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Abstract

Research on female labor force participation has a long tradition in economic research. While many open questions have been answered on the gender gap in labor market participation, the prevalent heterogeneity between women still keeps economists busy. While traditional economic theory attributed unexplained differences in decision-making to idiosyncratic shocks, modern empirical approaches are more and more interested in investigating this psychological black box behind participation decisions. This paper contributes to this research by discussing the role of the personality trait locus of control (LOC), a measure of an individual's belief about the causal relationship between behavior and life outcomes, for differences in participation probabilities between women. In line with the existing literature, an important role of LOC for independence preferences as well as subjective beliefs about returns to investments are proposed. The connection between LOC and participation decisions is tested using German survey data, finding that internal women are on average more likely to be available for market production and this higher availability also translates into higher employment probabilities. Additional analyses identify a strong heterogeneity of the relationship with respect to underlying monetary constraints and social working norms.

Keywords: Locus of Control; Labor Supply; Female Labor Force Participation; Social Norms; Personality; Preferences
PsycINFO codes: 3120, 3140
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1 Introduction

The research on female labor force participation has a long tradition. Triggered by the growing labor supply of women in the second half of the last century,[1] a large strand of theoretical and empirical research on this new issue has arisen. Nevertheless, the early literature on female participation in the labor market was largely concentrated on gender gaps in monetary constraints as well as social norms of working, in order to explain participation decisions. Based on this literature, we already know a lot about why women keep on having lower participation rates and wage elasticities than men and why these variables started converging in recent decades. However, between-women heterogeneity in participation probabilities can only be explained by monetary constraints and social norms of working to a limited extend. While traditional economic models largely attribute these unexplained differences in decision outcomes to idiosyncratic shocks or unobserved constraints and opportunities, modern behavioral economic and applied microeconomic approaches started investigating these differences with respect to unobserved, inherent beliefs and preferences. A growing literature is thus interested in investigating the psychological black box behind female labor supply decisions.

This paper contributes to the literature by investigating the role of a specific personality trait, which has already been found to have important explanatory power for decision making especially on the labor market: an individual's perception of control, also called locus of control (LOC). LOC can be characterized as a *"generalized attitude, belief, or expectancy regarding the nature of the causal relationship between one's own behavior and its consequences"* (Rotter, 1966) and describes whether individuals believe in the effects of their own efforts and abilities on their life outcomes. While individuals with an internal LOC (internals) believe that their own efforts and abilities will be rewarded in their future, individuals with an external LOC (externals) attribute life outcomes mainly to luck, chance, fate or other people. LOC has already been shown to have important effects on economic behavior and decision making in the labor market[2]. Nevertheless, to the best of the authors knowledge, no paper exists yet which investigates the effect of LOC on female participation decisions in a comprehensive and detailed manner.

Based on an one-period model of discrete labor supply decisions, which allows for heterogeneity in preferences through the incorporation of a vector of personal attributes into the individual utility function, the theoretical considerations mainly discuss an effect of LOC on participation probabilities via a difference in the direct marginal utility from participating. Individuals might

[1] See Killingsworth and Heckman (1986), Blau and Kahn (2007), Costa (2000), Goldin (1990) and Mincer (1985) for comprehensive overviews over the trends in female labor force participation during the 20th century.

[2] See Cobb-Clark (2015) for detailed discussion of the concept as well as an overview of the literature on LOC in labor economics.

not only derive utility from the consumption level generated through participation but also from the act of generating the consumption level itself. Based on the psychological literature which makes an important connection between LOC and independence considerations, this direct non-monetary gain from participation is expected to be higher for internal women. Internals put greater weight on the status of being active in the labor market. They not only derive utility from the consumption level as an outcome of participation, but also from the fact that they themselves had control over generating it. Additionally, potential alternative mechanisms, which can largely be formalized by differences in the individual budget constraints, are discussed. LOC might, for example, have an effect on beliefs about returns to investments, such as parental investments, job search and investments into the future career, but also on objective differences in opportunities and constraints, e.g. wages or family income.

Therefore, in the empirical part of the paper, I estimate the direct relationship between LOC and current labor force participation of a woman in a reduced form approach. The estimations are conducted using the extensive information available from the Socio-Economic Panel (SOEP, 2017), a large representative longitudinal household panel from Germany. Using this data, I estimate the average marginal effects of a woman's LOC on her probability of participating in the labor force using a binary logit estimation conditional on standard socio-economic determinants of participation. In this context, labor force participation is defined as a general availability for market production and thus concentrates on the behavioral implications of LOC on labor supply decisions. I find a significant positive relationship between having an internal LOC and being available to the labor market. A subgroup analysis reveals that while a strong relationship can be observed for cohabiting women and mothers, the effect for childless women is lower or even zero, depending on family status. This indicates a crucial heterogeneity with respect to underlying monetary incentives to work. In addition, a second heterogeneity analysis shows that the estimated effects are also sensitive with respect to the underlying social norms of working as measured by regional differences as well as cohort. Furthermore, additional analysis reveals important differences between labor market participation decisions at the intensive and extensive margin. While the positive effect on labor market availability also translates into higher actual labor market activity in a static as well as intertemporal perspective, for those women who do work, LOC has no significant effect on working hours.

The outline of the paper is as follows. Section 2 gives a comprehensive overview over the related literature. Section 3 summarizes the theoretical basis of the paper and, based on this, proposes hypotheses for the empirical analysis. The empirical part of the paper, Section 4 describes the data and the estimation strategy and Section 5, presents an overview of the results

of the main estimation. Section 6 describes a number of additional empirical analyses such as a heterogeneity analyses and results for alternative outcome variables. Section 7 concludes the paper.

2 Literature Review

The paper at hand significantly adds to two important bodies of economic literature which are, on the one hand, the literature on female labor force participation, including determinants of participation, overall time trends and gender differences, and on the other hand, the growing literature on the economic importance of personality traits in general and the personality trait LOC in specific.

The early literature on female labor force participation largely focused on the explanation of decreasing gender participation gaps as well as the positive long-term trends in female labor force participation. Inspired by the work of Mincer (1962), especially the increase in the average wage rate of women was the center of attention for a long time (see e.g. Mincer, 1985; Smith and Ward, 1985; Blau and Kahn, 2007; Juhn and Murphy, 1997). Large parts of the decrease in wage inequalities were explained by increasing returns to human capital for women (see e.g. Autor *et al.*, 2008; Blau, 1998; McGrattan and Rogerson, 2008). Although the wage rates of women and men did converge and the female wage elasticity fell over time (Blau and Kahn, 2007; Costa, 2000; Heim, 2007), the participation rate and the average number of working hours per week of married women in particular are still considerably lower than that of their partners and the gap in wage elasticities is also still clearly recognizable (Evers *et al.*, 2008; Blau and Kahn, 2017). Based on the growing theoretical considerations of joint family labor supply, empirical studies additionally found a strong and stable response of female labor supply to changes in their partners' wages, whereas no such responsiveness can be identified for men (Ashenfelter and Heckman, 1974; Lundberg, 1988; Devereux, 2004). In addition to considerations about wage and cross-wage responses of female labor supply, the conventional theoretical models were largely focused on overall declines in fertility rates through, for example, the improvement of fertility control (Goldin and Katz, 2002; Bailey, 2006), the improvement of household technologies (Greenwood *et al.*, 2005), the rise of the tertiary sector (Cortes and Pan, 2018; Weinberg, 2000; Oppenheimer, 1970) and a generally increased economic demand (Angrist, 2002; Carodso and Morin, 2018) in order to explain the observed positive trends (see e.g. Costa, 2000; Blau and Kahn, 2017; Mincer, 1985; Smith and Ward, 1985).

Over the years, multiple new strands of research have evolved which to a large extent have focused on alternative monetary factors behind (the lack of) female labor force participation

such as institutional barriers and public policy (e.g. tax incentives, transfer withdrawal rates and childcare provision) (see e.g. Blundell and MaCurdy, 1999; Hausman, 1980; Eissa and Liebman, 1996) as well as costs of participation in general (e.g. transportation and childcare) (see e.g. Cogan, 1980; Gronau, 1973; Angrist and Evans, 1998). However, as summarized by Blau and Kahn (2007, 2017), all of these conventional economic studies were not able to fully explain the observed trends in female labor force participation and the remaining gender gaps. Consequently, the economic research started to consider non-economic determinants of this development, especially by discussing and empirically analyzing the role of social norms and gender role attitudes as important non-pecuniary factors (see e.g. Bertrand, 2010; Fortin, 2015; Goldin, 2006; Reimers, 1985; Costa, 2000; Carodso and Morin, 2018). This literature is in line with the sociological literature on the transformation of traditional gender roles over time (Cotter *et al.*, 2011; Ross *et al.*, 1983). As stated by Goldin (2006), one key aspect of the *"quiet revolution of women's employment"* since the 1970s is the increasing importance of work as a key aspect for a woman's social identity. These considerations are based on the economic and sociological research on the importance of social purpose as well as economic identity and status as non-pecuniary incentives of labor force participation (Jahoda, 1981; Akerlof and Kranton, 2000). Traditional gender roles and the associated gender differences in the acceptance of home production as an alternative to market production (see e.g. Killingsworth and Heckman, 1986) are crucial drivers of differences in the importance of these social norms between men and women (see e.g. Bertrand *et al.*, 2015; Knabe *et al.*, 2016; Charles *et al.*, 2018). Thus, non-pecuniary incentives to work, driven by prevalent social norms, are likely to be crucial especially when explaining gender differences in labor force participation as well as long-term trends in female participation decisions. Nevertheless, a lot of unexplained heterogeneity in the decision making between women remains. Consequently, especially the most recent literature investigates the role of inherent personal attributes for female decision making in the labor market. Wichert and Pohlmeier (2010) find that, for example, the Big-Five personality traits play a significant role in explaining women's labor supply. Although they also consider indirect effects through wage-differences, they conclude that the traits conscientiousness, extraversion, neuroticism and openness have a crucial direct behavioral effect on participation decisions.

A second important strand of literature this paper contributes to is the emerging research linking individuals' personality to their behavior in the labor market. Specifically, LOC has already been shown to have a tremendous positive effect on "desirable" behavior and decision making in the labor market in such areas as human capital investment (Coleman and DeLeire, 2003), job search effort (McGee and McGee, 2016; Caliendo *et al.*, 2015), occupational attainment

(Heywood *et al.*, 2017; Cobb-Clark and Tan, 2011), entrepreneurial activity (Caliendo *et al.*, 2014) and labor market mobility (Caliendo *et al.*, 2019). Nevertheless, literature that directly relates female labor force participation to LOC is scarce. Most prominently, Heckman *et al.* (2006) find a significant positive effect of a combined measure of LOC and self-esteem on the individual probability of being employed at age 30 for the sample of young individuals from the NLSY79. They show that this relationship is much more pronounced for females. In a more recent study, Berger and Haywood (2016) analyze the effect of LOC on mothers's return to employment after parental leave. Using German survey data, they find that women with an internal LOC return to employment more quickly. Based on a heterogeneity analysis with respect to the underlying flexibility in the women's occupations, they conclude that the effect is mainly driven by different subjective expectations about future career costs of maternity leave. That study is most closely related to the paper at hand. Nevertheless, it concentrates on a very specific group of women in a rather exceptional stage of life whereas this paper is intended to draw a much more general picture.

3 Theoretical Considerations

3.1 Basic Model of Female Labor Supply

In order to discuss and formalize the potential mechanisms through which LOC might affect participation decisions of women, an one-period model of discrete labor supply decisions is considered as the baseline in the following (see e.g. McFadden, 1974; Borghans *et al.*, 2008; Almlund *et al.*, 2011). A woman's within-period discrete participation choice is based on the maximization of the following utility function:

$$U_i = U_i(C_i, L_i, H_i, P_i; \theta_i) \tag{1}$$

with U being the neoclassical utility function of woman i, which maps her preferences. U is convex, i.e. increasing in its arguments and twice differentiable ($U' > 0$ and $U'' < 0$). C_i is the consumption level and L_i is leisure. H_i captures all sorts of non-market (home) production such as in specific childcare. Hence, childcare is also allowed to generate a positive utility for woman i. Additionally, P_i captures the "joy of working", i.e. the non-monetary benefits from working, independent from the disutility of every hours worked (which is inversely captured by L). This is based on the idea that woman not only derive direct utility from the consumption level but also from the behavior they undertake to generate it. Consequently, utility not only depends on consumption as the monetary outcome of participation but also is a function of participation itself, independent of how large its effect on consumption levels might be.

In line with Borghans *et al.* (2011) and Almlund *et al.* (2011), the marginal gains from all arguments depend on a vector of individual attributes θ_i. Based on the expansion of the traditional choice model, which allows for non-stochastic personal attributes θ_i, instead of stochastic idiosyncratic shocks (McFadden, 1974), the potential role of LOC for explaining individual differences can be discussed. For simplification, the vector θ_i is reduced to the one parameter LOC by holding all other attributes constant. For intuition, two groups of women can be defined: Internal women (I) with the vector θ_I and external women (E) with the vector θ_E. In line with its later construction, we assume θ_i to increase with internality, i.e. $\theta_I > \theta_E$.

$$y_i + \tilde{w}_i(T - L_i - H_i) \quad \geq \quad C_i + p_h(T - H_i) \tag{2}$$

is the budget constraint of woman i. The non-labor income y_i summarizes all sources of income which are not generated by the woman participating in the labor market such as partner's earnings and capital income. w_i is the potential wage rate of the woman if she decides to supply a positive amount of labor to the market, i.e. $T - L_i - H_i > 0$, with T being the endowment of time. The woman is not expected to have perfect information. Thus, $\tilde{w}_i$ captures the expectations about the potential wage rate and is a subjective measure, which again depends on individual attributes: $\tilde{w}_i(\theta_i)$. The price of the aggregated consumption good is normalized to 1 and p_h is the hourly price for childcare and housework which is not provided by the woman $(T - H_i)$. $T - H_i$ could either be provided externally or by the partner in the household.[3]

Woman i chooses the optimal labor force status LF_i^* which maximizes her utility with the choice set B_i being either participating $(LF_i = 1)$ if $T - L_i - H_i > 0$ or not participating $(LF_i = 0)$ if $T - L_i - H_i = 0$ at the extensive margin:

$$LF_i^* = \underset{LF_i \in B_i}{\operatorname{argmax}}\{U_i\} \quad \text{with } B_i = \{0, 1\}. \tag{3}$$

As the focus of this paper is to analyze the behavioral aspects of labor force participation, while leaving the demand side aside, it concentrates on labor force availability as opposed to actual employment. This reduces the risk of biased results due to omitted returns in employment probability in the empirical section. In line with the ILO definition of "labor force", a woman is assumed to participate in the labor market if she is either already employed or self-employed or if she is unemployed and intends to participate by indicating that she is searching for a job (see International Labour Organization, 2018). Thus, LF_i also equals one if the woman does not work but is available to the market through job searching. In this simplification, given a certain expected market wage w_i, no assumptions on labor market conditions and frictions are necessary, as LF_i^* only depends on the woman's individual decision making processes and not

[3] p_h is assumed to capture the costs of external housework or childcare as well as the hourly wage of the husband.

on her exogenous probability of finding a job, except indirectly through $\tilde{w}_i$. In line with this, conditional transfer payments which are paid in response to job search efforts, such as unemployment insurance to woman i, are also captured by w_i while abstracting from the occurrence of welfare fraud. Thus, w_i can be labeled as the "earnings from participation".

3.2 Locus of Control and Potential Mechanisms

Based on this underlying model, multiple hypotheses can be formed about the relationship between LOC (θ_i) and female labor force participation which will guide the empirical analysis.

Mechanism 1 - Preferences The first potential channel suggests that LOC affecta a woman's preferences for the different components of the utility function and thus the marginal utility she derives from participation. Nevertheless, two conflicting hypotheses can be proposed based on this mechanism. In line with the argumentation in Cobb-Clark *et al.* (2014) about the effect of LOC on investments into health, internal women are likely to have a higher preference for being active in the labor market than external women. Thus, they derive more additional direct utility from participation than externals do: $\frac{\partial^2 U_i}{\partial P_i \partial \theta_i} > 0$. Internals prefer to directly affect their life outcomes and thus be independent of external forces. They are more resistant to external influences and make more independent judgments (Lefcourt, 1982). The role of independence considerations for LOC has already been discussed especially in the context of early childhood skill formation in the psychological literature (see e.g. Wichern and Nowicki, 1976; Hill, 2011). Thus, consumption which is generated based on self-earned income is valued higher than consumption based on external income such as partner's earnings or social transfers. Based on these theoretical considerations, internal women are ex-ante expected to be more likely to participate if P_i is increasing with participation.

As opposed to this, in the presence of children in the household, internal women might consider the effect of own actions on their children more carefully than external women. This is in line with the findings by Lekfuangfu *et al.* (2018) on the strong effect of maternal LOC on attitudes towards parental style as well as actual parental time investments. Thus internal mothers might have stronger preferences for home production as they gain higher utility from every unit of H_i: $\frac{\partial^2 U_i}{\partial H_i \partial \theta_i} > 0$. If a mother assumes that her efforts in child-rearing has important positive effects on her child's outcomes, she is also more likely to stay at home with young children as opposed to putting them into childcare. This channel would ex-ante be associated with a negative effect of LOC on participation probabilities in the presence of children in the household as H_i is decreasing with participation.

Mechanism 2 - Budget Constraints The second proposed channel suggests that LOC directly affects a woman's subjective and objective budget constraints. Firstly, women might differ in their expected monetary returns to participation driven by differences in the subjective expectations about returns to investments. The expected monetary returns to participation are higher for internal individuals as they believe in the direct causality between their own efforts and life outcomes. Internal women, for example, have higher subjective job-offer arrival rates, higher appreciation of future career costs of non-working and higher subjective future income paths (Caliendo *et al.*, 2015; Berger and Haywood, 2016). Hence, they expect higher (current and future) earnings from participation, i.e. $\partial\tilde{w}_i/\partial\theta > 0$, and thus gain higher utility from availability for market production as their budget constraints allows for higher returns to participation in expected consumption levels ($\tilde{C}_i$).[4]

Nevertheless, the difference between internal and external women could also be driven by differences in the objective monetary returns to LOC and thus, indirectly, via different constraints. One potential explanation for this may be positive demand-side responses to an internal LOC, i.e. higher realized wage rates (see e.g. Heineck and Anger, 2010) which are correctly anticipated by women and thus incorporated into the decision-making independent from the subjective beliefs discussed above. Additionally, internal women have been found to select occupations that are less open for flexible employment paths, i.e. leaving and returning to employment, such as science, engineering or related professions (Cobb-Clark and Tan, 2011). These occupations are likely to be associated with higher future career costs of non-participation and thus higher disincentives for home production through reduced future wages and employment probabilities. Thus, not only $\tilde{w}_i$ but also w_i itself depends on θ_i. Secondly, LOC might also be correlated with the partners' earnings driven by assortative mating or mating probabilities in general. Lundberg (2012) for example shows that personality traits have an important effect on the formation and stability of marriage. In the present case, it may be that internal women tend to marry men with higher or lower earnings or even tend to be less or more likely to marry at all, which would again affect their own participation probabilities through y_i. It is also possible that assortative mating is important with respect to the personality of the partner. Women with an internal LOC might be more likely to mate with men with an internal LOC, which again indirectly influences women's participation decisions through their partners' earnings. Hence, internal women might differ with respect to their available family income and thus have a higher or lower necessity to work in order to achieve their desired consumption level.

[4] For reasons of simplification, the illustrative theoretical framework abstracts from intertemporal decision making. Nevertheless, future earnings prospectives can be assumed to be captures by $\tilde{w}_i$ and thus $\tilde{C}_i$ via e.g. intertemporal consumption smoothing.

3.3 Effect Heterogeneity

The influence of personality on participation via preferences, beliefs and constraints can be assumed to crucially depend on the overall size of underlying incentives. If monetary and non-monetary incentives for market or home production are very high, the power of personality to affect participation probabilities may be comparably low. Thus, the estimated effects are expected to be highly heterogeneous with respect to the overall size of y_i and H_i, among others, which are determined by the existence of partners and children in the household as well as the amount of non-labor income. Partner earnings and thus the level of family income have already been found to be negatively associated with female participation probabilities (Ashenfelter and Heckman, 1974; Lundberg, 1988; Devereux, 2004). A single woman without any other external income sources ($y_i = 0$) thus has to fulfill all her basic consumption needs with her own market earnings or conditional transfer payments. If $w_i - p_h$ is assumed to be non-negative,[5] the woman has to generate a certain level of $w_i(T - L_i - H_i)$ and thus $(T - L_i - H_i) > 0$. If we assume no welfare fraud taking place, this woman will certainly participate in the labor market since unemployment benefits follow the workfare principle and are thus conditional on participation, i.e. working or searching for a job. As this considerably constraints her free choice between market and home production, the power of θ_i to affect LF_i^* is expected to be very low.

Also, the existence of children might interact with the effect of LOC on participation probabilities because the presence of children is likely to significantly increase the monetary and non-monetary utility from home production H_i and has thus been found to significantly reduce labor force participation of women (see. e.g. Angrist and Evans, 1998; Bronars and Grogger, 1994). If no children are present in the household, the utility from home production may be too low and home production might thus be a less attractive outside option from market production. LOC is therefore expected to affect the participation probabilities of women with (non-adult) children more strongly. On the other hand, the existence of (young) children could also lead to very high non-monetary incentives for home production, depending on a woman's parenting preferences, age of the children and the quality and costs of childcare options, and thus again reduce the power of LOC.

As a third heterogeneity consideration, the population-wide or sub-group specific amount of non-monetary utility from participation, captured by $\partial U_i / \partial P_i$, is likely to be important. If, for example, one group of women (1) is exposed to high social norms for working and another group (2) is exposed to low social norms of working ($\left(\frac{\partial U_i}{\partial P_i}\right)_1 > \left(\frac{\partial U_i}{\partial P_i}\right)_2$), even women in group (1) who individually gain lower marginal utility from participation (i.e. external women) still

[5] For the specific case of Germany, this assumption is reasonable as childcare costs are relatively low.

have a high probability of participating as the marginal utility from participation is already considerably high: $\left(\frac{\partial^2 U_i}{\partial P_i \partial \theta_i}\right)_1 < \left(\frac{\partial^2 U_i}{\partial P_i \partial \theta_i}\right)_2$. This is also in line with the idea that, for example, for men the social norms of "being the breadwinner" are expected to be very high in general and independent from their LOC (see e.g. Killingsworth and Heckman, 1986; Bertrand *et al.*, 2015; Knabe *et al.*, 2016; Charles *et al.*, 2018). The same might be true for groups of women who are subject to very high social norms of working. For them the harm from staying at home exceeds the gains from participation independent on their personal attributes θ_i.

4 Data and Empirical Identification

Based on these theoretical considerations, the goal of this paper is to empirically analyze the role of LOC in explaining women's current labor force participation. This is done by using data from the German Socio-Economic Panel (SOEP, 2017). The SOEP is an annual representative household panel that follows a general-purpose approach. It has been studying about 22,000 individuals living in 12,000 households in Germany since 1984. Personal questionnaires are completed by all individuals aged 18 or older. For more information on the SOEP see Goebel *et al.* (2018). The SOEP contains a measurement of LOC over multiple waves, rich information on current labor-market outcomes and family status, the opportunity to connect women to regional information, as well as their partners' characteristics if they are surveyed in the same household. The data is restricted to the 2000-2015 waves due to the measurement of LOC as well as the availability of the regional information.

Sample Restriction The sample restriction process is intended to create a relatively homogenous sample of women who could potentially be utilized in the workforce. Thus, I only keep women in the traditional working age, which is defined as 25 to 65 years[6] as well as only women who are not in school, academic or vocational education, not already in (early) retirement or in military service. Additionally, only women who live in single-adult or in couple households with or without children are kept. All women in multi-generation households or other unknown household combinations are dropped in order to enable a more straightforward argumentation about intra-household decision making. Finally, only women for whom it is possible to observe all the relevant socio-economic control variables are kept. This leaves 56,940 observations for 7,662 women over 15 years.

Table A.1 in the Appendix gives an overview of the descriptive statistics. In addition to the

[6] Sensitivity checks included a re-estimation of the results using a number of alternative age cutoffs such as 25-55. The results are found to be robust against these variations. Results are included in the supplementary material which is available from the author upon request.

Table 1: Descriptive Statistics - Labor Force Status

	All	Children under 16		Cohabiting	
		No	Yes	No	Yes
	(1)	(2)	(3)	(4)	(5)
Labor Force Status					
Employed	0.70	0.75	0.62	0.77	0.69
Unemployed	0.07	0.07	0.07	0.12	0.05
... and searching	0.05	0.05	0.05	0.09	0.04
Self-Employed	0.06	0.06	0.06	0.07	0.06
Not-Working	0.13	0.12	0.15	0.03	0.16
... and searching	0.00	0.00	0.01	0.00	0.01
Maternity Leave	0.04	0.00	0.10	0.01	0.04
Outcome: Labor Force Participation (LF_{it})	0.82	0.87	0.74	0.93	0.79
Observations	56,940	34,836	22,104	11,117	45,823
Individuals	7,662	5,890	3,589	2,266	6,499

Source: SOEP, waves 2000 - 2016, version 33, own calculations.
Note: Full descriptive statistics can be found in Table A.1 in the Appendix.

full sample of all women, the descriptive statistics are also reported for important subsamples of women, depending on (1) whether they have biological children under 16[7] and (2) whether they are cohabiting, i.e. have a partner living with them in the same household.

4.1 Labor Force Participation

Labor force participation (LF) is measured as a binary indicator that indicates a woman's availability to the labor market. The focus of this paper is to analyze the behavioral aspects of labor supply. Thus, LF does not describe a woman's true labor force status, but her willingness to participate in market production. Concentrating on the availability to the job market rather than on the actual employment status allows the demand side to be theoretically and empirically neglected and the risk of selection effects via differences in employment probabilities to be reduced.

In line with the ILO definition of labor force participation, a woman is counted as being in the labor force if she is either employed or self-employed or if she is registered unemployed or non-working (not registered unemployed) but intends to work and is searching for a job (see International Labour Organization, 2018). Registered unemployed and non-working women are recoded on the basis of the information available on intention to work, active search and ability to start working from the personal questionnaire.[8]

[7] The information on the children is generated on the basis of the individual birth history of the women available from the SOEP and thus counts all children under the age of 16, independent of whether they live in the same household.

[8] Registered unemployed women who indicate that they were not actively searching for work in the last 4 weeks are coded to "not participating" while women who were originally coded as "not working" but indicate that they actively searched for a job, have the unconstrained intention to work and are ready to immediately start working are coded to "participating".

Table 2: Components of Locus of Control (not imputed)

No	Item	*mean*	*SD*
Q:	The following statements apply to different attitudes towards life and the future. To what degree do you personally agree with the following statements? *Scale: 1 (Disagree completely) - 7 (Agree completely)*		
I1:	How my life goes depends on me	5.46	(1.39)
I2:	Compared to other people, I have not achieved what I deserve (-)	3.15	(1.76)
I3:	What a person achieves in life is above all a question of fate or luck (-)	3.53	(1.63)
I4:	If a person is socially [...] active, she can have an effect on social conditions	3.71	(1.58)
I5:	I have the experience that others have a controlling influence over my life (-)	3.11	(1.66)
I6:	One has to work hard in order to succeed	5.91	(1.14)
I7:	If I run up against difficulties in life, I often doubt my own abilities (-)	3.49	(1.66)
I8:	The opportunities that I have in life are determined by the social conditions (-)	4.54	(1.43)
I9:	Inborn abilities are more important than any efforts one can make	4.78	(1.31)
I10:	I have little control over the things that happen in my life (-)	2.63	(1.47)
	Observations	14,214[a]	

Source: SOEP, waves 1999, 2005, 2010 and 2015, version 33, doi:10.5684/soep.v33.
Notes: Items marked with a (-) are reversed prior to factor analysis.
[a] In this table, the item means and SD are computed for the observation waves 1999,2005, 2010 and 2015 only. Imputed values are not included.

Table 1 gives an overview of the current labor force status of women in our sample. In the full sample of all women (column 1), 70% are employed, 6% are self-employed, 7% are unemployed and in total 17% indicate that they are not working or on maternity leave. If, in addition to these raw shares, the information on active job search, intention to work and availability to start working are also considered, a labor force participation rate of 82% results, as only 5% are unemployed and indicate that they are actively searching plus another 0.5% of individuals are coded as not working but indicate that they are searching for a job. When compared to official statistics on labor force participation in Germany, available from the International Labour Organization (2018), this share seems reasonable. While the total estimated labor force participation of women from the EU Labour Force Survey, which was 56% in 2018, refers to all women in the age of 15 or above, the participation share of women between 25 and 64 is with 83% very similar to the shares in the SOEP-sample.

Due to a lower share of employed women and a higher share of women who indicate that they are not working in the subsample of cohabiting women (column 5) as compared to the subsample of non-cohabiting women (column 4), the labor force participation is distinctively lower for the former (79% compared to 93%). The same holds true for women with children under the age of 16 (column 3 compared to column 2).

4.2 Locus of Control

LOC is surveyed within the SOEP in the years 1999, 2005, 2010 and 2015. Based on a scale developed by Nolte *et al.* (1997), respondents were asked how closely a series of 10 statements characterizes their views about the extent to which they influence what happens in life. A four-

point Likert scale ranging from 1 ('applies fully') to 4 ('does not apply') was used in 1999, while in 2005, 2010 and 2015, responses were measured on a seven-point Likert scale ranging from 1 ('disagree completely') to 7 ('agree completely'). A list of the items can be found in Table 2.

In order to harmonize the scales, the responses from 1999 are reversed and "stretched".[9] Afterwards, an exploratory factor analysis is conducted separately by year in order to investigate the way these items load onto latent factors. Items 1 and 6 clearly load onto the first factor – which is interpreted as internal LOC –, while items 2, 3, 5, 7, 8 and 10 clearly load onto the second factor – interpreted as external LOC. Items 4 and 9 are not included in the following due to ambiguous loading[10]. Additionally, similar to the reasoning in Specht *et al.* (2013), excluding these two items improves the internal consistency and scale reliability of the resulting factor as Cronbach's alpha (Cronbach, 1951) increases from 0.62 to 0.67.

In line with the previous literature (see e.g. Piatek and Pinger, 2016), a two-step procedure is used in order to create a continuous and unidimensional LOC factor. First, the scores for items 2, 3, 5, 7, 8 and 10 are reversed such that all eight items are increasing in internality. Second, confirmatory factor analysis is used to extract a single factor for each year. This has the advantage that it avoids simply weighting each item equally, as averaging would do, and instead allows the data to determine how each item is weighted in the overall index. Simple averaging of all items would risk measurement error and attenuation bias (Piatek and Pinger, 2016).[11] The resulting factor is increasing in internal LOC and its distribution is shown in Figure A.1. On the basis of the generated and imputed continuous LOC factor variable, a categorical variable is created that splits the continuous LOC in three terciles, in order to identify non-linear relationships. These cutoffs are also illustrated in Figure A.1.

There is evidence that LOC is relatively stable for the working-age population (see e.g. Preuss and Hennecke, 2018; Cobb-Clark and Schurer, 2013). Nevertheless, in order to minimize concerns about potential reverse causality, it is ensured that the LOC factor is always included as a pre-market rather than a contemporaneous or post-market measure, i.e. always obtained prior to t. Hence, LOC is imputed forwards lagged by at least one year.[12]

[9] In line with Specht *et al.* (2013), this process preserves the relative differences between individuals. The process results in values of 1, 3, 5 or 7 such that a '1' on the 1999 four-point scale, for example, becomes a '7' on the 2005-2015 seven-point scales.

[10] Item 4 does not clearly load onto either of the two factors and is discarded. Item 9 loads onto the internal factor but an intuitive attribution based on the item's wording would point more in the direction of an external item.

[11] Sensitivity checks included a re-estimation of the results using this simple index. The results are found to be robust against this variation. Results are included in the supplementary material which is available from the author upon request.

[12] Based on the findings in Preuss and Hennecke (2018), this procedure does not prevent a bias due to a temporary measurement error in LOC during periods of unemployment. In line with what they propose, an additional sensitivity check has been conducted in which the LOC, which has been observed during the closest employment spell of these women, is used. The results are found to be robust against these variations. Results are included in the supplementary material which is available from the author upon request.

4.3 Estimation Strategy

For the main empirical analysis, I employ a reduced-form approach to estimate the association between a woman's propensity to be available to the labor force and her last LOC:

$$P(LF_{it} = 1) = P(\beta_1 + \beta_2 loc_{it-n} + \beta_3 X_{it} + \beta_4 P_i + \beta_5 R_{it} + \beta_6 T + \epsilon_{it} > 0), \tag{4}$$

where LF_{it} is the indicator for labor force participation of woman i at time t and loc_{it-n} is the locus of control of woman i in the last LOC interview prior to t, i.e. n interviews prior to t with $n = \{1, \ldots, 6\}$. In order to identify potential non-linearities in the relationship, the analysis is repeated with a categorical variable that indicates in which tercile of the LOC distribution a woman is classified. The vector X_{it} contains an extensive list of demographic information (age, religion, region of residence, school and vocational degree, subjective health) and family characteristics (partner status, number of children, indicators for children in certain age ranges and family income). Additionally, averaged and standardized personality and preference measures P_i (Big Five personality traits and risk aversion) are included as controls.

The vector R_{it} contains a list of regional information corresponding to the local planning region in which the woman lives at time t (indicator for East-Germany, unemployment rate, the gross value added, the population density, the median full-time income of women, share of children in public childcare for the age groups 1-3 years and 3-6 year, share of full-time (> 7 hours per day) childcare in the respective age-groups, approximate median costs for full-time childcare per child).[13] See Table A.1 for the full list of controls. Finally, the vector T contains year fixed effects.[14]

Equation 4 is estimated using a binary logit model. Standard errors are clustered on the personal level which considers the panel structure of the data and takes care of serial correlation of the error term ϵ_{it} across time for a given individual i. The results presented in Section 5 are the average marginal effects.[15]

As already discussed in the theoretical considerations, the estimated direct relationship is very likely to be non-linear with respect to monetary and non-monetary incentives as important decision constraints. Consequently, heterogeneity with respect to the family status (i.e. existence

[13] Due to restrictions in the availability of the geocodes, regional information are added to the model as dichotomous indicators, indicating a 'low', 'medium' or 'high' value of the indicator in the respective region. All results have been checked for sensitivity with respect to this simplification. The main estimation results are not affected by it.

[14] More detailed information on generated control variables are included in the supplementary material which is available from the author upon request.

[15] In order to assess the sensitivity of the results with respect to the choice of method, the main results were replicated using a linear probability model with clustered standard errors as well as a random effects logit model. The estimated results only marginally differ and are included in the supplementary material which is available from the author upon request.

Table 3: Descriptive Statistics by LOC - Labor Force Status

	Low LOC $[LOC_{min}, LOC_{P33}]$	**Medium LOC** $(LOC_{P33}, LOC_{P66}]$	**High LOC** $(LOC_{P66}, LOC_{max}]$
Labor Force Status			
Employed	0.67	0.72	0.72
Unemployed	0.10	0.06	0.04
... and searching	0.07	0.04	0.03
Self-Employed	0.04	0.06	0.08
Not-Working	0.16	0.12	0.11
... and searching	0.01	0.00	0.00
Maternity Leave	0.03	0.04	0.04
Outcome: Labor Force Participation (LF_{it})	0.78	0.83	0.84
Observations	18,800	18,786	19,354

Source: SOEP, waves 2000 - 2016, version 33, doi:10.5684/soep.v33, own calculations.

of a partner and children in the household) as well as with respect to underlying differences in social norms of working (i.e. region of living and cohort indicators) is considered in a second step. Since not only β_2, i.e. the marginal effect of loc, is regarded to be non-linear, the heterogeneity is examined using fully separated models for the different subgroups SG_{it}:

$$P(LF_{it} = 1|SG_{it}) = P(\beta_1 + \beta_2 loc_{it-1} + \beta_3 X_{it} + \beta_4 P_i + \beta_5 R_i + \beta_6 T + \epsilon_{it}|SG_{it}). \quad (5)$$

In order to prevent problems with selection into these sub-groups depending on LOC, it is generated, standardized and cut into terciles for each sub-group separately such that women are always only compared to women in the same sub-group.

5 Results

5.1 Descriptive Evidence

Table 3 gives descriptive evidence for the relationship between LOC and labor force status and participation of the women in the sample. The shares of all labor force statuses, as well as the dependent variable LF_{it}, are given separately for all three terciles of LOC. It can be seen that due to a higher share of employed and self-employed women and a lower share of non-working women for the highest tercile, the overall share of LF is higher for women with a high LOC than for those with a low LOC. Nevertheless, this descriptive relationship is very likely to be driven by a long list of socio-demographic characteristics that are associated with a higher participation probability and a higher LOC, such as education, age and family status (e.g. number and age of children).

Table 4: Main Results - Average Marginal Effects (Sample: All)

	Outcome Variable: Labor Force Participation							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LOC Factor (cont.)	0.026***		0.010***		0.017***		0.011***	
	(0.003)		(0.003)		(0.003)		(0.003)	
Locus of Control Terciles (Ref.: $[LOC_{min}, LOC_{P33}]$)								
$(LOC_{P33}, LOC_{P66}]$		0.041***		0.015**		0.025***		0.020***
		(0.008)		(0.007)		(0.006)		(0.006)
$(LOC_{P66}, LOC_{max}]$		0.056***		0.017**		0.033***		0.020***
		(0.008)		(0.008)		(0.007)		(0.007)
Observations	56,940	56,940	56,940	56,940	56,940	56,940	56,940	56,940
Year Fixed-Effects	✓	✓	✓	✓	✓	✓	✓	✓
Regional Controls	✓	✓	✓	✓	✓	✓	✓	✓
Socio-Demographic Controls			✓	✓	✓	✓	✓	✓
Family Controls					✓	✓	✓	✓
Personality Controls							✓	✓

Source: SOEP, waves 2000 - 2016, version 33, doi:10.5684/soep.v33, own calculations.
Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Full estimation results for the specification in column (8) can be found in Table A.2 in the Appendix.

5.2 Main Results

Table 4 presents an overview of the estimated average marginal effects of the continuous LOC variable and the LOC categories medium ($(LOC_{P33}, LOC_{P66}]$) and high ($(LOC_{P66}, LOC_{max}]$) on LF, with a low LOC ($[LOC_{min}, LOC_{P33}]$) being the reference category. All the estimations are for the full estimation samples of all women, while gradually including more and more sets of control variables.[16]

In line with the descriptive evidence in the previous subsection, the results of the raw difference, only controlled for year fixed effects, indicate that, on average, women with a high or medium LOC are ceteris paribus more likely to participate in the labor force (see column 2). Furthermore, the continuous LOC factor is significantly positive, indicating an increasing probability of participation with increasing values of LOC (column 1). Including additional control variables indicates that the raw gap was biased downwards by omitted-variable bias especially through family characteristics. The effect size increases considerably between columns 3 (4) and 5 (6), when partner status, number of children, age of children and family income are included. Also in the full specification (columns 7 and 8), the average marginal effect is still statistically and economically significant. Having a medium or a high LOC equally increases the probability of being in the labor force by, on average, 2.0 percentage points compared to having a low LOC. When comparing these effects to the mean non-participation rate in the full sample of 18 percent (see Table 1), this amounts to an 11.1 percent decrease in the probability of staying at

[16] Table A.2 in the Appendix provides an overview of the estimated marginal effects for all the control variables analogous to the estimation in columns 8.

home. Increasing the LOC by approximately one standard deviation, increases the probability of participation by 1.1 percentage points (column 7).

When comparing the marginal effects of a medium and a high LOC, a non-linearity in the effect of LOC on the participation probability becomes apparent. While a medium LOC is associated with an increased probability of participation, this effect flattens out. Women with a very high LOC are not significantly more likely to participate than women with a medium LOC. In line with the one-dimensionality of the LOC scale, the findings indicate that the effect is mainly driven by a negative impact of being strongly external, rather than a positive impact of being strongly internal.

5.3 Channel Identification - Objective Budget Constraints

As has been discussed in the theoretical considerations, differences in participation probabilities between internal and external women might be driven by omitted differences in the objective budget constraints. Thus, controlling for them is necessary to identify the direct behavioral effect of LOC on participation decisions instead of the indirect effects through differences in opportunities and constraints such as occupational selection, wage differences and assortative mating. The results from this additional estimation can be found in Table A.3 in the Appendix. Due to a high likelihood of path and state dependencies in employment biographies, controlling for these potentially endogenous variables is, however, less straightforward than expected. Simply including the information on the current or last job would leave us with a large multicollinearity problem caused by the characteristics themselves, but also by their availability in general. The information on employment characteristics (occupation and wage) has to be imputed from the last employment or self-employment spell if a woman is not (self-)employed at the moment. Nevertheless, it is not possible to observe any information on employment for a lot of women if they were either never employed or at least never employed during their time in the SOEP. This is, by definition, more often the case in the group of women who do not participate in the labor force at the moment. Driven by this proposed role of state dependence, the indicator for non-availability of the information would thus be a "bad control", in line with the arguments by Angrist and Pischke (2008), as it is highly multi-collinear with the labor force participation indicator. Not only are external women more likely to be observed outside the labor force at the moment, but they are also more likely never to be observed in the labor force, and the indicator could just as well be a dependent variable in the estimation model. To disentangle the endogeneity problem from the true effects of controlling for occupational characteristics and wages, column (1) of Table A.3 starts by reducing the observation sample to the women who are observed in occupation during their time in the SOEP at least once. In line with expectations,

the estimated effects for the LOC drop if the sample is reduced, indicating an endogeneity problem due to state dependencies in the observability of information. Hence, the estimated effects from this reduced sample are taken as the new baseline in the following, in order to eradicate parts of the bad control problem. In columns 2 and 3 of Table A.3 potentially omitted information on the industry and occupation type of women in their current or last job, as well as net labor income of the last observed working spell, are added as controls to the model. The estimated effects for LOC do not change substantially. Although the effect size does go down when wage is controlled for, the effects remain significantly positive. Hence, an effect of LOC on participation probabilities via occupational selection and differences in the expected future costs of non-participation, as well as demand-side response to LOC via higher expected wages can be largely rejected.

As a second set of variables that might explain parts of the estimated relationship, information on a woman's partner has to be controlled for. Fortunately, the SOEP makes it possible to merge cohabiting women with their partners. Thus, columns 4 to 6 of Table A.3 present the results of the sensitivity check in which the partner's current net labor income as well as the continuous LOC factor of the partner are included as additional control variables for cohabiting women. The results do not change if partner's net income and LOC are included as control variables, indicating that the results of the main estimation are not severely biased by assortative mating.

6 Additional Empirical Evidence

6.1 Heterogeneity Analysis

Family Status and Children Using these main results for the full sample, Table 5 presents the results for the sub-samples based on family status and existence of biological children under the age of 16.[17] Fully separated estimations are reported. These subgroup analyses correspond to the supposed heterogeneity of the effect of LOC on participation probabilities with respect to underlying monetary and non-monetary incentives and disincentives to work, driven by the existence of partners and children in the household.

Looking at the estimated average marginal effects for the separate groups, we can see that the effect is, in large part, driven by cohabiting women and women with children under 16 in general. Cohabiting women with a medium and high LOC are, on average, ceteris paribus 2.2 - 2.8 percentage points more likely to be in the labor force than cohabiting women with a low

[17] Tables including the full estimation results are included in the supplementary material which is available from the author upon request.

Table 5: Heterogeneity Analysis (Marginal Effects): Family Status and Children

	All		**Non-Cohabiting**		**Cohabiting**	
	Children under 16		Children under 16		Children under 16	
	No	Yes	No	Yes	No	Yes
	(1)	(2)	(3)	(4)	(5)	(6)
Locus of Control Terciles (Ref.: $[LOC_{min}, LOC_{P33}]$)						
$(LOC_{P33}, LOC_{P66}]$	0.021***	0.025**	-0.007	0.038**	0.028***	0.022*
	(0.007)	(0.011)	(0.008)	(0.017)	(0.009)	(0.012)
$(LOC_{P66}, LOC_{max}]$	0.017**	0.028**	-0.004	0.017	0.023**	0.028**
	(0.008)	(0.011)	(0.008)	(0.020)	(0.011)	(0.012)
Observations	34,836	22,104	8,295	2,822	26,541	19,282
LF = 0	4,661	5,804	375	438	4,286	5,366
LF = 1	30,175	16,300	7,920	2,384	22,255	13,916
	(86.62%)	(73.74%)	(95.48%)	(84.48%)	(83.85%)	(72.17%)
All Controls	✓	✓	✓	✓	✓	✓

Source: SOEP, waves 2000 - 2016, version 33, doi:10.5684/soep.v33, own calculations.
Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

LOC, depending on whether they have children under 16 in the household (column 5 and 6). The effects differ only marginally between cohabiting women with and without children. For non-cohabiting women, the effect is insignificant and close to zero if no children are present in the household. However, in the subgroup of non-cohabiting women with children under 16, i.e. single mothers, the effect of a medium LOC is positive and significant and even higher than the effect for cohabiting women with children (column 4). Single mothers with a medium LOC are, on average, ceteris paribus 3.8 percentage points more likely to be in the labor force than single mothers with a low LOC. Nevertheless, a high LOC does not significantly increases the probability of being in the labor force for single mothers likely due to the small sample size. Table A.4 in the Appendix also provides analog estimation results for mothers depending on the age of their children. Women with pre-school children exhibit the largest effects (column 3 of Table A.4). Having a high LOC, on average, decreases a woman's non-participation probability by 3.3 percentage points if she has pre-school children. For mothers of babies especially the effect of a high LOC is close to zero. As opposed to this, the effect for women with "adult" children is still significant and positive.

All these results support the theoretical idea that the effect of LOC on participation probabilities strongly interacts with underlying incentives and disincentives to work. If the monetary incentives for market production, such as in the case of single women without children,[18] already

[18] Consideration about monetary constraints do not fully apply for single mothers with young children. In German law, employment is, amongst others, not "reasonable" if this employment would, for example, endanger the upbringing of children. As is regulated in §10 SGB II, this applies to children under the age of 3. Hence, these single mothers do have the opportunity to chose home production and receive social transfers as an equivalent to partners income.

Table 6: Heterogeneity Analysis: Social Working Norms (Sample: All)

	Region		**Cohort**[1]		
	West	East	Early *<'58*	Middle *'58-'66*	Late *>'66*
	(1)	(2)	(3)	(4)	(5)
Locus of Control Terciles (Ref.: $[LOC_{min}, LOC_{P33}]$)					
$(LOC_{P33}, LOC_{P66}]$	0.022***	0.011	0.038***	0.010	0.011
	(0.008)	(0.008)	(0.013)	(0.011)	(0.009)
$(LOC_{P66}, LOC_{max}]$	0.023***	0.011	0.026*	0.018	0.018**
	(0.009)	(0.009)	(0.015)	(0.012)	(0.009)
Observations	41,448	15,485	18,435	17,649	20,851
LF = 0	8,812	1,653	3,936	2,313	4,216
LF = 1	32,636 (79%)	13,839 (89%)	14,504 (79 %)	15,336 (87%)	16,635 (80%)
All Controls	✓	✓	✓	✓	✓

Source: SOEP, waves 2000 - 2016, version 33, doi:10.5684/soep.v33, own calculations.
Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
[1] Cohort Cutoffs: Early - born before 1958, Middle - born 1958-1966, Late - born after 1966.

considerably exceed the decision threshold, personality and preferences have no power to affect the participation decision. The same holds true for very high monetary disincentives to work, e.g. in the sample of women with children under the age of one, i.e. women who are largely eligible for generous parental leave payments. Thus, very high monetary incentives and disincentives to work act in the same direction: they reduce the power of LOC.

The theoretical idea that an internal LOC might be associated with a lower participation probability for mothers due to considerations about their own influence on children's outcomes cannot be found in the results for participation probabilities in general. The effect of LOC on participation probabilities is robustly positive over all the subgroups considered. Merely the non-linearity in the effects for single mothers might be driven by this alternative mechanism.

Social Norms of Working In additional to budget constraints, a woman's decision making might also be constraint by prevailing social norms of working. If social norms of working are rather high (such as for men), decision making based on inherent preferences is considerably constrained. Table 6 presents the results of this heterogeneity analysis.

Firstly, heterogeneity can be expected with respect to differences between the eastern and western parts of Germany. Due to the long-term socialist political influence in the former GDR, the east of Germany has a longer tradition of women's participation in the labor force.[19] The observation numbers (columns 1 and 2 in bottom panel of Table 6) support this assumption. The participation probability is with 79% distinctly lower in the west of Germany than in the

[19] The socialist system was characterized by a strong emphasis on the dual-earner/state-carer system of family labor supply, i.e. an extremely high levels of female labor force participation in combination with an extensive system-level organization of family-support structures and child care (see e.g. Braun *et al.*, 1994; Rosenfeld *et al.*, 2004).

east of Germany (89%). As the direct marginal utility from participation $\partial U_i \backslash \partial P_i$ is expected to be higher for eastern German women, the absolute effect of LOC on participation probabilities is likely to be lower. The upper panel of columns 1 and 2 of Table 6 presents the marginal effects based on the subgroups of women living in the east and west of Germany. In line with the theoretical argument, the results reveal that the significant positive marginal effect of a medium and a high LOC is only observable for women in the west of Germany.

Based on the continuous decrease in the importance of traditional gender roles over time in almost all modern Western societies (see e.g. Goldin, 2006), women in later cohorts are assumed to be more affected by a generalized social pressure to be economically independent from external forces than women of earlier cohorts (Heim, 2007). For the former, $\partial U_i \backslash \partial P_i$ can be assumed to be higher than for the latter. They might therefore have a higher participation probability independent from LOC as their utility from participation is higher. Thus, columns 3 to 5 of Table 6 present the results of the estimations. The cutoffs for the manifestations of the birth cohort indicator "early", "middle" and "late" were generated based on the terciles of year of birth in the full estimation sample, i.e. $P(33) = 1958$ and $P(66) = 1966$, in order to obtain groups of approximately similar size. The results indicate a strong heterogeneity of the effect with respect to cohort. The distinct marginal effects of a medium and high LOC on participation probabilities can only be observed for women from the early cohorts, i.e. born before 1958 (column 3). The effect is distinctly lower for both the women in the medium as well as in the latest cohorts (columns 4 and 5) and statistically insignificant except for the case of a high LOC in the latest cohorts.

6.2 Labor Force Activity, Working Hours and Lifetime Participation

The behavioral implications of LOC on labor force availability have been the center of attention in the theoretical considerations as well as the main part of the empirical analysis. Nevertheless, it is interesting to investigate whether those static behavioral effects actually translate into higher employment probabilities and higher average lifetime participation, as these are the variable with the desired positive macro- and microeconomic consequences in the long run. If a higher probability of being available to the market for internal women does not translate into higher employment probabilities, the positive economic implications of LOC are limited by other unobserved factors such as, for example market conditions and frictions.

In order to assess the generalizability of the results with respect to the choices made about the participation indicator as described in Section 4.1, three major components of the dependent variable are investigated: 1) the concentration on labor force availability instead of labor force activity, 2) the restriction to the extensive margin as well as 3) the focus on an one-period

Table 7: Additional Results (Marginal Effects): Outcome Variable - Labor Force Activity

				Sample: All Employed					
	Employment			No Marginal			Full-Time		
	All	Kids <16	Cohab.	All	Kids <16	Cohab.	All	Kids <16	Cohab.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Locus of Control Terciles (Ref.: $[LOC_{min}, LOC_{P33}]$)									
$(LOC_{P33}, LOC_{P66}]$	0.038***	0.041***	0.038***	0.003	-0.001	0.005	-0.016	-0.014	-0.009
	(0.008)	(0.012)	(0.009)	(0.003)	(0.008)	(0.004)	(0.010)	(0.016)	(0.011)
$(LOC_{P66}, LOC_{max}]$	0.039***	0.040***	0.036***	0.003	0.002	0.005	-0.000	0.003	-0.002
	(0.008)	(0.013)	(0.010)	(0.004)	(0.007)	(0.004)	(0.011)	(0.017)	(0.012)
Observations[1]	53,560	20,826	43,166	39,959	13,808	31,397	39,959	13,808	31,397
LF = 0	13,601	7,018	11,769	1,415	812	1,241	14,194	7,265	12,327
LF = 1	39,959	13,808	31,397	38,544	12,996	30,156	25,765	6,543	19,070
	(75%)	(66%)	(73%)	(96%)	(94%)	(96%)	(64%)	(47%)	(61%)
All Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓

Source: SOEP, waves 2000 - 2016, version 33, doi:10.5684/soep.v33, own calculations.
Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
[1] Self-employed are dropped from the sample as working hours cannot be determined for them.

discrete choice rather than a intertemporal lifetime perspective on labor force participation.

Labor Force Activity and Working Hours Table 7 starts by giving the results of the investigations with respect to the first two points. As a first step, the dependent variable is adjusted such that it only captures labor force activity instead of availability. Thus, the indicator is one if a woman is actually employed and zero if she is unemployed or not-working, independent of her intention to work.[20] This alternative definition was neglected in the main part of the empirical analysis as it captures unobserved returns to LOC with respect to employment probabilities and therefore does not concentrate on the behavioral aspects of labor force participation.

Columns 1 to 3 of Table 7 give the results of this new indicator while still concentrating on the extensive margin. The results indicate that the behavioral changes are fully translated into higher employment probabilities. The effects are considerably stronger than in the main estimations. This is likely due to unobserved returns to LOC in employment probabilities. Having a high LOC thus on average increases the probability of being employed by 3.9 percentage points for the full sample (column 1). This is also true for the sub-samples of mothers (column 2) and cohabiting women (column 3).

In addition to this, columns 4 to 9 give the estimated marginal effects of LOC on participation indicators at the intensive margin. For the sub-sample of all women who are employed ($LF = 1$ in columns 1 to 3), the outcome variable in columns 4 to 6 indicates whether the woman is employed

[20] In this specification, self-employed women are set to missing as it is not possible to identify working hours for these women in the further steps. Nevertheless, the results for the indicator at the extensive margin do not strongly differ if self-employed women are included. Results are available upon request.

Table 8: Additional Results (Marginal Effects): Outcome Variable - Aggregated Participation (Sample: 55+)

	Sample: Cross-Section - Women 55+					
	Years in Labor Force 25-55y			Years Employed 25-55y		
	All	Kids[2]	Cohab.	All	Kids[2]	Cohab.
	(1)	(2)	(3)	(4)	(5)	(6)
Locus of Control Terciles (Ref.: $[LOC_{min}, LOC_{P33}]$)[1]						
$(LOC_{P33}, LOC_{P66}]$	0.241	0.279	0.329	0.840**	0.862**	0.708*
	(0.352)	(0.376)	(0.403)	(0.360)	(0.384)	(0.407)
$(LOC_{P66}, LOC_{max}]$	0.854**	0.683*	0.750*	1.549***	1.373***	1.185***
	(0.372)	(0.396)	(0.423)	(0.381)	(0.404)	(0.428)
Observations	3,232	2,887	2,624	3,232	2,887	2,624
All Controls	✓	✓	✓	✓	✓	✓

Source: SOEP, waves 2000 - 2016, version 33, doi:10.5684/soep.v33, own calculations.
Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
[1] Locus of Control is calculated based on the average over all available LOC observations.
[2] The sub-group consists of all women with any biological children at time t independent from their age.

at least part-time and consequently not marginally employed, defined as 15 contracted working hours per week or more. Additionally, the outcome variable in columns 7 to 9 indicates whether a woman is full-time employed, defined by at least 35 contracted working hours per week. While LOC positively affects labor force availability as well as participation at the extensive margin, no effects can be identified at the intensive margin. This is largely in line with the theoretical idea of LOC mainly affecting the non-monetary gains from participation independent of the working hours.

Lifetime Participation Additionally, the lifetime perspective should be considered in order to understand whether this static relationship actually translates into differences for the whole working life due to the potentially important role of path and state dependencies in women's employment biographies. Thus, in the additional results presented in Table 8, the accumulated years in the labor force as well as in employment between the age of 25 and 55 are the outcome variables of interest. Using the detailed biographical information available for every SOEP participant, the aggregated time in the labor force is calculated by adding the years a woman spent in employment or registered unemployment during those 30 years.[21] As no biographical information is available on the job-search behavior, I have to rely on the reported labor force status in order to identify LF. As job-search is likely to be an important determinant of true willingness to participate, it has to be taken into account that this is, therefore, only a rough measure of participation. The cross-sectional estimation sample consists of the first available observation

[21] A women is assumed to spend a full year in a certain labor force status if she only reports one spell during a certain year. If she reports multiple spells during one year, she is assumed to have spend an equal share of the year in either spell and consequently the value (1\number of spells) is added to the counter.

in the age of 55 or later, per woman. Only women who have valid information on their labor force status during at least 25 of those 30 years are considered. The explanatory variable is a measure for the average LOC over all available observations. The effects are estimated using a linear regression model.

The results presented in Table 8 indicate a significant positive effect of LOC on lifetime labor force availability and activity during these 30 years. Women with a high average LOC spend on average approximately 0.85 years more in the labor force (column 1) and 1.55 more years in employment (column 4) during this time.[22] The effect is relatively homogeneous with respect to the marital status as well as indicator for children (of any age) at time t.

7 Conclusion

How do women make decisions about their labor force participation at a given point in time and what factors determine heterogeneity in participation probabilities between and within genders? This is a question economists have already been interested in for many years of fruitful theoretical and empirical research. Nevertheless, we are still far from solving the puzzles within this long-lasting "hot topic" in labor economics. A lot of open questions have been answered on the gender gap in labor market participation. Especially wage gaps and differences in social norms for working and gender roles determine the differences between men and women. However, the prevalent within-gender heterogeneity still keeps economists and politicians busy. When getting to a point at which standard economic theories are unable to fully explain individual decision making with observed opportunities and constraints, traditional approaches often contribute remaining heterogeneity to stochastic idiosyncratic shocks (see e.g. McFadden, 1974; Borghans *et al.*, 2008). Nevertheless, with the advancement of modern behavioral economics and applied microeconomics in combination with an increased availability of comprehensive survey-data, economists are more and more interested in understanding the psychological black box behind unexplained individual differences.

In line with this, especially in the last couple of years, empirical economic research has been increasingly informed by ideas from psychology. A huge body of empirical literature provides evidence for the importance of especially personality traits for individual decision making in various domains of the individual life-cycle. This paper contributes to this line of research in the context of female labor force participation by theoretically and empirically discussing the role of the personality trait locus of control for differences in participation probabilities between women.

[22] The lower estimates for labor force participation are likely to be driven by the rough measure of participation here as no information on job search is available and also all other alternative labor force statuses such as retirement and education influence the overall number of years. As internal women are observed to spend less years in registered unemployment, this drives the estimated results downwards.

Due to the rich facets of the construct LOC, it can be assumed to influence multiple components of a woman's maximization problem when choosing the optimal labor force status. Existing literature predicts that LOC plays a crucial role in independence preferences and expected returns to investment decisions. Therefore, a positive relationship between LOC and the marginal utility from both participation and home production, through subjective monetary and non-monetary gains, is expected.

Based on the theoretical considerations, a reduced form estimation of the relationship between LOC and a woman's probability of being available to the labor market is conducted. I find that internal women, i.e. women who believe in the importance of their own efforts for life outcomes are, on average, more likely to be available to the labor force. LOC thus adds explanatory power to the participation decision above and beyond traditional socio-economic factors as well as other preference measures. Hence, the paper significantly adds to the existing economic literature on female labor force participation as well as the important economic consequences of LOC by suggesting and empirically identifying distinct behavioral implications of LOC in the participation decision. Hence, the paper primarily contributes to the investigation of the psychological black box behind female labor force participation and, additionally, broadens the knowledge on the economic importance of LOC. On the other hand, a heterogeneity analysis identified an interesting sensitivity of the effect with respect to given monetary constraints as well as prevalent social working norms. This suggests that inherent traits, preferences and tastes are only able to inform participation decisions if the underlying budget constraints are fulfilled and if the decision-making is not constrained by exogenously imposed social norms. It seems natural to argue that this is not a phenomenon which is specific to LOC, but very likely also translates to other measures of psychological traits and economic preferences.

The identified role of locus of control for a woman's decision-making process as well as the prevalent importance of exogenous constraints in the relationship has crucial implications for the widespread political discourse about low labor force participation rates of women. When discussing and evaluating political measures targeted at increasing participation rates, such as active labor market policies, quotas or childcare availability, and costs, it is therefore extremely important to understand the boundaries of monetary incentives set by latent psychological characteristics. Considerations about the effectiveness of active labor market policies need to be aware of the large component in individual decision making which cannot be influenced by monetary incentives, as it is based on inherent personal attributes and preferences for either participation or home production. As opposed to this, the results from the heterogeneity analysis also illustrate that preference-based decision making is massively bounded by exogenous monetary

and non-monetary constraints. Reducing them would presumably raise individual welfare as an individual's freedom of choice is increased. Although LOC arguably is a trait which is of specific interest for participation considerations, due to its focus on effort and independent action, those findings are highly relevant above and beyond this special case and the considerations are likely to be universally valid for other traits and preferences.

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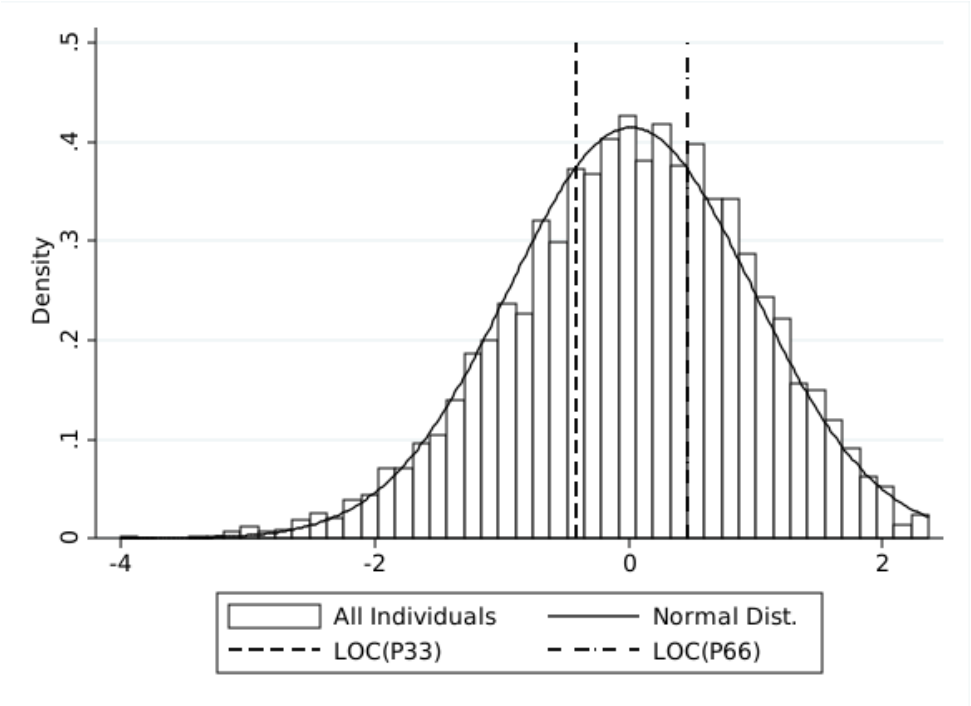
A Appendix

Figure A.1: Distribution of Locus of Control



Source: SOEP, waves 1999, 2005, 2010 and 2015, version 33, doi:10.5684/soep.v33, own illustration.

Table A.1: Descriptive Statistics

	All	Children under 16		Cohabiting	
		No	Yes	No	Yes
	(1)	(2)	(3)	(4)	(5)
Family Characteristics					
Family Status					
Single	0.13	0.16	0.08	0.68	
Partner not in HH	0.06	0.07	0.04	0.32	
Partner in HH	0.10	0.11	0.09		0.13
Married	0.70	0.65	0.78		0.87
Number of Children	1.62	1.35	2.03	1.19	1.72
Has Child under 1	0.03		0.07	0.01	0.03
Has Child 1 - 3 Years	0.06		0.15	0.02	0.07
Has Child 3 - 7 Years	0.13		0.33	0.07	0.14
Has Child between 7 and 16 years	0.28		0.72	0.20	0.30
Family Income					
Low	0.33	0.40	0.22	0.86	0.20
Medium	0.34	0.31	0.38	0.09	0.40
High	0.33	0.29	0.41	0.05	0.40
Socio-Demographic Controls					
Age Categories					
25 - 34 Years	0.21	0.14	0.31	0.28	0.19
35 - 44 Years	0.30	0.16	0.52	0.27	0.31
45 - 54 Years	0.31	0.40	0.16	0.28	0.31
55 - 65 Years	0.18	0.30	0.00	0.17	0.19
Religious Affiliation					
Non	0.32	0.35	0.27	0.37	0.31
Christian	0.64	0.62	0.67	0.60	0.65
Muslim	0.02	0.01	0.03	0.01	0.02
Other	0.02	0.01	0.03	0.01	0.02
Highest School Degree					
No School Degree	0.02	0.02	0.02	0.01	0.02
Lower Secondary School	0.24	0.26	0.21	0.24	0.24
Middle School	0.40	0.39	0.42	0.37	0.41
Highschool	0.27	0.27	0.28	0.33	0.26
Other School	0.06	0.06	0.07	0.05	0.07
Highest Vocational Degree					
No Vocational Diploma	0.15	0.15	0.16	0.16	0.15
Apprenticeship	0.43	0.43	0.41	0.41	0.43
Higher Technical College	0.28	0.27	0.31	0.28	0.29
College or University Degree	0.24	0.26	0.21	0.26	0.23
In Bad Health	0.14	0.17	0.09	0.16	0.13
Personality Controls					
Willingness to take risk (std., avg.)	-0.20	-0.21	-0.18	-0.10	-0.22
Patience (std., avg.)	0.01	0.04	-0.04	-0.01	0.01
Openness (std., avg.)	0.03	0.04	0.01	0.12	0.01
Conscientiousness (std., avg.)	0.07	0.09	0.03	0.07	0.07
Extraversion (std., avg.)	0.10	0.06	0.16	0.09	0.10
Agreeableness (std., avg.)	0.18	0.16	0.20	0.13	0.19
Neuroticism (std., avg.)	0.15	0.14	0.16	0.12	0.16
Regional Controls					
East-Germany	0.27	0.29	0.24	0.30	0.27
Unemployment Rate					
Low	0.33	0.32	0.33	0.32	0.33
Medium	0.30	0.30	0.31	0.30	0.30
High	0.37	0.38	0.36	0.38	0.37
Gross Value Added					
Low	0.27	0.26	0.27	0.24	0.27
Medium	0.29	0.28	0.29	0.29	0.29

Continued on next page...

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	All	**Children under 16**		**Cohabiting**	
		No	Yes	No	Yes
	(1)	(2)	(3)	(4)	(5)
High	0.45	0.45	0.44	0.47	0.44
Population Density in 100					
Low	0.21	0.21	0.20	0.20	0.21
Medium	0.25	0.25	0.26	0.24	0.25
High	0.54	0.54	0.54	0.56	0.54
Median Full-Time Income Women					
Low	0.29	0.30	0.27	0.28	0.29
Medium	0.26	0.25	0.27	0.24	0.26
High	0.46	0.45	0.46	0.48	0.45
Children under 3 in Public Care					
Low	0.22	0.19	0.25	0.19	0.22
Medium	0.37	0.36	0.38	0.36	0.37
High	0.41	0.44	0.37	0.45	0.40
Share of Full-Time Childcare (under 3)					.
Low	0.18	0.16	0.20	0.17	0.18
Medium	0.34	0.33	0.36	0.31	0.35
High	0.49	0.51	0.45	0.52	0.48
Children 3 - 6 in Public Care					
Low	0.26	0.24	0.28	0.25	0.26
Medium	0.44	0.46	0.42	0.45	0.44
High	0.30	0.30	0.29	0.30	0.30
Share of Full-Time Childcare (3-6)					
Low	0.21	0.19	0.24	0.20	0.21
Medium	0.31	0.30	0.33	0.29	0.32
High	0.48	0.51	0.43	0.52	0.47
Median Costs for Childcare (full-time)					
Low	0.40	0.40	0.40	0.40	0.40
Medium	0.32	0.32	0.31	0.31	0.32
High	0.28	0.28	0.29	0.29	0.28
Observations	56,940	34,836	22,104	11,117	45,823
Individuals	7,662	5,890	3,589	2,266	6,499

Source: SOEP, waves 2000 - 2016, version 33, doi:10.5684/soep.v33, own calculations.
Notes: Clustered Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.2: Main Results (Marginal Effects) - Full Results

	b	se
Locus of Control Terciles (Ref.: $[LOC_{min}, LOC_{P33}]$)		
$(LOC_{P33}, LOC_{P66}]$	0.020***	(0.006)
$(LOC_{P66}, LOC_{max}]$	0.020***	(0.007)
Family Status (Ref.: Single)		
Partner not in HH	-0.000	(0.013)
Partner in HH	0.029**	(0.012)
Married	-0.027***	(0.010)
Number of Children	-0.022***	(0.003)
Has Child under 1	-0.640***	(0.013)
Has Child 1 - 3 Years	-0.313***	(0.012)
Has Child 3 - 7 Years	-0.069***	(0.008)
Has Child 7 - 16 Years	-0.032***	(0.007)
Family Income (Ref.: Low)		
Medium	-0.073***	(0.006)
High	-0.144***	(0.008)
Socio-Demographic Controls		
Age Categories (Ref.: 25 - 34 Years)		
35 - 44 Years	0.009	(0.006)
45 - 54 Years	-0.019**	(0.009)
55 - 65 Years	-0.151***	(0.012)
Religion (Ref.: No Religious Affiliation)		
Christian	-0.009	(0.008)
Muslim	-0.122***	(0.025)
Other	-0.080***	(0.021)
Highest School Degree (Ref: No Degree)		
Lower Secondary School	0.011	(0.021)
Middle School	0.063***	(0.021)
Highschool	0.082***	(0.019)
Other School	0.039**	(0.019)
Highest Vocational Degree (Ref.: No Vocational Diploma)		
Apprenticeship	0.026***	(0.009)
Higher Technical College	0.046***	(0.009)
College or University Degree	0.070***	(0.010)
In Bad Health	-0.041***	(0.007)
Regional Information		
East-Germany	0.022	(0.016)
Unemployment Rate (Ref.: Low)		
Medium	-0.015**	(0.007)
High	-0.020**	(0.010)
Population Density (Ref.: Low)		
Medium	-0.014	(0.010)
High	-0.014	(0.011)
Gross Value Added (Ref.: Low)		
Medium	0.003	(0.008)
High	-0.001	(0.011)
Median FT Income Women (Ref.: Low)		
Medium	0.023*	(0.013)
High	0.003	(0.015)
Children under 3 in Public Childcare (Ref.: Low)		
Medium	0.009	(0.009)
High	0.015	(0.013)
Children under 3 in FT Public Childcare (Ref.: Low)		
Medium	-0.008	(0.010)
High	-0.015	(0.013)
Children 3 - 6 in Public Childcare (Ref.: Low)		
Medium	0.021**	(0.008)
High	0.015	(0.010)

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Children 3 - 6 in FT Public Childcare (Ref.: Low)		
Medium	-0.007	(0.008)
High	0.011	(0.012)
Median Costs for FT Public Childcare (Ref.: Low)		
Medium	0.004	(0.006)
High	0.001	(0.007)
Personality Controls		
Willingness to Take Risk (std., avg.)	0.018^{***}	(0.005)
Openness (std., avg.)	-0.004	(0.005)
Conscientiousness (std., avg.)	0.026^{***}	(0.005)
Extraversion (std., avg.)	0.014^{***}	(0.004)
Agreeableness (std., avg.)	-0.004	(0.005)
Neuroticism (std., avg.)	-0.014^{***}	(0.005)
Observations	56,940	
Year Fixed-Effects	✓	

Source: SOEP, waves 2000 - 2016, version 33, doi:10.5684/soep.v33, own calculations.
Notes: Clustered Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.3: Additional Results (Marginal Effects): Confounders (Sample: All)

	Sample: Ever Employed			Sample: With Partner		
	(1)	(2)	(3)	(4)	(5)	(6)
Locus of Control Terciles (Ref.: $[LOC_{min}, LOC_{P33}]$)						
$[LOC_{P33}, LOC_{P66}]$	0.015***	0.014**	0.012**	0.024***	0.024***	0.025***
	(0.006)	(0.005)	(0.005)	(0.008)	(0.008)	(0.008)
$(LOC_{P66}, LOC_{max}]$	0.019***	0.019***	0.012**	0.028***	0.027***	0.029***
	(0.006)	(0.006)	(0.006)	(0.009)	(0.009)	(0.009)
Occupational Type in Last Employment (Ref.: Blue-collar Worker)						
White-collar Worker		0.039***				
		(0.008)				
Civil Servant		0.070***				
		(0.013)				
Other Occupations		-0.133***				
		(0.040)				
Not Available		-0.057*				
		(0.030)				
Industry in Last Employment (Ref.: Manufacturing)						
Agriculture		-0.101***				
		(0.038)				
Mining, Quarrying, Energy, Water		0.005				
		(0.038)				
Chemicals, Pulp, Paper		-0.000				
		(0.016)				
Construction		-0.007				
		(0.020)				
Iron/Steel		0.013				
		(0.017)				
Textile/Apparel		-0.120***				
		(0.034)				
Wholesale/Retail		-0.035***				
		(0.013)				
Transport/Communication		-0.021				
		(0.019)				
Public Service		0.003				
		(0.012)				
Financials/ Private Services		-0.023*				
		(0.012)				
Other		-0.018				
		(0.015)				
Not Available		-0.167***				
		(0.023)				
(Last) Net Labor Income in KEUR			0.083***			
			(0.006)			
Partner						
Partners Net Labor Income					0.003	0.004
					(0.003)	(0.003)
Partners LOC Factor (cont.)						-0.002
						(0.004)
Observations	53,403	53,403	53,403	39,780	39,780	39,780
All Controls	✓	✓	✓	✓	✓	✓

Source: SOEP, waves 2000 - 2016, version 33, own calculations.
Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.4: Heterogeneity Analysis: Age of Children

	Children under 16[1]				**Adult Child**
	Baby *0-1*	Toddler *1-3*	Pre-School *3-7*	School Age *7-16*	*over 16*
	(1)	(2)	(3)	(4)	(5)
Locus of Control Terciles (Ref.: $[LOC_{min}, LOC_{P33}]$)					
$(LOC_{P33}, LOC_{P66}]$	0.020	0.028	0.019	0.011	0.023**
	(0.024)	(0.024)	(0.017)	(0.013)	(0.010)
$(LOC_{P66}, LOC_{max}]$	0.003	0.031	0.033*	0.022*	0.028**
	(0.024)	(0.024)	(0.018)	(0.014)	(0.011)
Observations	1,554	3,372	7,275	11,998	23,763
LF = 0	1,310	1,738	2,388	1,811	4,141
LF = 1	244 (16%)	1,634 (48%)	4,887 (67%)	10,187 (85%)	19,622 (83%)
All Controls	✓	✓	✓	✓	✓

Source: SOEP, waves 2000 - 2016, version 33, own calculations.
Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
[1] The groups are not mutually exclusive. Women are included if they have at least one child in the respective age-group.