-0.229* (0.118)	-0.174 (0.113)
after 10 years	-0.131** (0.061)	-0.098 (0.060)	-0.262** (0.129)	-0.186 (0.127)
Job characteristics,	YES	NO	YES	NO

**Note:** Robust standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; female sample, no migrants; all regressions contain controls for individual characteristics, background characteristics, personality traits and attitudes, state-of-first-job and year-of-graduation dummies.