The Independent Woman - Locus of Control and Female Labor Force Participation*

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Abstract

While the majority of economic studies on female labor force participation rely on monetary incentives to explain the labor supply decision of women, the research on non-monetary and psychological factors is still relatively scarce. Based on earlier findings from labor economics, this paper focuses on the role of locus of control (LOC) in the explanation of a woman's participation decisions. LOC is a personality trait that measures an individual's belief about the causal relationship between one's own behavior and its consequences for life and is hence a crucial determinant of subjective expectations about monetary and non-monetary rewards for one's own efforts. In this paper, LOC is thus theoretically assumed to affect participation probabilities via differences in the relative importance and expected size of monetary and non-monetary incentives for market production. The implications of the theoretical idea are tested using German survey data from the SOEP in a reduced form approach, finding a strong indication of a significantly positive effect of an internal LOC on a woman's probability of being available for market production. LOC adds explanatory power in addition to commonly known traditional socio-economic determinants of participation. Additionally, the relationship is found to be strongly heterogeneous with respect to determinants of underlying monetary and non-monetary incentives such as family status, existence and age of children as well as cohort and region of living. These findings strongly support the hypothesis that internal women put a higher weight on social purpose and economic identity as non-monetary incentives to work and thus gain higher marginal utility from participation above and beyond monetary incentives.

Keywords: Locus of Control, Labor Supply, Female Labor Force Participation, Gender Differences, SOEP
JEL codes: J21, J22, J12. J13, J16

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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. Inspired by the work of Mincer (1962), the early literature largely focused on the increase in the average wage rate of women to explain the positive trend (see e.g. Mincer, 1985; Smith and Ward, 1985; Blau and Kahn, 2007; Juhn and Murphy, 1997). Large parts of this 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), we know that 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 that the gap in wage elasticity, especially at the extensive margin, has also not closed yet (Evers *et al.*, 2008; Blau and Kahn, 2017). Based on the growing theoretical considerations of joint family labor supply equations, 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 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 is summarized by Blau and Kahn (2007, 2017), all these conventional economic studies were not able to fully explain the observed trends in female labor force participation and

[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.

the remaining gender gaps. This is why the economic research started to consider non-standard determinants of the developments, 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 is nicely summarized by Goldin (2006), one key aspect of the *"quiet revolution of women's employment"* since the 1970s is the increasing importance of work, occupation and career as key aspects 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 in general (Jahoda, 1981; Akerlof and Kranton, 2000). The main message of this literature is straightforward: individual identity influences economic outcomes since deviating from socially desirable behavior is costly for the individual. Thus, not working is associated with very high non-monetary costs for the individual through losses in social purpose and economic identity, and thus significantly reduces individual well-being, independent of the monetary distress (see e.g Clark, 2003; Schöb, 2013; Hetschko *et al.*, 2014). Traditional gender roles and the associated gender differences in the acceptance of home production as a alternative to market production (see e.g. Killingsworth and Heckman, 1986)[2] are very likely to be important 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, when explaining gender differences in labor force participation, non-pecuniary incentives to work are likely to be crucial.

However, what cannot be explained by level differences in social norms of working and traditional gender roles are the differences in the participation probabilities between women. Behavioral economics would attempt to explain these differences with non-standard beliefs about and preferences for certain monetary and non-monetary incentives of working. Thus, the remaining open question is: what drives this heterogeneity of the subjective aspects of the participation decision between women if objective monetary and non-monetary (dis)incentives to work are held constant? It might well be that psychological factors – such as individual personality – are highly important as a potential determinant of this heterogeneity.

Based on these considerations, this paper attempts to investigate the role of the personality trait locus of control (LOC) in the labor force participation of women. Locus of control

[2]Killingsworth and Heckman (1986) state that men and women might differ with respect to their alternative use of time outside market production, in particular. Home production is socially more accepted as an outside option for women than for men and the negative effects of non-employment on social identity might thus be higher for men as the social norm of being the "breadwinner" of the family is stronger for them, and social pressure to work is higher.

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 on their lives' outcomes. Using social learning theory as a basis, Rotter (1966) defined locus of control as a trait which mainly describes the *"nature and effects of reinforcement"*. While individuals with a high LOC (Internals) tend to perceive reinforcements as being a causal consequence of their own actions and efforts, individuals with a low LOC (Externals) attribute these reinforcements to luck, chance, fate or other people. LOC has already been shown to have a tremendous positive effect on "desirable" behavior and decision making on the labor market in such areas as human capital investment (Coleman and DeLeire, 2003), job search effort (McGee and McGee, 2016; Caliendo *et al.*, 2015b), occupational attainment (Heywood *et al.*, 2017; Cobb-Clark and Tan, 2011), entrepreneurial activity (Caliendo *et al.*, 2014) and labor market mobility (Caliendo *et al.*, 2015a).[3] Nevertheless, literature that directly relates female labor force participation to locus of control is scarce. Most prominently, Heckman *et al.* (2006) find a significant positive effect of locus of control and self-esteem on the individual probability of being employed at age 30, which is more pronounced for females. In a more recent study, Berger and Haywood (2016) analyze the effect of locus of control on women's return to employment after parental leave. Using German survey data, they find that women with an internal locus of control return to employment more quickly. Concerning other personality traits, Wichert and Pohlmeier (2010) find that the Big-Five personality traits also play a significant role in explaining women's labor supply.

In this paper, the theoretical considerations are based on the idea that locus of control, in line with its definition, crucially determines a woman's subjective expectations about monetary and non-monetary rewards of participation. It is thus assumed to affect the participation probability via differences in the relative importance and the expected size of monetary and non-monetary (dis)incentives for market production in the decision-making process. Three main alternative theories are hypothesized. Firstly, women with an internal LOC might derive more non-pecuniary utility from the status of being a labor market participant, as they perceive the positive effects of employment on social status to be directly correlated with their own efforts. They thus put a greater weight on the status of being employed in order to achieve a controlling influence over their own life, which is also conditional on monetary returns. Secondly, as a directly conflicting theory, internal women might also derive lower non-pecuniary utility from participation as they are largely independent of social norms as an external determinant of their individual well-being. Thirdly, LOC might of course also affect the monetary rewards of participation. Internal

[3]See Cobb-Clark (2015) for a comprehensive overview of the literature on LOC in labor economics.

women might have higher expectations about returns to job search and working and thus higher subjective monetary incentives to work in general.

In the empirical part of the paper, I estimate the direct relationship between LOC and current labor force participation of a woman using 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. The SOEP not only includes detailed socio-economic information but also surveys individuals' locus of control on a regular basis. 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 random effects 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 also includes non-employed women who are actively searching for a job. 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 women with (young) children, the effect for childless women is distinctly lower or even close to zero, depending on family status. This indicates a crucial heterogeneity with respect to underlying monetary incentives to work.

In a second step, I attempt to identify the underlying mechanism behind the identified positive relationship using indirect evidence from an additional heterogeneity analysis. Based on the assumption that traditional gender roles and social norms of working differ depending on the region of residence and birth cohort, these variables are used as proxies for exogenously given non-monetary incentives to participate. The heterogeneity analysis reveals that the effect is distinctly higher in western Germany and for women in older cohorts. This supports the hypothesis that LOC is an important determinant of the weighting of non-monetary incentives to work.

The outline of the paper is as follows. Section 2 starts by giving a brief introduction to the basic underlying model of female labor supply and, based on this, introduces the theoretical idea of the paper and the proposed hypotheses for the empirical analysis. The empirical part of the paper, Section 3, describes the data and the estimation strategy and Section 4 presents an overview of the results of the main estimation as well as the attempts to identify the driving channels behind the relationship. Section 5 summarizes a number of tests for the robustness of the results. Section 6 concludes the paper.

2 Theoretical Considerations

2.1 The Traditional Model of Female Labor Supply

As the model proposed by Mincer (1962) is still the most prominent model on female labor force participation, the considerations and extensions made in this paper are guided by and incorporated into this baseline model. In this model, the labor income of the husband or partner is assumed to negatively affect female labor force participation by increasing the woman's non-labor income. In line with Mincer (1962), this can be formalized as follows:

$$L_i = \gamma_1 w_i + \gamma_2 y + u, \tag{1}$$

where L_i is the amount of labor supplied by woman i to the market and w_i is "market earnings power" of woman i, i.e. her expected market income from a labor supply amount L_i. y is the total family income and u is a residual component capturing other factors such as taste. w_i captures only those earnings which are directly related to a positive labor supply of the woman, i.e. market income from dependent or independent work, and the first part of the equation thus summarizes what is known as the substitution effect with $\gamma_1 > 0$. On the other hand, y captures all the components of the permanent family income, i.e. the market incomes of the woman w_i and the market wage of her partner w_p as well as all other sources of income x, such as transfer income, welfare benefits, property income and capital income: $y = w_i + w_p + x$. The second part of the equation thus describes the traditional income effect with $\gamma_2 < 0$.

For simplicity and because existing evidence, e.g. in Kimmel and Kniesner (1998), shows that the labor supply decision of married men and women mainly differs at the extensive margin, the theoretical considerations as well as the empirical analysis are concentrated on the decision making at the extensive margin:

$$\begin{aligned} LFP_i &= 1 \quad \text{if } L_i > 0 \\ P(LFP_i = 1) &= P(\gamma_1 w_i + \gamma_2 y + u > 0), \end{aligned} \tag{2}$$

where $P(LFP_i = 1)$ is the latent probability of woman i participating in the labor force (i.e. of supplying a positive amount of labor $L_i > 0$). Additionally, the focus of this paper is to analyze the behavioral aspects of labor force participation, while leaving the demand side aside. This is done by concentrating on labor force availability as opposed to actual employment, thus reducing the risk of biased results due to omitted returns in employment probability in the empirical part. In line with the ILO definition of "labor force", a woman is thus assumed to participate in the labor market if she is either already employed ($E_i = 1$) or self-employed ($SE_i = 1$) or if she

is unemployed and intends to participate by indicating that she is searching for a job (see International Labour Organization, 2018). Thus, LFP_i also equals one if the woman does not work but is available to the market by searching for a job ($JS_i = 1$): $LFP_i = (E_i, SE_i, JS_i)$. In this simplification, given a certain expected market wage w_i, no assumptions on labor market conditions and frictions are necessary, as $P(LFP_i = 1)$ only depends on the woman's individual decision making processes and not on her exogenous probability of finding a job, except indirectly through w_i. In line with this expansion, transfer payments which are paid in response to, for example, job search efforts, such as unemployment insurance to woman i, are now also captured by w_i. Thus, w_i can be labeled as the "earnings from participation" rather than the "market wage". For a single woman ($w_p = 0$) without any other external income sources ($x = 0$), the participation decision thus only depends on her own earnings from participation: $y = w_i$. If we assume that she has to fulfill the second-order condition of meeting her basic consumption needs, the woman has to generate a certain level of y. In the case of Germany, this woman will certainly participate in the labor market since basic welfare benefits are also conditional on participation[4]. This consideration can be slightly softened for single mothers with young children in Germany, with these women having the opportunity of rest on welfare payments as long as their children are relatively young. For these women, unemployment insurance payments can thus be assumed to be independent of L_i as long as no other sources of income exist[5].

Additional Monetary and Non-Monetary Incentives to Supply Labor The literature on additional monetary incentives as well as the more recent literature on non-monetary incentives to work can also easily be incorporated into the basic model by splitting up what was summarized in u in the traditional model. u is a vector of multiple possible influencing factors such as additional monetary incentives m (e.g. search costs, commuting costs, childcare costs, tax (dis)incentives, transfer withdrawal rates), non-pecuniary incentives n (e.g. social purpose, economic identity, social networks) and a remaining error term ν:

$$u = \delta_1 m + \delta_2 n + \nu. \tag{3}$$

This leaves us with the following participation equation

$$P(LFP_i = 1) = P(\gamma_1 w_i + \gamma_2 y + \delta_1 m + \delta_2 n + \nu > 0). \tag{4}$$

[4]Adults who receive social transfer payments in Germany are in general required to be available for any reasonable employment if they are employable (§7 SGB II). Unemployment insurance payments are thus directly bound to an active job search requirement.

[5]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.

We know from the earlier literature that the wage elasticity γ_1 and cross-wage elasticity γ_2 of men are comparably low. If we assume that $\delta_1 m$ does not strongly differ between men and women and wage differences w_i are moderate, large parts of gender differences in participation probabilities are thus captured by differences in $\delta_2 n$. Based on the literature on traditional gender roles and social identity already introduced, this is very likely to be driven by differences in the importance of social norms of working between men and women. The same might hold true for differences between single and partnered women since the social pressure on single women to be independent of social transfers might be similarly high.

The question that still needs to be answered is, what drives the differences between women in labor force participation if objective monetary incentives to work and family status are held constant? Besides differences in the subjective beliefs about the objective components of the decision equation, mainly differences in unobserved preferences are likely to be at play here. In the neoclassical model of labor-leisure choice, this difference in preferences is represented by differences in the slope of the indifference curves. At the two extreme ends, some women have very flat indifference curves, i.e. they gain high marginal utility from every unit of work[6] and therefore make their participation decision in a similar way to their male partners, i.e. in large parts independent of monetary incentives. In contrast to this, other women have relatively steep indifference curves, i.e. relatively speaking, they gain less marginal utility from every unit of work and higher marginal utility from outside options such as leisure or home production. They thus strongly respond to monetary (dis)incentives to work such as the existence and level of their partner's earnings and other monetary disincentives to work, e.g. childcare costs. The participation gap between these two notional groups of women thus also remains if monetary incentives and their own expected earnings are held constant.

2.2 Personality Traits as Non-Standard Determinants of Participation

A woman's personality might also play a crucial role in explaining parts of this heterogeneity. Personality traits are *"relatively enduring patterns of thoughts, feelings, and behaviors that reflect the tendency to respond in certain ways under certain circumstances"* (Roberts, 2009) and are largely assumed to have a high potential to *"account for a substantial amount of variation in human behavior"* (Paunonen and Ashton, 2001). Hence, based on the simple participation model above, personality can be assumed to affect the participation decision via three main channels: (1) preferences via differences in the valuation of the objective components, i.e. γ_1, γ_2, δ_1 and δ_2, (2) beliefs via differences in the subjective expectations about w_i and y or (3) opportunities

[6] In addition to the simple model, this utility might not only be attached to the value of consumption but also to other non-pecuniary benefits of working.

via the realization of w_i (i.e. wage-returns to personality), and y (e.g. assortative mating).

As mentioned earlier, this paper attempts to contribute to the literature by specifically considering the potential role of the personality trait locus of control in this context. Based on the definition by Rotter (1966), LOC is assumed to affect behavior, i.e. participation, mainly through expectations and motivation (see e.g. Cobb-Clark, 2015). Internal individuals can be assumed to have more positive subjective expectations about whether their own behavior will be followed by rewards in the future and at the same time to have a stronger motivation to keep their own life under control. Locus of control (loc) can thus be assumed to affect differences in the valuation of the non-pecuniary as opposed to pecuniary factors, i.e. the size of δ_2, the subjective expectations about and objective realization of monetary returns to participation, i.e. the size of w_i, and the realization of family income, i.e. the size of y:

$$P(LFP_i = 1) \quad = P(\gamma_1 w_i(loc) + \gamma_2 y(loc) + \delta_1 m + \delta_2(loc)n + \nu > 0). \tag{5}$$

2.3 Derived Empirical Hypotheses

Multiple hypotheses can be formed about the relationship between locus of control and female labor force participation on the basis of the proposed channels (1) - (3) in the general considerations. These hypotheses will then inform the empirical analysis in Sections 3 and 4. The following section will give a detailed discussion of the possible hypotheses for the empirical analysis and, in addition, roughly describe how the hypotheses about different channels can be tested using survey data.

The first channel suggests that LOC might affect the importance of non-monetary incentives to work, i.e. social purpose and economic independence, through differences in the motivation to achieve a controlling influence over the outcomes of one's own life. Nevertheless, two explanations for this relationship are possible and two competing hypotheses, H1.1 and H1.2, can therefore be constructed. First, it can be argued that if individuals think that their own efforts determine their lives' outcomes, they are very likely to be motivated to act according to this. They are then expected to frame their lives such that they are as independent as possible of external forces, e.g. their partners or social transfers. As participating in the labor force is a highly important action in the context of economic and financial outcomes, internal individuals are more likely to generate positive social purpose and economic identity from being active on the labor market conditional on all other important factors that determine the decision. Thus, women with an internal LOC are expected to derive more utility from the status of being employed, independent of all monetary incentives, as they perceive the positive effects on social status to be directly correlated with their own efforts:

H1.1) Internal women put a higher weight on non-monetary incentives to work and thus gain higher marginal utility from market production: $\frac{\partial \delta_2}{\partial loc} > 0$

Alternatively, it nevertheless might also be possible that women with a more internal LOC have stronger "internal" sources of social identity and are thus even more independent of their labor force status as a determinant of social purpose in society. Social norms of working might be experienced as external forces on individual well-being and internal individuals may be more independent of these:

H1.2) Internal women put a higher weight on non-monetary disincentives to work and thus gain higher marginal utility from home production: $\frac{\partial \delta_2}{\partial loc} < 0$

The second proposed channel suggests that LOC might affect the subjective expectations about the monetary returns to participation. The expected monetary returns to participation are higher for internal individuals as they believe in the direct causality between their own efforts and life's outcomes. Internal women might, for example, have higher subjective job-offer arrival rates (Caliendo *et al.*, 2015b), higher appreciation of future career costs of non-working (Berger and Haywood, 2016) and higher subjective wage rates in general:

H2) Internal woman expect higher earnings from participation and thus gain higher utility from availability for market production: $\frac{\partial w_i}{\partial LOC} > 0$

In addition to these three main hypotheses, some other explanations are possible, although they are less prevalent and easier to control for. The difference between internal and external women could, for instance, also be driven by differences in the realization of monetary incentives and disincentives to work. One potential explanation for this may be positive demand-side responses to an internal LOC, i.e. higher wages rates (see e.g. Heineck and Anger, 2010) which are anticipated by women and thus incorporated into the decision-making. 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 thus likely to be associated with higher future career costs of non-participation and thus higher disincentives not to work through reduced future wages and employment probabilities:

H3.1) Internal women anticipate that they are able to realize higher wages in the present and the future and thus gain higher utility from market production: $\frac{\partial w_i}{\partial LOC} > 0$

Alternatively, LOC might also be correlated with the partners' earnings driven by assortative mating or mating probabilities in general. For instance, it may be the case that internal women

tend to marry men with higher or lower earnings or even tend to be less likely to marry at all, which would again affect their own participation probabilities. 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:

H3.2) Internal women 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: $\frac{\partial y}{\partial LOC} \neq 0$

Channel Identification Both hypotheses of channel (3) can be precluded in the empirical analysis by controlling for the respective intermediating variables. H3.1 can be ruled out by controlling for the last labor net income of the woman as a proxy for the expected wage as well as controlling for occupational characteristics (industry and occupational type) in the last observed employment. H3.2 can be ruled out by controlling for partners earnings and personality[7]. All of this is done in the empirical analysis in Section 4.

As hypotheses H1.1 and H1.2 point into opposite directions, empirically disentangling these two competing channels will also be straightforward. If we can identify a positive relationship between LOC and participation probabilities, H1.1 is likely to be the more dominant causal explanation and vice versa.

Empirically distinguishing hypothesis H2 from hypothesis H1.1, however, is less straightforward. Identifying whether a positive effect of LOC on participation probabilities operates through δ_2 or through w_i would require either measures about the individual importance of non-monetary incentives to work or measures of subjective expectations about monetary returns from participation, such as job-offer arrival rates. Neither is available in the data, however. In order to nevertheless, at least indirectly, identify the underlying channel, variation in the non-monetary incentives to work, n, can be used. This is based on the assumption that if the non-monetary incentives to work are very high, even women who tend to give them lower weight might still have a high probability of participating. This is in line with the idea that, for example, for men the social norms of working are expected to be very high and we would thus not expect a strong effect of LOC on participation probabilities through this channel for them. Rotter (1966) nicely summarized this by stating that *"the more clearly and uniformly a situation is labeled as skill or luck determined, in a given culture, the lesser the role [locus of control] would play in determining individual differences in behavior"*. The stronger the social norms of working,

[7]Remaining concerns about various other possible interdependencies between partners such as those with respect to gender attitudes cannot be completely ruled out. Internal women might, for instance, be more likely to mate with men who have more tolerant gender attitudes and are thus more likely to participate. These characteristics have to be assumed to be largely captured by the partner's locus of control and earnings.

e.g. through more modern gender roles, the lower the expected effect of LOC for the affected woman. The heterogeneity of social norms and gender roles is nevertheless not expected to affect the subjective expectations about monetary returns to participation. If heterogeneity of the effects can be identified, this points in the direction of channel (1), while homogeneity would favor channel (2). In the empirical analysis, cohort and region of living are used as proxies for differences in prevailing traditional gender roles and social norms of working in order to distinguish the channels. Based on the continuous decrease in the importance of traditional gender roles and family labor division patterns over time in almost all modern Western societies (see e.g. Costa, 2000; Goldin, 2006; Ross *et al.*, 1983), women in younger cohorts are assumed to be more affected by a generalized social pressure to work than women of older cohorts. For the former, n can be assumed to be higher, i.e. closer to their male counterparts, than for the latter. They might therefore have a higher participation probability that is more independent of LOC. A similar 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.[8] Thus, non-monetary incentives n might also be heterogeneous with respect to region of living, i.e. n is higher for eastern German women. The absolute effect of LOC on participation probabilities may thus be lower in the east of Germany.

Subgroup-specific Hypotheses The influence of LOC on participation crucially depends on the overall size of incentives for market and home production, independent of the effect's underlying channels. If monetary and/or non-monetary incentives for market or home production are very high, the power of LOC to affect participation probabilities may be comparably low. Thus, the estimated effects are expected to be highly heterogeneous with respect to the existence of partners and children in the household as they crucially determine the size of y, m and n. In light of these considerations, all effects are estimated for different subgroups of women, depending on their family status[9] as well as the existence and age of children.

As has already been stated above, a non-cohabiting, childless woman's monetary incentives to work are very high in the given context. As this considerably reduces her free choice between market and home production, the power of *loc* to affect $P(LFP_i = 1)$ is expected to be very low. Nevertheless, due to the prevailing legal regulations the effect for non-cohabiting women is

[8]The socialist system was characterized by a strong emphasis on the dual-earner/state-carer system of family labor supply, i.e. a 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).

[9]Family status in this context denotes the presence of a partner in the household, independent of the marital status of the woman. Women are thus divided into non-cohabiting (single or partner outside the household) and cohabiting women (partner or husband in the household).

expected to be highly heterogeneous with respect to the existence of young children. As non-cohabiting women with young children have lower monetary incentives to work, they have the opportunity to choose home production, with an effect of LOC thus perhaps being observable for them. Concerning monetary incentives, the opposite case is true for women (independent of their family status) with very young children due to generous parental leave payments in Germany. Thus, women with children under the age of one could have very high monetary incentives for home production and LOC has no strong effect on their participation probabilities.

Also in the case of cohabiting woman, i.e. women with moderate monetary incentives for market production[10], the existence of children might interact with the effect of LOC. This is because the presence of children is likely to significantly increase the non-monetary utility from home production. 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 and the quality of childcare options, and thus again reduce the power of LOC. Even more dramatically for the estimated relationship, internal mothers might even consider the effect of their own actions on their children more carefully then external mothers. If a mother assumes that her efforts in child-rearing might have important positive effects on her children's outcomes, she is also more likely to stay at home with young children as opposed to putting them into childcare. This could also mean that for mothers with certain parenting preferences, a potential generally positive effect of LOC on the participation probability is compensated for or, in line with the direction of H1.2, the effect might even be negative.

3 Data and Empirical Identification

On the basis of these theoretical considerations, the goal of this paper is to empirically analyze the role of locus of control in explaining women's current labor force participation while additionally investigating the potential driving channel(s) behind it. 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 (Wagner *et al.*, 2007). It contains a measurement of locus of control over multiple waves, rich information on current labor-market outcomes and family status as

[10]Childcare costs in Germany are relatively low and thus not expected to strongly influence participation decisions.

Table 1: Descriptive Statistics - Labor Force Status (shares in %)

	(1) All	(2) Children under 16	(3) Non-Cohabiting	(4) Cohabiting
Labor Force Status				
Employed	0.70	0.63	0.76	0.69
Full-Time ($\geq$ 35 hours)	0.54	0.35	0.68	0.49
Part-Time ($<$ 35 hours)	0.46	0.65	0.32	0.51
Self-Employed	0.07	0.07	0.12	0.05
Unemployed	0.06	0.06	0.07	0.06
Not-Working	0.13	0.15	0.04	0.16
Maternity Leave	0.04	0.10	0.01	0.04
Labor Force Participation	0.82	0.74	0.92	0.79
Observations	65453	24869	13337	52116
Individuals	9384	4234	2858	7780

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

well as the opportunity to connect women to their partners' characteristics if they are surveyed in the same household. The data is restricted to the waves 2000-2016 due to the measurement of locus of control.

Sample Restriction For the sample restriction process, I only keep women in the traditional working age, which is defined as 25 to 65 years. As another restriction, all women who are still in school, academic or vocational education, already in (early) retirement, in military service or in other unknown labor force statuses are dropped. Additionally, only those women for whom it is possible to observe all the relevant socio-economic control variables are kept. This leaves 65,453 observations for 9,384 women over 16 years in the full sample of all women.

Tables 1 and A.1 give an overview of the descriptive statistics of the full sample (column 1). In addition to the full sample of all women, the descriptive statistics are also reported for three (non-exclusive) subsamples: (1) all women with biological children under 16[11] (2) non-cohabiting women, i.e. single women or women with a partner outside their household, and (3) cohabiting women, i.e. married women or women with a partner in the same household.

3.1 Labor Force Participation

Labor force participation (LFP) 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, labor force participation 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

[11]The sample includes all women independent of their family status. The information on the children is generated on the basis of the individual birth history of the women available from the SOEP. The sample thus includes all women who have children under the age of 16 (independent of whether they live in the same household).

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)[12]. The robustness of the results with respect to the definition of the dependent variable is tested in a sensitivity check in Section 5. Table 1 gives an overview of the current labor force status of the women. In the full sample of all women (column (1)), 70% are employed, 7% are self-employed, 6% are unemployed and 13% indicate that they are not working. If, in addition to these raw shares, the information on active job search is also considered, a labor force participation rate of 82% results. 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 as compared to the subsample of non-cohabiting women, the labor force participation is distinctively lower for the former (79% compared to 93%).

3.2 Locus of Control

In 1999, 2005, 2010 and 2015, 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".[13] Afterwards, an explanatory factor analysis is conducted separately by year in order to investigate the way these items load onto latent factors.[14] 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 loadings[15].

[12]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. 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".

[13]This process preserves the standard deviation, but allows for changes in the mean. The process results in values of 1, 3, 5 or 7 so that a '1' on the 1999 four-point scale, for example, becomes a '7' on the 2005-2015 seven-point scales.

[14]The detailed results from the factor analysis are available upon request. A loading plot pooled for all years can be found in Figure A.1 in the Appendix but the pattern of factor loadings is similar in all years.

[15]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.

Table 2: Components of Locus of Control in SOEP (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	(1.30)
I2:	Compared to other people, I have not achieved what I deserve (R)	3.16	(1.74)
I3:	What a person achieves in life is above all a question of fate or luck (R)	3.54	(1.64)
I4:	If a person is socially or politically active, he/she can have an effect on social conditions	3.67	(1.58)
I5:	I frequently have the experience that other people have a controlling influence over my life (R)	3.10	(1.65)
I6:	One has to work hard in order to succeed	5.90	(1.16)
I7:	If I run up against difficulties in life, I often doubt my own abilities (R)	3.45	(1.65)
I8:	The opportunities that I have in life are determined by the social conditions (R)	4.53	(1.42)
I9:	Inborn abilities are more important than any efforts one can make	4.79	(1.31)
I10:	I have little control over the things that happen in my life (R)	2.65	(1.47)
	Observations	18149[a]	

Source: SOEP, waves 1999, 2005, 2010 and 2015, version 33.

Notes: Items marked with a (R) are reversed prior to factor analysis.

[a] In this table, the item means and SD are computed for observation waves only.

In line with the previous literature (see e.g. Piatek and Pinger, 2016), I use a two-step procedure to create a continuous and unidimensional LOC variable. First, I reverse the scores for items 2, 3, 5, 7, 8 and 10 such that all eight items are increasing in internality[16]. Second, I use factor analysis 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 drive how each item is weighted in the overall index. Simple averaging risks measurement error and attenuation bias (Piatek and Pinger, 2016). The resulting factor is increasing in internal LOC and its distribution is shown in Figure 1.

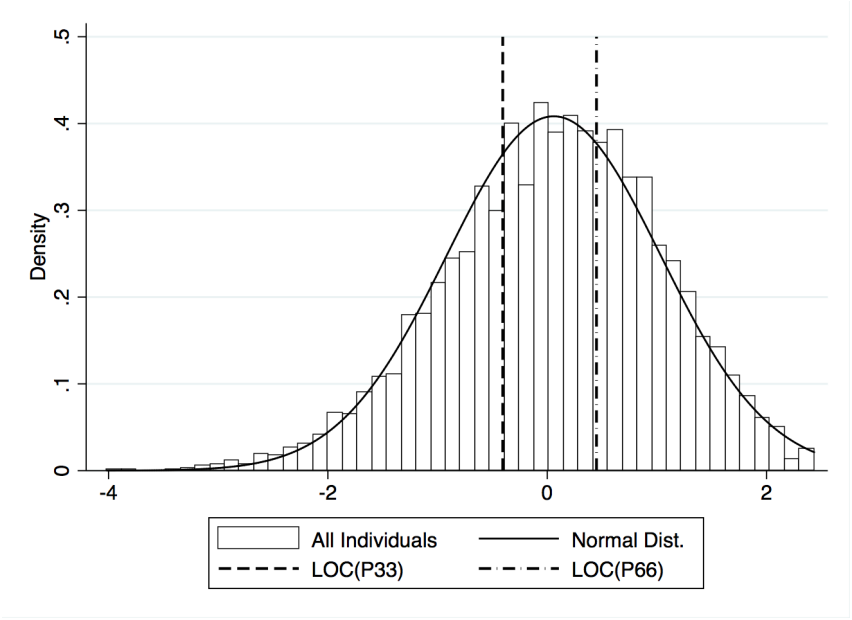
There is evidence that LOC is relatively stable for the working-age population (see e.g. Preuss and Hennecke, 2018; Cobb-Clark and Schurer, 2013). Nevertheless, in order to minimize concerns about potential reverse causality, I ensure that the LOC factor is always measured prior to the period in which the labor force participation is observed. That is, LFP in 2000 - 2005 depends on the 1999 locus of control, LFP in 2006 - 2009 depends on the 2005 locus of control and LFP in 2010 - 2014 depends on the 2010 locus of control.[17]

On the basis of the generated and imputed continuous LOC factor variable, I create a categorical variable that splits the continuous LOC in three tertiles, in order to identify non-linear relationships. These cutoffs are also illustrated in Figure 1.

[16] These items are marked with an (R) in Table 2.

[17] 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 (registered and unregistered) unemployment. In line with what is proposed in Preuss and Hennecke (2018), I thus additionally attempt to correct the LOC measurement by using the LOC which has been observed during the closest employment spell of those women. The results of these estimations are presented and discussed in Section 5.

Figure 1: Distribution of Locus of Control



Source: SOEP, waves 1999, 2005, 2010 and 2015, version 33, own illustration.

Table 3: Descriptive Statistics by LOC - Labor Force Status (shares in %)

	$[LOC_{min}, LOC_{P33}]$	$(LOC_{P33}, LOC_{P66}]$	$(LOC_{P66}, LOC_{max}]$
Labor Force Status			
Employed	0.67	0.72	0.72
Full-Time Employed	0.53	0.53	0.55
Part-Time Employed	0.47	0.47	0.45
Self-Employed	0.10	0.06	0.04
Unemployed	0.04	0.06	0.08
Not-Working	0.16	0.12	0.11
Maternity Leave	0.03	0.04	0.04
Labor Force Participation	0.79	0.83	0.84
Observations	21342	21632	22479

Source: SOEP, waves 2000 - 2016, version 33, own calculations.

3.3 Locus of Control and Labor Force Participation

Table 3 gives first 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 labor force participation are given separately for all three tertiles of LOC. It can be seen that due to a higher share of employed, self-employed and unemployed women and a lower share of non-working women for the highest tertile, the overall share of labor force participation is higher for women with a higher 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).

3.4 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:

$$P(LFP_{it} = 1) = P(\beta_1 + \beta_2 loc_{it-1} + \beta_3 X_{it} + \beta_4 T + \epsilon_{it} > 0), \tag{6}$$

where LFP_{it} is the indicator for labor force participation of woman i at time t and loc_{it-1} is the locus of control of woman i in the last LOC interview prior to t. In order to identify potential non-linearities in the relationship, in addition to the continuous variable loc_{it-1}, the LOC is alternatively also included as a categorical variable that indicates in which tertile of the LOC distribution a woman is classified. The vector $\boldsymbol{X}_{it}$ contains an extensive list of demographic information (age, religion, region of residence, school and vocational degree, subjective health), family characteristics (partner status, number of children, indicators for children in certain age ranges) as well as averaged and standardized personality and preferences measures (Big Five personality traits and risk aversion)[18]. See Table A.1 for the full list of controls. Additionally, the vector T contains year fixed effects.

Equation 6 is estimated using a random effects logit model. The use of random effects is necessary here as it 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 4 are the average marginal effects on the probability of a positive outcome assuming that the random effect is zero. In order to assess the sensitivity of the results with respect to the choice of method, I also estimate the main results using a simple logit with clustered standard errors and a random effects estimation in a case which assumes a linear probability model. The results are presented in the sensitivity checks in Section 5.

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 interaction terms. This is why in a second step, based on the simple baseline estimation as presented in equation 6, heterogeneity with respect to the family status (i.e. existence of a partner and children in the household) as a major indicator of differences in the monetary incentives to work is considered. Since not only β_2, i.e. the marginal effect of loc, is regarded as non-linear with respect to the family status, and since family status will be considered with multiple, non-exclusive subgroups, this heterogeneity is examined using fully separated models

[18] In a sensitivity check in Section 5, I additionally investigate the role of characteristics of the employment type in the current or last employment spell in order to assess the importance of selection in certain industries or occupational types. Nevertheless, these variables are assumed to be "bad controls" in the estimation due to the high risk of endogeneity of those variables in the model (see Angrist and Pischke, 2008, for more information). See a more detailed discussion of the problem in Section 5.

for the different subgroups conditional on a woman's family status FS_{it}:

$$P(LFP_{it} = 1|FS_{it}) = P(\beta_1 + \beta_2 loc_{it-1} + \beta_3 X_{it} + \beta_4 T + \epsilon_{it} > 0|FS_{it}). \quad (7)$$

In a third step, proxies for differences in the non-monetary incentives to work, i.e. region of living and cohort indicators, are included as interaction terms in the estimation equation in order to identify heterogeneity of the marginal effect of *loc* driven by differences in the underlying non-monetary incentives to work:

$$P(LFP_{it} = 1) = P(\beta_1 + \beta_2 loc_{it-1} \times n_{it} + \beta_3 X_{it} + \beta_4 T + \epsilon_{it} > 0), \quad (8)$$

with n_{it} being a vector of proxies for differences in non-monetary incentives to work, i.e. region of living and birth cohort, as discussed in the theoretical considerations. Following the random effects logit estimation, which includes this vector in the estimation equation, average marginal effects are computed separately over the different manifestations of n, i.e. East and West for the region of living indicator and "old" (born before 1958), "middle-age" (born between 1958 and 1966) and "young" (born after 1966) for the birth cohort indicator[19].

4 Results

4.1 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 labor force participation, 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. In addition, column (1) of Table A.2 in the Appendix provides an overview of the estimated marginal effects for all the control variables analogous to the estimation using the categorical LOC variable (i.e. columns (8) in Table 4).

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) of Table 4). Furthermore, the continuous LOC factor is significantly positive, indicating an increasing probability of participation with increasing values of LOC. Including additional control variables indicates that the raw gap was biased downwards by omitted-variable bias especially through family characteristics such as partner status, number

[19]The cutoffs for the manifestations of the birth cohort indicator "old", "middle-age" and "young" were generated based on the tertiles 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.

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LOC Factor (cont.)	0.005***		0.005***		0.008***		0.007***	
	(0.001)		(0.001)		(0.001)		(0.001)	
Locus of Control Tertiles (Ref.: $[LOC_{min}, LOC_{P33}]$)								
$(LOC_{P33}, LOC_{P66}]$		0.009***		0.010***		0.014***		0.013***
		(0.002)		(0.003)		(0.003)		(0.003)
$(LOC_{P66}, LOC_{max}]$		0.009***		0.008***		0.015***		0.012***
		(0.002)		(0.003)		(0.003)		(0.003)
Observations	65453	65453	65453	65453	65453	65453	65453	65453
Year Fixed-Effects	✓	✓	✓	✓	✓	✓	✓	✓
Socio-Demographics	✗	✗	✓	✓	✓	✓	✓	✓
Family Controls	✗	✗	✗	✗	✓	✓	✓	✓
Personality Controls	✗	✗	✗	✗	✗	✗	✓	✓

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

of children and age of children. The average marginal effect is still significantly positive for the estimation using the full specification (columns (7) and (8)). Having a medium or a high LOC increases the probability of being in the labor force by, on average, 1.3 and 1.2 percentage points compared to having a low LOC. When comparing this effect to the mean non-participation rate in the full sample of 18 percent (see Table 1), this amounts to a 7.2 percent decrease in the probability of staying at home. Increasing the LOC by approximately 1 standard deviation, increases the probability of participation by 0.7 percentage points.

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 afterwards. 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. While a negative effect of LOC on participation probabilities in line with H1.2 can in general be rejected, the considerations about "independence of social norms as external forces" might nevertheless be valid, especially for women with a very high LOC, counteracting the effects proposed in H1.1 and H2.

Subgroup Analysis - Family Status and Children Using these main results for the full sample, Tables 5 and 6 present the results for the subsamples based on family status and existence of biological children under the age of 16. All estimations include the full specification and, for comparison, columns (1) and (2) of Table 5 give the results for the full sample (equivalent to columns (7) and (8) in Table 4).[20] These subgroup analyses correspond to the supposed

[20]In addition, Table A.2 in the Appendix gives an overview of the estimated marginal effects for all the control variables analog to the estimation using the categorical LOC variable in the full specifications.

Table 5: Heterogeneity Analysis: Family Status

	All		Non-Cohabiting		Cohabiting	
	(1)	(2)	(3)	(4)	(5)	(6)
LOC Factor (cont.)	0.007***		0.003***		0.007***	
	(0.001)		(0.001)		(0.002)	
Locus of Control Tertiles (Ref.: $[LOC_{min}, LOC_{P33}]$)						
$(LOC_{P33}, LOC_{P66}]$		0.013***		0.004		0.015***
		(0.003)		(0.003)		(0.004)
$(LOC_{P66}, LOC_{max}]$		0.012***		0.005*		0.013***
		(0.003)		(0.003)		(0.004)
Observations	65453	65453	13337	13337	52116	52116
Year Fixed-Effects	✓	✓	✓	✓	✓	✓
Family Controls	✓	✓	✓	✓	✓	✓
Socio-Demographic Controls	✓	✓	✓	✓	✓	✓
Personality 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 6: Heterogeneity Analysis: Children

		No Children		Children under 16		
	All	N.Cohab.	Cohab.	All	N.Cohab.	Cohab.
	(1)	(2)	(3)	(4)	(5)	(6)
Locus of Control Tertiles (Ref.: $[LOC_{min}, LOC_{P33}]$)						
$(LOC_{P33}, LOC_{P66}]$	0.007***	-0.000	0.010***	0.022***	0.023*	0.018**
	(0.002)	(0.002)	(0.003)	(0.007)	(0.013)	(0.008)
$(LOC_{P66}, LOC_{max}]$	0.007***	0.001	0.010***	0.021***	0.028**	0.016**
	(0.002)	(0.002)	(0.003)	(0.007)	(0.013)	(0.008)
Observations	40584	10058	30526	24869	3279	21590
Year Fixed-Effects	✓	✓	✓	✓	✓	✓
Family Controls	✓	✓	✓	✓	✓	✓
Socio-Demographic Controls	✓	✓	✓	✓	✓	✓
Personality Controls	✓	✓	✓	✓	✓	✓

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

interaction of the effect of LOC on participation probabilities with 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 LOC are, on average, ceteris paribus 1.5 percentage points more likely to be in the labor force than cohabiting women with a low LOC, while a high LOC increases the probability of being in the labor force by 1.3 percentage points. For non-cohabiting women, the effect is close to zero and only slightly significant for women with a high LOC[21]. However, separating the two groups by the children-indicator in Table 6 shows that this difference is in large part driven by the existence of children in both groups. In the subgroup of women with children under 16, the effect for non-cohabiting women (i.e. single

[21]Similar insignificant close-to-zero effects can be found for men using the same sample specifications. The results can be obtained from the author upon request.

mothers) is even higher than the effect for cohabiting women. Single mothers with a medium LOC are, on average, ceteris paribus 2.3 percentage points more likely to be in the labor force than single mothers with a low LOC, while a high LOC increases the probability of being in the labor force by 2.8 percentage points. In the subsample of women without children, the effect is still positive and significant for cohabiting women but zero for non-cohabiting women. Table A.3 in the Appendix also provides an analog estimation result for women with very young children, i.e. under 7, as well as for women with "adult" children, i.e. children 16 years or older. The presented marginal effects in these subgroups indicate that the effect is strongest for women with young children. Although based on a relatively small sample size, the effect is extremely high for non-cohabiting women with children under 7. In their case, having a high LOC increases the probability of being available to the labor force by 9.2 percentage points. Nevertheless, the effect for cohabiting 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, already considerably exceed the decision threshold, personality and preferences have no power to affect the participation decision.[22] Also in line with the theoretical considerations, non-monetary dis- incentives to work to some extent, e.g. through the social purpose the existence of (young) children adds to home production, impose the necessary scope of decision making that is important in order LOC for to change the decision making towards working. Being independent of monetary incentives, only women who at least consider home production as an outside option to market production are assumed to be affected by their LOC. If no (non-adult) children are present in the household, the utility from home production seems to be too low and home production is thus a less attractive outside option to market production – such as in the case of cohabiting women without children or with adult children. Evaluating the theoretical ideas on the consequences of very high non-monetary incentives for home production, e.g. through the importance of care provided by the mother as opposed to outside-household childcare, is less straightforward as this is highly heterogeneous with respect to individual preferences about childcare and the quality of alternative childcare options. 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 data. The effect

[22] As a test for the effect of very high monetary disincentives to work, an alternative heterogeneity check, which reduced the sample to women with children under the age of one, i.e. women who are largely eligible for generous parental leave payments, was conducted. The estimated effects are insignificant and close to zero and thus support the idea that very high monetary disincentives to work act in the same direction as high incentives to work, i.e. reduce the power of LOC. The results can be obtained from the author upon request.

Table 7: Heterogeneity Analysis: Region of Residence

	All	Cohabiting
	(1)	(2)
Locus of Control Tertiles (Ref.: $[LOC_{min}, LOC_{P33}]$)		
$(LOC_{P33}, LOC_{P66}]$ ×West	0.014^{***}	0.017^{***}
	(0.004)	(0.005)
×East	0.007^{***}	0.008^{***}
	(0.003)	(0.003)
$(LOC_{P66}, LOC_{max}]$ ×West	0.015^{***}	0.015^{***}
	(0.004)	(0.005)
×East	0.005	0.006^{*}
	(0.003)	(0.004)
Observations	65453	52116
Year Fixed-Effects	✓	✓
Family Controls	✓	✓
Socio-Demographic Controls	✓	✓
Personality Controls	✓	✓

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

of LOC on participation probabilities is robustly positive over all the subgroups considered and the identified non-linearities are largely similar for women with and without children.

4.2 Channel Identification

The results of the main estimation indicate that multiple alternative channels for the estimated relationship remain possible. It is thus the goal of this second part of the empirical analysis to indirectly narrow down the important channels. In a first step, the two main competing hypotheses, H1.1 and H2, are isolated using the proposed heterogeneity analysis. In a second step, a number of potential intermediating variables, such as occupational choice, wage-responses and assortative mating, are controlled for in order to largely neglect H3.1 and H3.2.

Heterogeneity of Social Norms and Gender Roles Tables 7 and 8 present the marginal effects based on the estimations in which LOC is interacted with region of residence and cohort as indicators for differences in prevailing traditional gender roles and social norms of working as proxies for different non-monetary incentives to work. The marginal effects are calculated over the region and cohort categories (n), i.e. separate sets of margins are estimated at unique values of n. Thus, the reference group always is women with a low LOC in the particular group.

Table 7 reveals that the significant positive marginal effect of a medium and a high LOC is distinctively larger for women in the west of Germany both in the full sample (column 1) as well as in the subsample of cohabiting women (column 2). The effect of a high LOC is not significantly different from zero for women in in the east of Germany in the full sample. Additionally, the results presented in Table 8 indicate a strong heterogeneity of the effect with respect to cohort. The strong marginal effects of a medium and high LOC on participation probabilities can only

Table 8: Heterogeneity Analysis: Cohort

	All	Cohabiting
	(1)	(2)
Locus of Control Tertiles (Ref.: $[LOC_{min}, LOC_{P33}]$)		
$(LOC_{P33}, LOC_{P66}]$ ×Old*	0.039***	0.052***
	(0.008)	(0.009)
×Middle-Age*	0.008**	0.009**
	(0.003)	(0.004)
×Young*	0.001	-0.005
	(0.006)	(0.008)
$(LOC_{P66}, LOC_{max}]$ ×Old*	0.038***	0.055***
	(0.008)	(0.010)
×Middle-Age*	0.005	0.005
	(0.004)	(0.004)
×Young*	0.004	-0.001
	(0.007)	(0.009)
Observations	65453	52116
Year Fixed-Effects	✓	✓
Family Controls**	✓	✓
Socio-Demographic Controls**	✓	✓
Personality Controls	✓	✓

Source: Source: SOEP, waves 2000 - 2016, version 33, own calculations.
Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
* Cutoffs: Old - born before 1958, Middle-Age - born 1958-1966, Young - born after 1966.
** The list of control variables was slightly adjusted. Age is included as a continuous variable and only an indicator for children under 16 is included.

be observed for women from older cohorts, i.e. born before 1958. The effect is distinctly lower and only significantly different from zero for a medium LOC in the case of women in middle-age cohorts (born between 1958 and 1966). No significant marginal effects can be identified for women in the youngest cohort (born after 1966).

This is in line with the theoretical idea that the relationship between LOC and labor force participation is expected to be more pronounced for women in older cohorts and in the west of Germany. This is based on the assumption that the generalized social pressure to work is higher for women of younger cohorts and women in the east of Germany and the non-monetary incentives to work are thus already considerably high. The effect of the component n in the labor supply equation might therefore be very high for all the women in these regions and age groups, making any influence of the LOC redundant. For these women, the labor supply equation at the extensive margin may equal that of men more strongly. At the same time, this heterogeneity gives a clear indirect indication in favor of hypothesis H1.1 being the driving channel behind the estimated relationship since, for example, an effect of LOC on participation probabilities via differences in the subjective returns to job search and working, H2, is assumed to be largely homogeneous with respect to region of living and cohort.

As an additional validation for H1.1, the correlation of locus of control with a measure of the relative importance of monetary incentives to work, which is available for a subset of SOEP-respondents on an irregular basis, can be analyzed. Non-employed individuals are asked

to indicate their main reason for working, i.e. earning money as compared to other reasons. In line with the expectations, women with a high internal LOC are significantly more likely to indicate that, for them, there are other reasons for working besides earning money[23].

Occupational Choice In line with the proposition in H3.1, it could be interesting to investigate how much the estimated effects are driven by omitted information on the industry and occupational type of women in their current or last job as measures of occupational selection based on locus of control. Controlling for these characteristics is, however, less straightforward than expected. Simply including the information on the current or last job would leave us with a large endogeneity problem caused not necessarily by the characteristics themselves, but by the availability of the information in general. The information on employment 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[24]. This is, by definition, more often the case in the group of women who do not participate in the labor force at the moment. When controlling for the employment information, 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. Table A.4 in the Appendix presents the results for the main specification when including the information on the (last) occupational type and the (last) industry. To disentangle the endogeneity problem from the true effects of controlling for occupational characteristics, columns (2) and (4) start by reducing the observation sample to those women for whom we are able to observe any information on occupational type or industry. In line with expectations, the estimated effects for the LOC drop if the sample is reduced, indicating an endogeneity problem in the observability of information. However, if the last occupational type and the last industry classification are included, the estimated effects for LOC do not change significantly. This can thus be taken as an indication of no severe bias through omitted occupational information in the main estimations. An effect of LOC on participation probabilities via occupational selection and thus differences in the expected future costs of non-participation H.3.1 can thus be rejected.

[23]The results of the estimation can be obtained from the author upon request.

[24]The problem can be slightly weakened by using information on the very first employment of women given in the biography questionnaire, which is answered by every SOEP-respondent. If no information on occupational type or industry is available during the time in in the SOEP, this information is used.

Expected Wage Differences It is necessary to discuss the expected wage from working in detail since it, too, is an important intermediating variable. In order to investigate the importance of this channel, a proxy for the expected wage from working has to be included as a control variable. Table A.5 presents the results of the sensitivity check in which the net labor income of the last observed working spell is included as a proxy for the expected wage of a potential future employment. In line with the observation problem discussed in the last paragraph, as a first step in the sensitivity check, the sample is reduced to the sample of women who are observed in employment at some point in the SOEP and thus have a valid observation of (last) labor net income (column (2)). In line with the discussion above, the estimated marginal effect of LOC drops significantly due to the endogeneity issue in data availability. However, if the reduced sample is used and the last labor net income is included as a control variable, this does not further change the estimated coefficient for LOC. The coefficient of the last net labor income has the expected positive sign. Thus there is little possibility of the estimated relationship between LOC and the participation decision being driven by differences in the expected wages between internal and external women. H3.1 can therefore also be rejected with respect to a demand-side response to LOC via higher expected wages, too.

Assortative Mating - Partner's Wage and LOC As a third 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, Table A.6 presents 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 is included as an additional control variable for cohabiting women. Calculated in line with the procedure in the paragraphs above, the results of the baseline estimation for the reduced sample of all women for whom it is possible to merge the partner's wages and locus of control are presented in column (2) of Table A.6. As can be seen in columns (3) and (4), the results do not change if partner's net income and LOC is included as a control variable, indicating that the results of the main estimation are not severely biased by assortative mating. Admittedly, as already discussed in the theoretical considerations, the partner's gender attitudes might affect a woman's participation decision, but there is also a possibility of these being associated with a woman's LOC through assortative mating. Unfortunately, information on values and attitudes is not available from the SOEP and thus cannot be ruled out. The fact that the positive relationship between LOC and participation decisions can also be identified for single mothers, however, provides some reassurance that the channel proposed in H3.2 does not drive large parts of the estimated relationship.

5 Sensitivity Analysis

Estimation Method In order to assess the sensitivity of the results with respect to the chosen method as well, the results of the main estimation for the sample of all women are replicated using a simple logit model with clustered standard errors and a random effects linear probability model instead of the random effects logit. The results are presented in Table A.7 in the Appendix. The estimated results of both alternatives only marginally differ from the random effects logit estimation in effect size.

Definition of Labor Force Participation In addition to the choice of method, the definition of the dependent variable might potentially significantly affect the estimated marginal effects. In order to assess the sensitivity of the results with respect to the choices made about the participation indicator as described in Section 3.1, it is necessary to examine the corresponding estimation results when the definition of labor force participation is slightly adjusted, as can be seen in Table A.8 in the Appendix. In the dependent variable used for the estimations in columns (3) and (4), women who are marginally attached to the labor force are also counted as "in the labor force". Women who are not in the labor force (not working) are considered to be marginally attached if they are either actively looking for work (but potentially not able to start immediately) or if they intend to work and are available to start working (but potentially not searching actively). The estimated effects change only marginally through this adjustment. The most radical change was made to the dependent variable for the sensitivity check in columns (5) and (6). In the new dependent variable for those estimations, search behavior and intention to work are not considered at all. The variable is purely based on the status of labor force participation i.e. being registered unemployed or not. Women who are not registered unemployed but are nevertheless searching for a job, independent from the unemployment agency, are counted as not being available to the labor force, whereas women who are registered unemployed but indicate that they are not searching are assumed to be participating. The estimated effects drop if this alternative dependent variable is used due to the missing behavioral components in the dependent variable. Nevertheless, the results also remain significantly positive if only the pure status is considered. In a last robustness check, a slight adjustment is made to the definition of "intention to work" in columns (7) and (8). Here, those women who indicate that they "probably" intend to work, are counted as participating in the labor force. This adjustment does not alter the estimated effects either.

LOC Measurement As a last sensitivity check, the measurement of locus of control itself is tested. Table A.9 in the Appendix presents the results of two alternative forms of construction and imputation of the LOC factor. Columns (3) and (4) provide the results of the main specification for the full sample of all women, analogous to the baseline in columns (1) and (2) when varying the construction of the LOC factor in the observation years. Instead of using the results of the factor analysis, the "simple index" assumes equal weights of all 8 items used, and a simple average over all item responses is calculated. The results differ only marginally from those in the baseline.

Secondly, the timing of the LOC measurement and thus the imputation approach is tested. Based on the findings in Preuss and Hennecke (2018), the procedure of lagging the LOC observations by one year does not prevent a reverse causality bias due to a temporary measurement error in LOC during periods of (registered and unregistered) unemployment. Due to the fact that employed and non-employed individuals are pooled in the estimation sample, there might be a risk of biased results due to a measurement bias in LOC, which would, by definition, be greater in the group of non-participating women due to a higher share of non-employed individuals in this group[25]. In order to circumvent this measurement problem, the LOC observation during the closest employment or self-employment spell to t is used. The two conditions for imputing the LOC observation from a period $t + x$ or $t - x$ into t is that (a) LOC has to be observed in that year and (b) the woman is observed to be employed or self-employed in that year. I also allow for backwards imputation to avoid problems with sample size[26]. Columns (7) and (8) of Table A.9 present the results for this alternative approach of imputation for the LOC factor. Although still positive and significant, the estimated effect is now considerably smaller, which might indicate an actual problem of reverse causality in the estimated relationship. Nevertheless, this approach has one main caveat: by imputing from the closest employment spell, all women who are never observed in (self-)employment are lost. This is largely in line with the problems discussed in the first paragraph of the sensitivity section. Never being observed in (self-)employment is highly endogenous to the model, which might be the reason for the lower estimated effect. Columns (5) and (6) thus check the effect of the LOC variable in the baseline model, using only the sample of women for which the LOC variable from the closest employment is observed. As expected, the reduction of the estimated effect is purely driven by the selectivity of the sample in (7) and (8) and not by the new LOC measure.

[25] While in the group of participating women potentially only some of the women, i.e. those who are unemployed, might have a state-bias in their observed LOC, the share is expected to be greater in the group of non-participating women as 100% of women in this sample might be affected by such a state-bias.

[26] This is based on the assumption that, besides measurement bias in LOC through non-employment, non-employment has no long-term effect on LOC based on the findings in Preuss and Hennecke (2018).

6 Conclusion

Labor economists nowadays largely agree on the high importance of non-pecuniary incentives for labor force participation. Additionally, it is known that the elasticity with respect to one's own and one's partner's wages is still considerably lower for men than for women. Both observations combined only allow for one conclusion, which is that men are likely to put a greater weight on non-monetary incentives for labor force participation. In societies that are characterized by a still very traditional gender role model in combination with the social norm of being economically independent and thus being the "breadwinner" for the family, men are more likely to participate in the labor force, independent of potential differences in the monetary incentives, such as e.g. the gender wage gap. Nevertheless, in modern Western societies, more and more women are observed to make participation decisions similar to their partners at the extensive margin, i.e. largely independent of their own expected earnings and their partners' expected earnings. The question remains what drives differences in the role of monetary and non-monetary incentives between women.

This paper contributes to this question by theoretically and empirically discussing the role of the personality trait locus of control for differences in participation probabilities between women. On the basis of the theoretical considerations and the findings of the empirical part of the paper, locus of control can be assumed to affect participation probabilities mainly via the weighting of non-pecuniary incentives to work in the participation equation. A reduced form estimation, which used data from the SOEP and a random effects logit model, found that internal women, i.e. women who believe in the importance of their own efforts for life's outcomes, are on average more likely to participate in the labor force. LOC thus adds explanatory power to the participation decision above and beyond traditional socio-economic factors. Based on the heterogeneity analysis, which identified interesting non-linearities of the effect with respect to prevailing gender roles and social norms of working, the theoretical hypothesis that internal women might feel a greater urge to fit into the social norm of "earning your own living" was strongly supported. These women put a higher weight on economic and financial independence as non-pecuniary incentives to work and thus gain higher marginal utility from participation, holding monetary incentives constant. The very large effect that was identified for single mothers indicates, moreover, that the importance of LOC for an individual's suggestibility by social norms may be even more pronounced when talking about being economically independent of social transfer systems rather than of partners.

Overall, the paper significantly adds to the existing economic literature on female labor force participation by suggesting and empirically identifying important behavioral implications of per-

sonality traits in the participation decision and thus contributes to closing the knowledge gap on labor force participation decisions in general. Additionally, the identified importance of locus of control for a woman's decision-making process has crucial implications for the widespread political discourse about low labor force participation rates of women in general and the labor force return rates of mothers in particular. When discussing potential political measures targeted at increasing participation rates, such as quotas or childcare availability and costs, it is therefore extremely important to understand the boundaries of monetary incentives set by latent psychological characteristics, inherent preferences and social norms.

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A Appendix

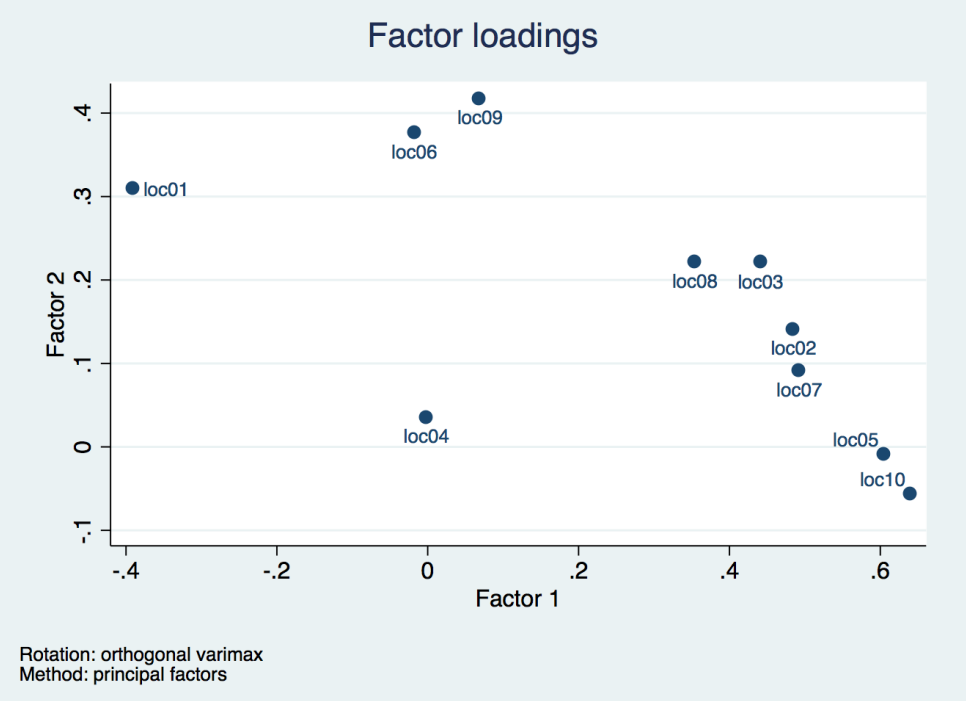
Table A.1: Descriptive Statistics

	(1) All	(2) Children under 16	(3) Not Cohabiting	(4) Cohabiting
	mean	*mean*	*mean*	*mean*
Family Status				
Single	0.14	0.08	0.68	
Partner not in HH	0.07	0.05	0.32	
Partner in HH	0.10	0.09		0.13
Married	0.69	0.78		0.87
Number of Children	1.61	2.03	1.19	1.72
Children Age Indicators				
Child under 1	0.03	0.07	0.01	0.03
Child 1 - 3	0.06	0.15	0.02	0.07
Child 3 - 7	0.12	0.33	0.06	0.14
Child between 7 and 16	0.27	0.72	0.20	0.29
Age Categories				
25 - 34 Years	0.20	0.31	0.28	0.19
35 - 44 Years	0.29	0.52	0.26	0.30
45 - 54 Years	0.31	0.16	0.29	0.31
55 - 65 Years	0.19	0.00	0.18	0.20
Religion				
No Religious Affiliation	0.32	0.27	0.37	0.31
Christian	0.64	0.67	0.61	0.65
Muslim	0.02	0.03	0.01	0.02
Other	0.02	0.03	0.01	0.02
East-Germany	0.27	0.24	0.29	0.26
Highest School Degree				
No School Degree	0.02	0.02	0.01	0.02
Lower Secondary School	0.24	0.20	0.23	0.24
Middle School	0.40	0.42	0.37	0.41
Highschool	0.28	0.29	0.33	0.27
Other School	0.06	0.07	0.05	0.07
Highest Vocational Degree				
No Vocational Diploma	0.15	0.16	0.16	0.15
Apprenticeship	0.43	0.42	0.41	0.43
Higher Technical College	0.28	0.30	0.28	0.29
College or University Degree	0.24	0.21	0.26	0.23
In Bad Health	0.14	0.10	0.17	0.13
Personality and Preferences				
Willingness to take risk (std., avg.)	-0.20	-0.18	-0.10	-0.22
Openness (std., avg.)	0.03	0.01	0.12	0.01
Conscientiousness (std., avg.)	0.07	0.04	0.07	0.07
Extraversion (std., avg.)	0.10	0.17	0.10	0.11
Agreeableness (std., avg.)	0.18	0.20	0.13	0.19
Neuroticism (std., avg.)	0.15	0.16	0.12	0.15
Observations	65453	24869	13337	52116
Individuals	9384	4234	2858	7780

Source: SOEP, waves 2000 - 2016, version 33.

Figure A.1: Factor Loadings of the LOC Variable

SOEP



Source: SOEP, waves 1999, 2005, 2010 and 2015, version 33, own illustration.

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

	(1)	(2)	(3)	(4)	(5)	(6)
		All			**Children under 16**	
	All	N.Cohab.	Cohab.	All	N.Cohab.	Cohab.
LOC Factor Tertiles (Ref.: $[LOC_{min}, LOC_{P33}]$))						
$(LOC_{P33}, LOC_{P66}]$	0.013***	0.004	0.015***	0.022***	0.008**	0.016***
	(0.003)	(0.003)	(0.004)	(0.007)	(0.004)	(0.006)
$(LOC_{P66}, LOC_{max}]$	0.012***	0.005*	0.013***	0.021***	0.010**	0.017***
	(0.003)	(0.003)	(0.004)	(0.007)	(0.004)	(0.006)
Family Status (Ref.: Single)						
Partner not in HH	-0.001	0.002		-0.005	0.003	
	(0.004)	(0.003)		(0.011)	(0.005)	
Partner in HH	-0.011***			-0.018*		
	(0.004)			(0.011)		
Married	-0.045***		-0.035***	-0.048***		-0.051***
	(0.003)		(0.004)	(0.009)		(0.006)
Number of Children	-0.020***	-0.004**	-0.025***	-0.041***	-0.005***	-0.038***
	(0.002)	(0.002)	(0.003)	(0.004)	(0.002)	(0.004)
Has Child under 1	-0.805***	-0.707***	-0.821***	-0.782***	-0.725***	-0.774***
	(0.012)	(0.067)	(0.011)	(0.011)	(0.063)	(0.012)
Has Child 1 - 3 Years	-0.319***	-0.294***	-0.342***	-0.310***	-0.326***	-0.291***
	(0.013)	(0.039)	(0.014)	(0.015)	(0.042)	(0.014)
Has Child 3 - 7 Years	-0.046***	-0.060***	-0.046***	-0.031***	-0.073***	-0.027***
	(0.004)	(0.011)	(0.005)	(0.006)	(0.013)	(0.005)
Has Child 7 - 16 Years	-0.010***	-0.012***	-0.008**	0.020**	-0.016***	0.012*
	(0.003)	(0.004)	(0.004)	(0.008)	(0.005)	(0.007)
Age Categories (Ref.: 25 - 34 Years)						
35 - 44 Years	0.012***	0.001	0.015***	0.028***	0.005	0.021***
	(0.003)	(0.003)	(0.004)	(0.007)	(0.005)	(0.006)
45 - 54 Years	0.006	0.000	0.007	0.042***	0.001	0.032***
	(0.004)	(0.004)	(0.005)	(0.010)	(0.006)	(0.009)
55 - 65 Years	-0.055***	-0.017***	-0.069***	0.020	-0.020**	-0.015
	(0.007)	(0.006)	(0.008)	(0.039)	(0.009)	(0.023)
Religion (Ref.: No Religious Affiliation)						
Christian	-0.002	0.002	-0.003	-0.002	0.003	-0.005
	(0.004)	(0.003)	(0.005)	(0.009)	(0.005)	(0.008)
Muslim	-0.043***	-0.059**	-0.048***	-0.098***	-0.054*	-0.091***
	(0.014)	(0.029)	(0.017)	(0.026)	(0.032)	(0.024)
Other	-0.030***	0.003	-0.044***	-0.056**	0.004	-0.067***
	(0.011)	(0.009)	(0.015)	(0.022)	(0.012)	(0.021)
East-Germany	0.031***	-0.008*	0.049***	0.048***	-0.011*	0.043***
	(0.004)	(0.005)	(0.005)	(0.009)	(0.006)	(0.008)
Highest School Degree (Ref: No Degree)						
Lower Secondary School	0.018	0.018	0.011	0.075***	0.024	0.055**
	(0.014)	(0.012)	(0.018)	(0.027)	(0.015)	(0.024)
Middle School	0.056***	0.034***	0.056***	0.112***	0.040***	0.087***
	(0.013)	(0.012)	(0.016)	(0.031)	(0.014)	(0.027)
Highschool	0.053***	0.035***	0.052***	0.105***	0.042***	0.082***
	(0.010)	(0.009)	(0.013)	(0.025)	(0.011)	(0.022)
Other School	0.027**	0.015*	0.025	0.053**	0.018*	0.037
	(0.011)	(0.008)	(0.016)	(0.026)	(0.011)	(0.023)
Highest Vocational Degree (Ref.: No Vocational Diploma)						
Apprenticeship	0.026***	0.011**	0.026***	0.034***	0.013**	0.020**
	(0.005)	(0.004)	(0.007)	(0.011)	(0.006)	(0.010)
Higher Technical College	0.038***	0.020***	0.040***	0.050***	0.027***	0.031***
	(0.005)	(0.004)	(0.006)	(0.010)	(0.005)	(0.009)
College or University Degree	0.045***	0.012***	0.053***	0.063***	0.013**	0.052***
	(0.004)	(0.004)	(0.006)	(0.010)	(0.006)	(0.009)
In Bad Health	-0.023***	-0.025***	-0.021***	-0.030***	-0.031***	-0.022***
	(0.003)	(0.004)	(0.004)	(0.008)	(0.005)	(0.007)
Willingness to Take Risk (std., avg.)	0.012***	0.001	0.018***	0.010	0.003	0.011**
	(0.003)	(0.003)	(0.004)	(0.007)	(0.004)	(0.006)

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	(1)	(2)	(3)	(4)	(5)	(6)
Openness (std., avg.)	-0.002	0.003	-0.005	-0.001	0.003	0.001
	(0.003)	(0.002)	(0.003)	(0.006)	(0.003)	(0.005)
Conscientiousness (std., avg.)	0.016***	0.007***	0.019***	0.020***	0.011***	0.013***
	(0.003)	(0.002)	(0.004)	(0.006)	(0.003)	(0.005)
Extraversion (std., avg.)	0.009***	-0.000	0.014***	0.014***	-0.001	0.013***
	(0.002)	(0.002)	(0.003)	(0.005)	(0.003)	(0.004)
Agreeableness (std., avg.)	-0.005*	-0.001	-0.004	-0.008	-0.002	-0.007
	(0.003)	(0.002)	(0.003)	(0.006)	(0.003)	(0.005)
Neuroticism (std., avg.)	-0.012***	-0.003	-0.015***	-0.009*	-0.004	-0.007
	(0.003)	(0.002)	(0.004)	(0.006)	(0.003)	(0.005)
Observations	65453	13337	52116	24869	10202	25992
Year Fixed-Effects	✓	✓	✓	✓	✓	✓

Source: SOEP 2000 - 2016, version 33, own calculations.

Notes: Standard Errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.3: Heterogeneity Analysis: Age of Children

	Children under 7			Children 16 or older		
	All	N.Cohab.	Cohab.	All	N.Cohab.	Cohab.
	(1)	(2)	(3)	(4)	(5)	(6)
Locus of Control Tertiles (Ref.: $[LOC_{min}, LOC_{P33}]$)						
$(LOC_{P33}, LOC_{P66}]$	0.040***	0.079**	0.031**	0.006**	0.001	0.010***
	(0.014)	(0.038)	(0.015)	(0.003)	(0.003)	(0.004)
$(LOC_{P66}, LOC_{max}]$	0.040***	0.092**	0.031*	0.010***	-0.001	0.015***
	(0.015)	(0.041)	(0.016)	(0.003)	(0.004)	(0.004)
Observations	11352	1080	10272	27677	4827	22845
Year Fixed-Effects	✓	✓	✓	✓	✓	✓
Family Controls	✓	✓	✓	✓	✓	✓
Socio-Demographic Controls	✓	✓	✓	✓	✓	✓
Personality 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: Sensitivity Analysis: Employment Characteristics (Sample: All)

	(1)	(2)	(3)	(4)	(5)
Locus of Control Tertiles (Ref.: $[LOC_{min}, LOC_{P33}]$)					
$[LOC_{P33}, LOC_{P66}]$	0.013***	0.011***	0.010***	0.009***	0.009***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
$(LOC_{P66}, LOC_{max}]$	0.012***	0.011***	0.010***	0.008***	0.009***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Occupational Type in Last Employment (Ref: Blue-collar Worker)					
White-collar Worker			0.005		
			(0.003)		
Civil Servant			0.025***		
			(0.006)		
Other Occupations			-0.071***		
			(0.025)		
Industry in Last Employment (Ref: Manufacturing)					
Agriculture					-0.028**
					(0.013)
Mining, Quarrying, Energy, Water					0.028***
					(0.010)
Chemicals, Pulp, Paper					0.012**
					(0.006)
Construction					0.015**
					(0.007)
Iron/Steel					-0.006
					(0.009)
Textile/Apparel					-0.068***
					(0.017)
Wholesale/Retail					-0.001
					(0.005)
Transport/Communication					0.014**
					(0.006)
Public Service					0.020***
					(0.004)
Financials/ Private Services					0.005
					(0.005)
Other					0.008
					(0.005)
Observations	65452	63856	63856	60789	60789
Year Fixed-Effects	✓	✓	✓	✓	✓
Family Controls	✓	✓	✓	✓	✓
Socio-Demographic Controls	✓	✓	✓	✓	✓
Personality Controls	✓	✓	✓	✓	✓

Source: 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.5: Sensitivity Analysis: Expected Wage Differences (Sample: All)

	(1) Full Sample	(2) Reduced Sample	(3) Reduced Sample
Locus of Control Tertiles (Ref.: $[LOC_{min}, LOC_{P33}]$)			
$(LOC_{P33}, LOC_{P66}]$	0.013***	0.008***	0.008***
	(0.003)	(0.002)	(0.002)
$(LOC_{P66}, LOC_{max}]$	0.012***	0.009***	0.008***
	(0.003)	(0.002)	(0.002)
(Last) Net Labor Income in KEUR			0.017***
			(0.002)
Observations	65453	61372	61372
Year Fixed-Effects	✓	✓	✓
Family Controls	✓	✓	✓
Socio-Demographic Controls	✓	✓	✓
Personality Controls	✓	✓	✓

Source: 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.6: Sensitivity Analysis: Partners Wage and Personality (Sample: Cohabiting)

	(1) Full Sample	(2)	(3) Reduced Sample	(4)
Locus of Control Tertiles (Ref.: $[LOC_{min}, LOC_{P33}]$)				
$(LOC_{P33}, LOC_{P66}]$	0.015***	0.014***	0.015***	0.015***
	(0.004)	(0.004)	(0.004)	(0.004)
$(LOC_{P66}, LOC_{max}]$	0.013***	0.012***	0.013***	0.013***
	(0.004)	(0.005)	(0.005)	(0.005)
Partners Net Labor Income in KEUR			-0.007***	-0.007***
			(0.001)	(0.001)
Partners LOC Factor (cont.)				-0.000
				(0.002)
Observations	52116	34943	34943	34943
Year Fixed-Effects	✓	✓	✓	✓
Family Controls	✓	✓	✓	✓
Socio-Demographic Controls	✓	✓	✓	✓
Personality Controls	✓	✓	✓	✓

Source: 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.7: Sensitivity Analysis: Estimation Method (Sample: All)

	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline		Simple Logit Clustered SE		Random Effects Linear Probability	
LOC Factor (cont.)	0.007***		0.008***		0.007***	
	(0.001)		(0.003)		(0.002)	
Locus of Control Tertiles (Ref.: $[LOC_{min}, LOC_{P33}]$)						
$(LOC_{P33}, LOC_{P66}]$		0.013***		0.017***		0.012***
		(0.003)		(0.006)		(0.003)
$(LOC_{P66}, LOC_{max}]$		0.012***		0.014**		0.012***
		(0.003)		(0.007)		(0.004)
Observations	65453	65453	65453	65453	65453	65453
Year Fixed-Effects	✓	✓	✓	✓	✓	✓
Family Controls	✓	✓	✓	✓	✓	✓
Socio-Demographic Controls	✓	✓	✓	✓	✓	✓
Personality 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.8: Sensitivity Analysis: Participation Definitions (Sample: All)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Baseline		Marginal Attachment[1]		Status (w/o search)[2]		Baseline w. broader intention[3]	
LOC Factor (cont.)	0.007^{***}		0.006^{***}		0.004^{***}		0.007^{***}	
	(0.001)		(0.001)		(0.001)		(0.001)	
Locus of Control Tertiles (Ref.: $[LOC_{min}, LOC_{P33}]$)								
$(LOC_{P33}, LOC_{P66}]$		0.013^{***}		0.011^{***}		0.009^{***}		0.013^{***}
		(0.003)		(0.003)		(0.003)		(0.003)
$(LOC_{P66}, LOC_{max}]$		0.012^{***}		0.010^{***}		0.007^{**}		0.012^{***}
		(0.003)		(0.003)		(0.003)		(0.003)
Observations	65453	65453	65453	65453	65453	65453	65453	65453
Year Fixed-Effects	✓	✓	✓	✓	✓	✓	✓	✓
Family Controls	✓	✓	✓	✓	✓	✓	✓	✓
Socio-Demographic Controls	✓	✓	✓	✓	✓	✓	✓	✓
Personality 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] Specification is equal to baseline but also includes women who are marginally attached to the labor force into the group of women in the labor force.

[2] Labor force definition purely based on status, no information on active job search.

[3] Equal to baseline but also includes women who only "probably" intend to return to the labor force for non-working women.

Table A.9: Sensitivity Analysis: Locus of Control Measurement (Sample: All)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Lagged (Baseline)		Simple Index[1]		Lagged Reduced sample		Closest Employment[2]	
Loc Factor (cont.)	0.007^{***}		0.007^{***}		0.004^{***}		0.003^{***}	
	(0.001)		(0.001)		(0.001)		(0.001)	
Locus of Control Tertiles (Ref.: $[LOC_{min}, LOC_{P33}]$)								
$(LOC_{P33}, LOC_{P66}]$		0.013^{***}		0.011^{***}		0.006^{***}		0.006^{***}
		(0.003)		(0.003)		(0.002)		(0.002)
$(LOC_{P66}, LOC_{max}]$		0.012^{***}		0.010^{***}		0.006^{***}		0.006^{***}
		(0.003)		(0.003)		(0.002)		(0.002)
Observations	65453	65453	65453	65453	57174	57174	57174	57174
Year Fixed-Effects	✓	✓	✓	✓	✓	✓	✓	✓
Family Controls	✓	✓	✓	✓	✓	✓	✓	✓
Socio-Demographic Controls	✓	✓	✓	✓	✓	✓	✓	✓
Personality 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] LOC Factor for each year is calculated using a simple average of all 8 items used and thus assuming equal weights of all items. The Index is then imputed using the same rule as in the Baseline (lagged).

[2] LOC Factor is calculated as usual for each year but is imputed from the closest LOC observation in which the individual was employed or self-employed and not from the last LOC observations.