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Automation, the changing task content of jobs, and marital plans in Czechia

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Abstract: As labour-replacing technologies, such as industrial robots and AI-driven automats, alter the structure of labour demand, the task content of occupations has emerged as an increasingly important indicator of socioeconomic position. This study explores how exposure to job automation influences short-term marital intentions, using data from 1,345 respondents in the Czech Household Panel Survey (2015–2019) and occupational measures derived from the European Skills, Competences, Qualifications and Occupations (ESCO) Database. Our findings reveal a gendered pattern: men employed in highly routine-intensive occupations—indicative of greater vulnerability to automation—are more likely to report no plans to marry. Conversely, women in similar jobs are more likely to express positive marital intentions. These results highlight how technological change not only alters labour market outcomes but also shapes demographic behaviours through the lens of gender norms. The study contributes to broader debates on the interplay between socioeconomic disadvantage and family formation, suggesting that automation may be contributing to a growing group of 'non-marriageable' men. As technological change continues to transform the labour markets, especially with the rise of artificial intelligence, the number of individuals at risk of both economic and relational marginalization may further expand.

Keywords: task content of jobs, marital plans, marriage, gender roles, Czechia

JEL codes: J10, J11, J12, J13

1. Introduction

While the decision to marry and making plans to marry are certainly associated with relationship characteristics, individual attitudes, and social norms (Hiekel et al., 2015; Liefbroer et al., 1994; Perdoch Sladká, 2023; Žilinčíková & Hiekel, 2018), they also depend on the life trajectory and socioeconomic position of each individual. Previous studies have found that certain job characteristics (especially men's) influence partnership plans and transitions (Bolano & Vignoli, 2021; Gibson-Davis et al., 2005; Kalmijn, 2011; Watson & McLanahan, 2011; Yu & Hara, 2020; Yu & Kuo, 2017). Job characteristics, such as unemployment or employment insecurity, can also affect partnership quality or the likelihood of relationship dissolution (Blom et al., 2020; Killewald, 2016; Zvoníček et al., 2023). The current economic standing of individuals as well as their future economic prospects determine how attractive they are on the marriage market and affect their chances of finding the right match, thus influencing both union formation and dissolution (Yu & Kuo, 2017). Moreover, among men with worse economic prospects, married life might seem unattainable, leading them to postpone marriage and to cohabit instead (Kalmijn, 2011). Thus, socioeconomic position plays an important role in partnership trajectories.

Apart from more traditional indicators of socioeconomic position, such as employment status or income, job task content (i.e., what tasks people mainly perform in their occupation) is becoming increasingly important. Structural changes in the labour markets of developed countries, caused, among others, by technological advances and globalisation, have led to a decline in the demand of jobs that require the performance of routine tasks, creating uncertainty for certain groups of workers (Autor et al., 2006; Goos et al., 2014; Hardy et al., 2018). At the same time, people with analytical or social skills are increasingly sought after in the labour market and are thus in a more advantageous position (ibid.). These shifts in labour demand have been widely demonstrated to have substantial and long-term implications for individuals' earnings and employment prospects as well as their sense of economic security (Dekker et al., 2017; de la Rica et al., 2020). Consequently, they may also influence the family-related plans and behaviours of young adults. The latter topic has only recently begun to attract attention among family scholars. In a study conducted in Germany, Bogusz et al. (2024) demonstrated that

individuals in noncognitive jobs, who are more exposed to low wages and job loss resulting from structural changes in the labour market, are increasingly more likely to remain childless. Moreover, studies from the United States showed that the decline in manufacturing jobs, which are rich in routine tasks, led to a decline in the marriage rate and an increase in the divorce rate (Autor et al., 2019; Anelli et al., 2021). However, how job task content, in particular the extent to which job tasks are routine, is associated with union formation plans and how these associations differ by workers' gender has not yet been investigated. As partnership plans are often linked with career trajectories (Liefbroer et al., 1994), the task content of men's and women's jobs is likely also to be associated with their short-term marital plans. Furthermore, these relationships may be different for women and men, especially in social contexts where there are traditional gender role attitudes and the marriage value of men is strongly defined by their earning opportunities (Chang et al., 2024; Kalmijn, 2011).

In this paper we fill this research gap and examine how job task content is associated with people's marital plans in Czechia and whether the association between the two depends on workers' gender. Our study is set in a country where most people still value the institution of marriage (Perdoch Sladká, 2024) and gender inequality is one of the highest in Europe (European Institute for Gender Equality, 2023). Family roles are still gendered, with men being more responsible for financial security and women being responsible for the household and childcare (Ciccia & Bleijenbergh, 2014; Hamplová et al., 2019; Tomešová Bartáková, 2010; Wall & Escobedo, 2013). Czechia is also a country that has experienced strong economic growth over the last two decades and gradually began to experience the same kinds of structural labour market transformations driven by globalisation and technological change as Western European countries (Hardy et al., 2018; Keister & Lewandowski, 2017). In this context, we expect job content to be associated with men's and women's marital plans. We also hypothesise that men in disadvantageous job positions are more likely to make no marital plans or to delay them, while the opposite association may apply for women. We examine these hypotheses by analysing data from the Czech Household Panel Survey (CHPS) from 2015–2019 combined with data on the task content of occupations based on the European Skills, Competences, Qualifications, and Occupations Database (ESCO).

This study makes at least two important contributions to the literature. First, it adds to the emerging research on the impact that structural labour market changes, driven by technological advances and globalisation, have on family formation. While the effects of these changes on workers' economic, mental, and physical well-being have been widely studied (Dekker et al., 2017; de la Rica et al., 2020; Bratsberg et al., 2022), studies on their consequences for family formation, particularly among young adults, have been emerging only recently (Anelli et al., 2024; Matysiak et al., 2023; Bogusz et al., 2024). This is crucial, as ongoing technological progress continues to influence labour markets, and labour market position and economic uncertainty are known determinants of family formation (Matysiak &Vignoli, 2024). Second, we provide empirical evidence on the topic for a post-socialist country. Despite some notable exceptions (Katrňák et al., 2004; Matysiak, 2009; Sobotka et al., 2008), post-socialist countries have been underrepresented in international debates on family formation and labour market transformations. This is a significant gap, as labour markets in the region have undergone substantial changes since the early 1990s, resulting first from the transition to a market economy and later from exposure to global competition, the inflow of technological innovations, and European integration. Although these labour market shifts are argued to affect family formation (Frejka, 2008; Sobotka, 2011; Spéder, 2016), empirical research on this topic remains scarce.

2. Background

2.1 Changes in the labour market

Labour markets in developed countries have been going through large structural changes in the 21st century (Acemoglu & Autor, 2011; Anelli et al., 2021; Autor et al., 2003; Matysiak et al., 2023). One of the most significant changes is the polarisation of the distribution of jobs. While the demand for occupations requiring the highest skill levels has grown rapidly in recent decades, the demand for occupations requiring intermediate skill levels has fallen.

One of the most important causes of this polarisation is the digitalisation of certain job tasks that 'can be (and increasingly are) codified in computer software and performed by machines (or, alternatively, are sent electronically– 'outsourced'–to foreign worksites)' (Acemoglu & Autor, 2011, p. 1076). These are largely routine tasks (both

manual and cognitive) that 'require the performance of explicit and repeatable sets of activities that can be easily coded into a computer programme' (Keister & Lewandowski, 2017, p. 268) and are thus the tasks most affected by digitalisation (Acemoglu & Autor, 2011). These are tasks carried out either by 'clerks, sales workers, administrative workers, tellers and cashiers' (routine cognitive) or by 'production workers such as assemblers and toolmakers' (routine manual) (Keister & Lewandowski, 2017, p. 268). Jobs with a particularly high proportion of routine tasks are most exposed to automation (Arntz et al., 2016; Nedelkoska & Quintini, 2018).

While jobs intense in routine tasks are disappearing or experiencing wage stagnation, new jobs are being created (especially in the service sector). However, newly created jobs mainly require different, non-routine, and highly cognitive skills, such as 'abstract thinking, creativity, problem solving and strong communication skills' (Keister & Lewandowski, 2017, p. 268). Alternatively, jobs are also being created in the low-skilled service economy (cleaning, delivery, etc.). Even though they do not require high-level cognitive skills, they are intense in non-routine manual tasks and are thus less exposed to automation.

Unlike economic recessions and other temporary shocks that we experienced in recent decades, caused by cyclical swings in the economy, the current changes are likely to change people's economic prospects permanently as they are the result of structural changes in labour demand (Seltzer, 2019). Anelli et al. (2021, p. 2) predict that, since economic prospects are important determinants of family formation (Bolano & Vignoli, 2021; Matysiak et al., 2021), changes in the structure of labour demand, brought about, for example, by technological innovations or the offshoring of production to countries with lower labour costs, will have 'long-lasting effects on family and fertility behaviour.' Anelli et al. (2021) found that an increase in robot exposure in the United States was associated with a decrease in the marriage rate and an increase in cohabitations and divorces. They suggested that these associations can be explained by the decreasing marriage-market value of men, which results from their reduced employment opportunities and earning prospects. Similar findings were obtained by Autor et al. (2019), who looked at the effects of a decline in manufacturing jobs on marriage caused by growing import competition from China. Consequently, job content could be another

important determinant of partnership plans and transitions in contemporary developed economies, alongside education or unemployment.

2.2 Men, women, and the role of socioeconomic factors in marriage

Since the 1980s, research has focused on what makes men and women 'marriageable' (Bridges & Boyd, 2016; Wilson, 1987). In the economic theory of marriage, Becker (1981) argues that the gains from marriage are the highest if men specialise in market production and women in household production. In other words, the gain from marriage 'lies in the mutual dependence of spouses' (Becker, 1981; Oppenheimer, 1997, p. 432). According to this theory, women's rising employment and rising independence have caused women's declining interest in marriage. However, Oppenheimer (1997) claims that there is little empirical evidence for this hypothesis and that studies often confuse non-marriage with what in reality is delayed marriage. She offers an explanation for the trend of delayed marriage in her Theory of Marriage Timing (Oppenheimer, 1988).

As Oppenheimer suggests, 'the timing of the transition to a stable work career has an important impact on marriage timing' (Oppenheimer, 1988, p. 586). She argues that the importance of men's economic prospects, paired with the uncertainty about adult work roles that people experience in young adulthood, leads to marriage postponement. In other words, while it is important for men to have a stable career before starting a family, their work roles may not be fully decided in young adulthood, and this can lead them to delay marriage. Past empirical research has provided findings in support of this hypothesis. For instance, in an analysis of 13 European countries, Kalmijn (2011) found that marriage is more sensitive to men's employment (being unemployed or in a temporary job) than cohabitation, which may explain why men with uncertain futures choose cohabitation instead of marriage. Other studies have also demonstrated that men's socioeconomic status, measured through job characteristics, income, education, or employment insecurity, is positively associated with union formation behaviour and intentions (Bolano & Vignoli, 2021; Gibson-Davis et al., 2005; Perdoch Sladká, 2023; Watson & McLanahan, 2011; Yu & Hara, 2020; Yu & Kuo, 2017), suggesting that economically disadvantaged men may see marriage as unattainable for them. Part of the reason why

they marry less may be that they are less interested in marriage, because they are afraid of being unable to provide for their future family (Nemoto et al., 2013; Yu & Hara, 2020).

Women's career development can also influence their union formation prospects. According to Oppenheimer (1997), women's increasing independence decreases their economic need for marriage and can lead them to delay marriage (rather than actually discouraging them from it). However, previous research showed that the relationship between women's jobs and their union formation plans and behaviour depends on the social context. Whereas women's better economic standing decreases their chances of marriage in contexts with highly segregated gender roles, it encourages marriage in more equal contexts (Kalmijn, 2013; Ono, 2003). In societies with higher gender inequality (including Czechia, which was one of the European countries with the highest levels of gender inequality in 2023 (European Institute for Gender Equality., 2023)), the expectations for the roles of men and women in marriage still differ to a great degree. For women who contribute significantly to household income, forming a marriage might lead to lost career opportunities or pressures to perform the majority of domestic chores and childcare tasks on top of performing paid work (Ono, 2003). For some women, thinking about marriage means choosing 'between marriage and family, on one side, and personal independence, on the other' (Gerson, 2010, p. 125). Conversely, as Bolano and Vignoli (2021) found, women with uncertain careers tend to focus on family life and have a higher probability of forming a union.

2.3 The Czech context

2.3.1 Labour market

At the turn of the centuries and in the following decades the task content of occupations underwent a transformation in Czechia, like in other European countries (Hardy et al., 2018, Figure 1). Routine manual tasks decreased the most – by almost 15% – between 1998 and 2015. According to Keister and Lewandowski (2017), people in highly routine jobs in Central and Eastern European countries tend to be middle educated and employed either in manufacturing (usually men) or the lower-paid service economy (usually women) (Keister & Lewandowski, 2017). Besides jobs intense in routine manual tasks, those rich in non-routine manual tasks also declined substantially, by around 10%, while

jobs intensive in cognitive routine tasks experienced a small increase of around 3.5%. Conversely, jobs involving cognitive (both analytical and social) non-routine tasks, performed mainly by tertiary-educated workers, increased by around 10–15% from 1998 to 2015 (Hardy et al. 2018, Figure 1). Reijnders and De Vries's analysis (2018) found that the increase in non-routine jobs between 1999 and 2007 was mostly due to technological changes (see Figure F.2 in Reijnders & De Vries, 2018). All in all, these developments contributed to the polarisation of the Czech labour market and resulted in poorer economic prospects among workers in disappearing occupations. According to Arntz et al., (2016), in 2012, 10% of Czech workers were at a high risk (more than 70%) of seeing their jobs automated, and the mean automatability was 44% – one of the highest means among OECD countries.

2.3.2 Marriage and gender roles

In Czechia, gender roles are still divided in households. According to Hamplová et al. (2019), the country presents a specific context where egalitarian attitudes toward women's employment and financial responsibility are mixed with traditional gender role norms. In qualitative interviews with Czech women, Tomešová Bartáková (2010) found that there is a significant gender gap in the division of labour in Czech households. This gender gap is further pronounced by the long parental leave that women usually take (Tomešová Bartáková, 2010) and by family policies that promote the roles of a male breadwinner and a female homemaker (Ciccia & Bleijenbergh, 2014).

Past evidence suggests that these relatively traditional gender roles in Czechia are manifest as differences in the association between economic uncertainty and marriage formation among women and men. For example, it has been shown that job insecurity is negatively associated with partnership satisfaction among men and positively among women (Zvoníček et al., 2023), suggesting that women turn to family more than men when their career seems uncertain. Likewise, while lower-educated men tend to avoid coresident partnerships because of their inability to fulfil the breadwinner role, women sometimes see marrying as a way of reducing their career and earnings uncertainty (Šťastná & Paloncyová, 2011).

Czechia is one of the countries in which marriage is still important and cohabitation acts mostly as a prelude to rather than a substitute for marriage (Heuveline & Timberlake, 2004). At the beginning of the 2020s, 63% of unmarried people in Czechia disagreed that marriage is an outdated institution – and this figure has actually increased since 2005 (Perdoch Sladká, 2024). Despite this fact, young adults continue to postpone marriage to an older age and instead enter unmarried cohabitation as their first coresident union (Kreidl & Štípková, 2012). All in all, Czechs continue to cohabit and postpone marriage if they feel they do not (yet) have what it takes to marry – whether that means money, stability, or status.

Research contributions and hypotheses

In this study, we investigate whether the ongoing structural transformations in the labour market, largely driven by technological change, may be contributing to changes in marriage formation in Czechia. More specifically, we investigate whether individuals in more routine jobs are less likely to formulate positive marital plans than those in non-routine jobs, in particular non-routine cognitive jobs. We also examine whether these relationships depend on a worker's gender. Given the persistence of the traditional gender division of labour in the country (Ciccia & Bleijenbergh, 2014; Hamplová et al., 2019), Czech men may be more hesitant to move their relationship forward if they have a job with an unpredictable future. For Czech women, by contrast, marriage and family may be an alternative to a career if they face poor labour market prospects. For these reasons, we expect:

Hypothesis 1: Among men, the increasing intensity of routine tasks will be associated with a higher probability of reporting no marital plans (rather than positive or uncertain marital plans). *Hypothesis 2*: Among women, the increasing intensity of routine tasks will be associated with a higher probability of reporting positive marital plans (rather than uncertain or no marital plans).

It should be noted that this is the first study to link job content with marital plans in the context of structural labour market change in Europe. Previous studies, conducted in the United States (Anelli et al., 2021; Autor et al., 2019), were limited to the macro level and investigated how changes in the job composition in a given region are associated

with changes in marriage rates. In this study, we move to the micro level and examine the role of individual job characteristics for workers' marital plans. This allows us to adopt a gendered perspective and avoid the risks of ecological fallacy.

3. Data and methods

3.1 Data

We use two data sources in our analysis. The individual data come from the five waves of the Czech Household Panel Survey (CHPS), which were collected in 2015–19. The data are freely available in Dataverse at https://archivdv.soc.cas.cz/dataverse/chps. CHPS is a survey that collects data on households in Czechia, irrespective of the household members' citizenship or ethnicity. In Wave 1 (2015), 5,159 households were interviewed. In the following years (2016, 2017, 2018, and 2019), the same households were invited to participate in the survey. The survey focuses on the following thematic areas: family life, time use, health, education and the labour market, social stratification, housing, political participation, and civil society (Kudrnáčová, 2020).

The second source of data is a set of measures of the task content of occupations developed by Matysiak et al. (2024a), which are freely available at Zenodo (Matysiak et al., 2024b). These measures build on past American studies on the task content of occupations by (Acemoglu & Autor, 2011; Autor et al., 2006), but instead of using the American database on occupations and their characteristics O*NET, the authors utilise the European Skills, Competences, Qualifications, and Occupations Database (ESCO), which can be used to measure non-routine cognitive (social and analytical) task intensity, routine task intensity, and manual task intensity, where social tasks are defined as 'those that are relevant for interpersonal interactions; analytical tasks are those connected to the mental process used to solve problems and digital skills; manual tasks refer to those that have a space-based component, such as driving, handling products or repairing; and routine tasks are those that are sufficiently well-understood so that a machine could be programmed to execute them' (Matysiak et al., 2024a, p. 10). The measures are continuous, with a higher value signifying that an occupation is more intense in a certain task. They were linked to our sample of respondents from the CHPS data by occupation. For respondents who were not working at the time of the data collection we used the

ISCO code of their last occupation. Next, they were standardised using weighted means and standard deviations to enhance the interpretation of the results.

3.2 Participants

In our analysis, we focused on respondents who had a partner in any of the waves of the CHPS and were not married to their partner. The variables used in the analysis come from the first wave in which the respondent reported having a partner. Thus, if the respondent reported having a partner in Wave 1, we use their data from this wave. If the respondent first reported having a partner in Wave 2, we use their data from Wave 2, etc.

Originally, there were 1,600 respondents aged 18–54 years who had a non-marital partner at the time of the interview in any of the five waves. We eliminated respondents who did not answer the question on marital plans (N = 64) or had a missing value on the ISCO code of their occupation (N = 124). For some respondents, information on the duration of their cohabitation was missing because the question on the beginning of cohabitation was not asked in Waves 3–5. Among those who first reported a cohabiting partner in Waves 3–5 and had participated in the previous wave (without being in a cohabiting relationship at that time), we assumed the shortest possible duration of cohabitation—i.e., one year. However, if Wave 3–5 was a respondent's first time participating in the survey and no prior information on partnership status was available, the individual was excluded from the analytic sample (N = 67). The final analytical sample consisted of 1,345 respondents (798 women and 547 men). We also constructed a more restricted sample in order to run additional analysis (described below) only for respondents currently in paid work (N = 959).

Table 1 shows the distribution of the sample by respondents' gender. In the whole sample, 47% of respondents reported no marital plans for the next three years, 38% answered they planned to marry in the next three years, and 15% answered *don't know* on their marital plans. There were no significant differences in the marital plans of women and men. Most of the respondents (36% of men and 31% of women) were 25–34 years old and did not have a child in their household (72% of men and 59% of women). The majority of the sample (80% of men and 64% of women) were never-married, while the rest were divorced or widowed. Also, 57% of men and 54% of women were cohabiting with their partner, while the rest lived in a separate household from their partner.

Table 1 Sample description, by respondents' gender. Czech Household Panel Survey, Waves 1–5 (2015–19). Respondents aged 18–54 years in non-marital partnerships.

	Men	Women	Total
N	547 (40.7%)	798 (59.3%)	1,345 (100.0%)
Marital plans			
No	262 (47.9%)	376 (47.1%)	638 (47.4%)
Don't know	78 (14.3%)	120 (15.0%)	198 (14.7%)
Yes	207 (37.8%)	302 (37.8%)	509 (37.8%)
Age category			
18–24	110 (20.1%)	165 (20.7%)	275 (20.4%)
25–34	195 (35.6%)	244 (30.6%)	439 (32.6%)
35–44	142 (26.0%)	225 (28.2%)	367 (27.3%)
45–54	100 (18.3%)	164 (20.6%)	264 (19.6%)
Child in the household			
No	391 (71.5%)	472 (59.1%)	863 (64.2%)
Yes	156 (28.5%)	326 (40.9%)	482 (35.8%)
Marital status			
Never-married	435 (79.5%)	508 (63.7%)	943 (70.1%)
Divorced/widowed	112 (20.5%)	290 (36.3%)	402 (29.9%)
Currently working			
No	105 (19.2%)	281 (35.2%)	386 (28.7%)
Yes	442 (80.8%)	517 (64.8%)	959 (71.3%)
Cohabiting			
Yes	313 (57.2%)	427 (53.5%)	740 (55.0%)
No	234 (42.8%)	371 (46.5%)	605 (45.0%)
Relationship/cohabitation duration			
Up to 3 years	291 (53.2%)	371 (46.5%)	662 (49.2%)
More than 3 years	216 (39.5%)	366 (45.9%)	582 (43.3%)
Missing	40 (7.3%)	61 (7.6%)	101 (7.5%)
Education			
Low	198 (36.2%)	259 (32.5%)	457 (34.0%)
Medium	228 (41.7%)	328 (41.1%)	556 (41.3%)
High	121 (22.1%)	211 (26.4%)	332 (24.7%)
Standardised values of manual	0.270 (1.109)	-0.185 (0.871)	-0.000 (1.000)
Standardised values of routine	-0.060 (0.834)	0.041 (1.098)	0.000 (1.000)
Standardised values of analytical	0.086 (0.991)	-0.059 (1.002)	0.000 (1.000)
Standardised values of social	-0.314 (0.680)	0.215 (1.121)	0.000 (1.000)

The most common duration of the relationship or cohabitation was up to three years, reported by 53% of men and 47% of women, followed by a duration of more than three years, reported by 40% of men and 46% of women. A total of 81% of men and 65% of women had paid work at the time of the interview, while the rest of the respondents were in other situations, such as unemployed, enrolled in education, on parental leave, etc. For these respondents, the independent variables (task content) refer to their last occupation.

Table 1 displays the mean values of the standardised task content variables for men and women. We can see men, on average, worked in jobs with a higher average value of manual and analytical tasks than women. On the other hand, women, on average, worked in jobs with a higher average value of routine and social tasks than men.

3.3 Analytical approach

The dependent variable was marital plans. Marital plans were measured by the question, 'Are you planning to marry your partner during the next 3 years?', to which the possible answers were *yes*; *no*; and *don't know, can't say*. For the independent variables we used the standardised measures of the task content of the respondents' occupation (based on its ISCO code) as described above.

The following variables were used as controls: age, relationship type, relationship/cohabitation duration, education, and a binary variable indicating whether there was at least one child in the respondent's household (regardless of whether they were biological, step, adopted, or foster children). These are the factors that are common predictors of marital plans and marital entry and their timing (see, for instance, Hiekel et al., 2015; Perdoch Sladká, 2023).

The data were analyzed using multinomial logistic regression models in a stepwise manner, with two main model specifications. The first specification focused on routine task intensity as a continuous variable, allowing for an examination of the linear relationship between the intensity of various tasks and marital plans. The second specification introduced routine task intensity as a categorical variable divided into quartiles (the first quartile contains respondents with the lowest routine task intensity, and the fourth contains those with the highest routine task intensity compared to the rest of

the sample) in order to reveal potential non-linear association. Other task content measures were included as continuous variables in both specifications, as they were not the primary focus of the analysis.

The analysis was conducted in two steps. First, models that included only the measures of task content as independent variables, without controls, were estimated. These are referred to as the first-step models (I). Second, full models that incorporated controls were estimated, referred to as full models (II). Additionally, all models were estimated separately for men and women, with models for men labeled (1) and those for women labeled (2).

For the continuous variable analysis, the first-step models are denoted as I.A.1 for men and I.A.2 for women, where routine task intensity was measured on a continuous scale. The full models are labelled as II.A.1 for men and II.A.2 for women, incorporating the same continuous variable approach.

For the categorical variable analysis, which utilized routine task intensity divided into quartiles, the first-step models are identified as I.B.1 for men and I.B.2 for women. Similarly, the full models with controls are labelled as II.B.1 for men and II.B.2 for women.

In total, eight models were estimated. The results presented in the subsequent sections focus on the findings from the full models only (i.e., II.A.1, II.A.2, II.B.1, and II.B.2). We mainly present the results in the form of predicted probabilities, which allow us to compare the probabilities of different outcomes of the variable marital plans at different levels of routine task intensity. Average marginal effects estimated by the models are documented in the Appendix for reference.

In addition to these models, we performed one robustness check, in which we excluded the nonworking respondents from our main sample and repeated the analysis (N = 959; 442 men and 517 women). As highly routine jobs are the most endangered by the current labour market transformations, it is possible that people previously working in highly routine jobs are overrepresented among those who are currently without paid jobs.[1]

[1] In our sample, nonworking people are overrepresented among those who belong to the category of occupations with high routine task intensity (for the nonworking respondents, the task intensity refers to their last occupation). Among men in the third and fourth quartile of routine task intensity, 26% and 27%

Moreover, current work situation is a predictor of entry to marriage (Perdoch Sladká, 2023). By performing the robustness check, we want to make sure that any significant relationship can also be found among working people in the sample, since respondents who were not working at the time of the interview were also assigned the task content measures, based on their previous occupation. All analyses were done using Stata 18 (StataCorp, 2023).

4. Results

In Figure 1, we present results from the full models in which routine task intensity is measured at a continuous scale (Models II.A.1 for men and Model II.A.2 for women) while in Figure 2 we present the results from the full models in which routine task intensity is a categorical variable (Models II.B.1 for men and Model II.B.2 for women). They show how the probability of all three outcomes of marital plans (*no*, *don't know*, *yes*) changes as the value of each task in the respondent's occupation increases from -1.5 standard deviations to +1.5 standard deviations (Figure 1) or from the first quartile to the fourth one (Figure 2). The full models on which these predictive margins are based can be found in Tables 2 and 3 in the Appendix.

The findings presented in Figure 1 for men suggest that the higher the routine task intensity, the more likely men are to report negative rather than positive marital plans. Men who work in occupations with very low routine task intensity (-1.5 SD) are as likely to express negative as they are to express positive marital intentions. At routine task intensity at 0.5 SD the probability of negative marital intentions among men is 51% and positive 37% (with the difference amounting to 14 percentage points). At 1.5 SD the difference is even larger and amounts to 19 percentage points. The average marginal effects in Table 2 show that the increase of 1 SD in routine tasks is weakly significantly associated with the increase in the probability of having no marital plans ($p < 0.1$; see Model II.A.1).

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were not working at the time of the interview, compared to 16% and 13% in the first and the second quartile. Among women in the third and the fourth quartile, 49% and 36% were not working, compared to 24% and 29% in the first and the second quartile.

Nonetheless, Figure 2 suggests that the relation between men's marital plans and the routine task intensity of their occupations is not linear. The significant difference in negative and positive intentions emerges only for men in occupations with very high routine task intensity (fourth quartile). The probability of expressing negative marital intentions for these men is 59%, while only 29% of them express positive marital intentions. The average marginal effects estimated in Table 3 show that men in the fourth quartile are significantly more likely to have no marital plans ($p < 0.05$) than those in the second quartile (see Model II.B.1). We also observe a growing gap between negative and uncertain marital intentions of men as the routine task intensity of their occupations increases. Altogether these findings provide partial support for our hypothesis 1 which stated that increasing intensity of routine tasks is associated with a higher probability of reporting no marital plans rather than positive or uncertain marital plans. We do observe a significant difference between men's negative and positive marital plans, but only for occupations with very high routine task intensity.

The findings for women mirror those for men. As can be seen in both Figures 1 and 2, the gap between negative and positive marital plans is the biggest among women in occupations that display small or medium routine tasks intensity (i.e., they are not in occupations with routine task intensity above 0.5 SD or, alternatively, in the fourth quartile), with these women being more likely to report negative than positive marital intentions. The same conclusions can be also reached on the basis of the marginal effects presented in Tables 2 and 3 which show that higher routine task intensity among women is positively related to higher likelihood of expressing positive marital intentions. We thus do not find support for our hypothesis 2 that the increasing intensity of routine tasks is associated with a higher probability of reporting positive marital plans rather than uncertain or no marital plans. Nonetheless, we do find that women in highly routine jobs express negative marital intentions as often as positive, and women's positive marital intentions are clearly higher if they are in jobs with very high routine task intensity compared to jobs with medium or low routine task intensity.

Fig. 1 Predictive margins (with 90% Cis) of routine task intensity (continuous variable) for respondents' marital plans, based on the full models (Models II.A.1 and II.A.2), separate for men and women. Czech Household Panel Survey, waves 1–5 (2015–19). Respondents aged 18–54 years in non-marital partnerships. N = 547 men and 798 women.

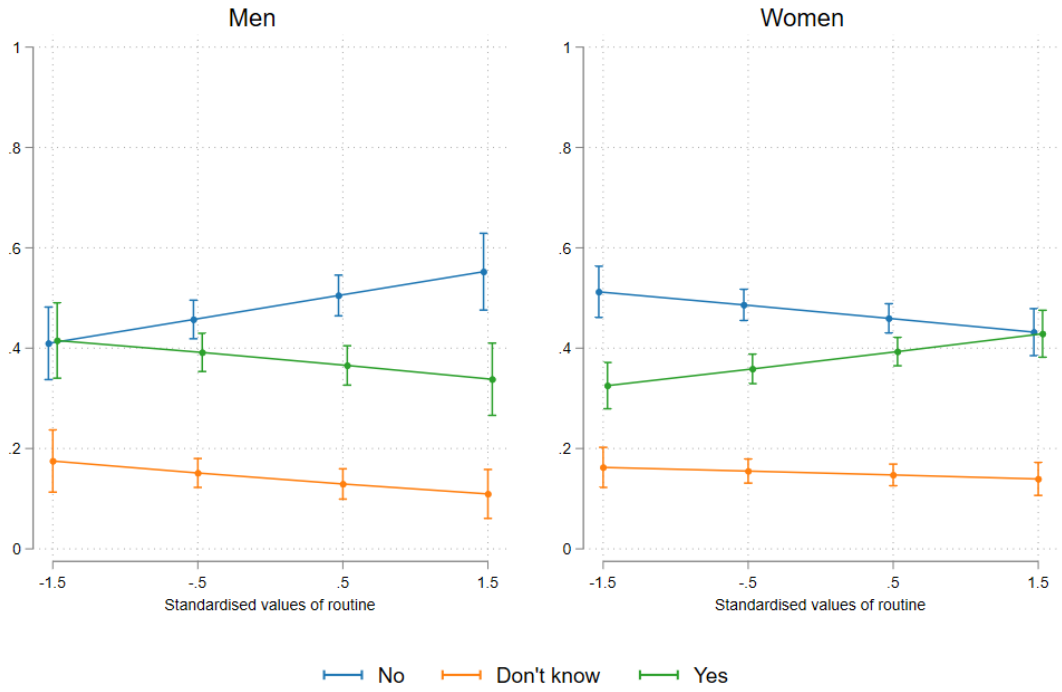
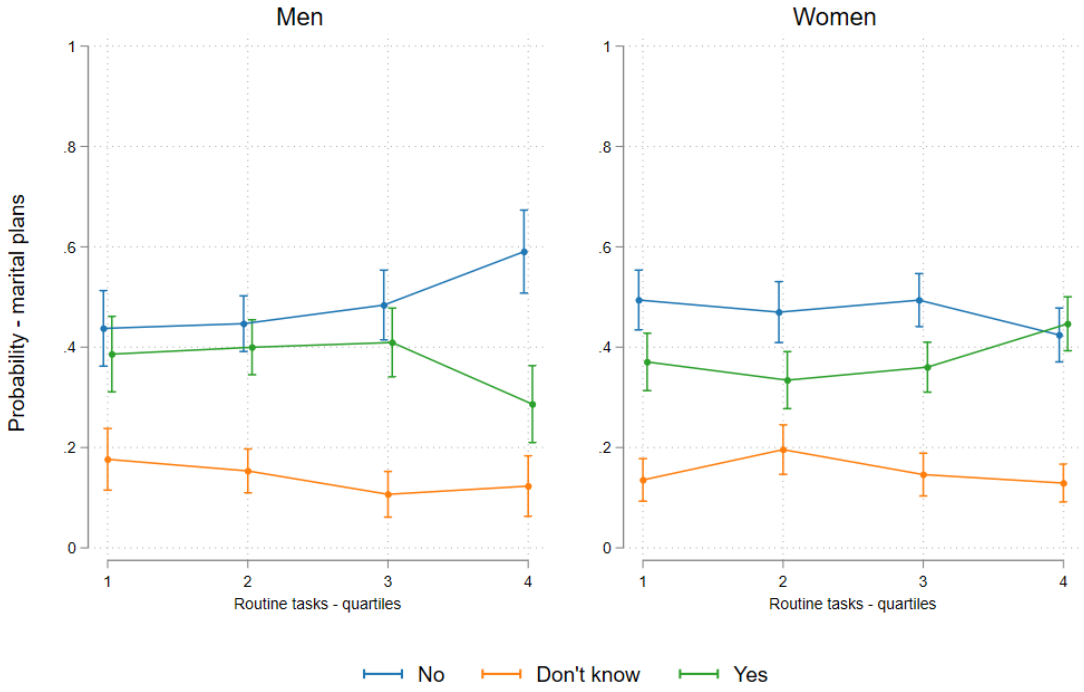


Fig. 2 Predictive margins (with 90% Cis) of routine task intensity (categorised into quartiles) for respondents' marital plans, based on the full models (Models II.B.1 and II.B.2), separate for men and women. Czech Household Panel Survey, waves 1–5 (2015–19). Respondents aged 18–54 years in non-marital partnerships. N = 547 men and 798 women.



Apart from the main analysis, we performed a robustness check on a restricted sample, containing only respondents who are currently working. Two versions of this analysis are presented in the Appendix. Figure 3 illustrates the predictive margins of routine task intensity as a continuous variable. Figure 4 shows the predictive margins of routine task intensity divided into quartiles. Full models are available upon request.

Figure 3 shows that the patterns of the relationship between routine tasks and marital plans among working men are similar to the pattern recorded in the full sample of men (see Figure 1), with the probability of negative marital intentions increasing with the increasing value of routine tasks, while the probability of positive marital intentions decreases. The linear relationship is stronger among working men than the full sample – the confidence intervals of the probability of having no marital plans do not overlap at -1.5 SD and +1.5 SD; thus, men in highly routine jobs are more likely to report no marital

plans than those with a low number of routine tasks. Figure 4 illustrates the relationship between routine task intensity divided into quartiles and the probability of marital plans among men and women in the restricted sample. The results for men are in line with the findings from the full sample (see Figure 2). Working men in the fourth quartile (with the most routine intense jobs) are less likely to have marital plans for the next three years compared to men in the first and the second quartiles, and their probability of having negative marital intentions is significantly higher than the probability of positive intentions.

In the restricted sample of women, the linear relationship between routine task intensity and marital plans is a little weaker than in the full sample, as the confidence intervals of the probability of positive marital intentions overlap slightly at -1.5 SD and +1.5 SD (see Figure 3). Women in the fourth quartile of routine tasks are more likely to have positive marital plans than those in the second quartile, but this difference is not significant (see Figure 4). Neither is the difference between positive and negative marital intentions significant at first or second quartile. Overall, Figure 4 shows that the pattern of the relationship among women is not as clear as that among men, and the association we found in the full sample of women (see Figures 1 and 2) does not seem to apply to the restricted sample.

5. Discussion

The task content of occupations continues to gain in importance as an indicator of socioeconomic position as the labour markets of developed countries go through large structural changes. This transformation, which is causing a decline in routine jobs and an increase in jobs that are intense in nonroutine cognitive tasks, is predicted to permanently change people's economic prospects (Anelli et al., 2021). Since economic prospects are important determinants of family formation, including marriage (Bolano & Vignoli, 2021; Matysiak et al., 2021), these structural transformations can impact the family-related behaviours of young adults (Anelli et al., 2021, p. 2). Unlike cyclical swings in the economy, which have the potential to change the timing of demographic events and may lead to their postponement, the recent structural changes have the potential to impact the occurrence of these events (Matysiak & Vignoli, 2024), especially among people performing jobs that are disappearing.

Whereas a person's current employment situation (for example, being unemployed or in a temporary job) can lead to marriage postponement (Kalmijn, 2011), job task content is directly linked to their future economic prospects. Therefore, job task content could be another important determinant of partnership plans and transitions. However, the relationship between job task content and marital plans has not been researched. This study filled this research gap. Namely, we analysed men's and women's marital plans for the next three years in relations to their job task content, using individual data from the Czech Household Panel Survey (2015–19) and measures of the task content of occupations developed by Matysiak et al. (2024a, 2024b) using the European Skills, Competences, Qualifications and Occupations Database (ESCO). Our research is based in Czechia, a context where there is a relatively strong division of gender roles (Ciccia & Bleijenbergh, 2014; Hamplová et al., 2019) and a high value is placed on marriage (Perdoch Sladká, 2024). We hypothesised that among men the higher intensity of routine tasks would be associated with a higher probability of reporting no marital plans compared to positive or uncertain plans (*hypothesis 1*), while among women we expected the greater intensity of routine tasks would be associated with a higher probability of reporting positive marital plans compared to uncertain or no marital plans (*hypothesis 2*).

Our findings supported hypothesis 1, but only for men in occupations with very high task intensity. While men in occupations with low or medium routine task intensity are equally likely to express positive and negative marital intentions, those in highly routine jobs are significantly more likely to express negative than positive intentions. They are also more likely to express negative marital intentions than men in occupations with low routine task intensity. These results were consistent with a robustness check that we performed on a restricted sample consisting of respondents who currently have paid work. In other words, the higher probability of reporting no marital plans among men in highly routine occupations does not seem to be affected by the current employment situation. These results indicate that men in very routine-intense occupations, who have the highest risk of being affected by the labour market changes, are also the least likely to have plans to marry in the short-term, regardless of whether they currently have a job or not. Prior research has shown that only jobs with very high routine task intensity, where more than 70% of tasks are classified as routine, are at risk of becoming obsolete (Arntz et al., 2016; Nedelkoska and Quintini, 2018). In contrast, occupations with lower levels

of routine task intensity tend to involve a mix of automatable and non-automatable tasks, meaning that while these jobs may undergo significant restructuring, they are less likely to disappear entirely. This distinction helps explain why we observe a predominance of negative over positive marital intentions only among men in the most routine-intensive occupations: the heightened risk of job loss or obsolescence in these roles likely contributes to greater uncertainty and reluctance to commit to long-term partnerships.

We did not find support for hypothesis 2, as women in highly routine occupations (+1.5 SD, or the fourth quartile) were similarly likely to have positive and negative marital intentions. However, we did find that the probability of reporting positive marital plans grew with the increasing routine task content of occupations, while the probability of having no marital plans decreased slightly (see Figure 1), suggesting that women in routine intense occupations are more likely to plan for marriage than their counterparts in less routine intense occupations. Both the linear and the categorised measure of routine task intensity showed weaker association with marital plans among the restricted sample of women who are currently working than in the full sample.

Three main implications stem from these findings. First, the content of people's jobs is associated with their marital plans, and this confirms that job task content is an important determinant of union formation, alongside other frequently studied determinants such as education and employment status (Kalmijn, 2011, 2013; Vergauwen et al., 2017). Second, our findings suggest that ongoing labour market transformations driven by technological change are not only diminishing the earning and employment opportunities of male workers with secondary education but are also hindering their chances of forming marital unions. As the technological transformation progresses and new developments, such as artificial intelligence, make an increasing number of work tasks redundant, the pool of those exposed to automation will likely increase, and so will the share of non-marriageable men. These changes may have important repercussions for men's opportunities to form families and have children as well as their mental health. At the macro level they may also result in declining fertility rates as an increasing proportion of men (and women) will be unable to form couples. Finally, our findings also send an important message about the role of women in Czech society, illustrating that women who are in a disadvantaged position in the labour market are more willing to marry and likely follow a traditional division of labour.

4.1 Limitations and further research

Our analysis focused on only one stage in the process towards marriage: the marital plans of persons who are already in unions. However, socioeconomic differences may already play a role earlier in a person's life trajectory in determining who is able to form an informal union. If men in routine jobs are less likely and women more likely to form unions in general, the negative impact of routine task intensity on men's marital plans that we observed is underestimated (the same conclusion applies for women). However, we checked the selection in our data and found that routine task intensity is not associated with the chances of having a partner among either men or women. Furthermore, even if people who have a partner intend to marry them, the realization of their intentions is not always in their hands and can be affected by the other partner's intentions and expectations regarding marriage (Cho et al., 2018; Perdoch Sladká, 2023; Waller & McLanahan, 2005) as well as by life-course factors (Liefbroer et al., 1994), including both partners' job situation. For instance, do the partners of women in highly routine jobs also work in occupations intense in routine tasks (in which case they would be less eager to marry) or in occupations intense in non-routine tasks (in which case marriage may be more likely to happen)? The role of job task content further along in the process towards marriage should be investigated in future research.

Our outcome variable referred to respondents' short-term marital plans. Ideally, we would also examine how job task content is associated with men's and women's longer-term plans to marry or overall marital expectations. However, these data were not available. Nor were we able to analyse the cross-over effects of partners' job task content on their marital intentions, as this would further limit our already relatively small sample. Future research, based on larger datasets, should be aimed at conducting such a couple-level analysis, as one partner's characteristics can also impact the other partner's marital plans (Perdoch Sladká, 2023). Furthermore, our sample might include some people who are currently in a same-sex partnership (despite same-sex marriage not being legal in Czechia as of April 2025), but we were not able to identify them because the question on the partner's sex is not available in the data. We expect the number of such couples to be very small, and thus unlikely to influence our findings. Last, in our study we were not

able to make causal inferences about the effects of having a routine job on partners' marital plans. While it is likely that worse or better economic prospects (depending on respondents' gender) lead people to hesitate to marry or to delay marriage, we cannot rule out the possibility that there are other factors contributing to the differences found in this study. For these reasons, we refrain from claiming causal effects, leaving that for future investigations.

6. Conclusion

Our study contributes to research examining the link between job characteristics and union formation. This study is the first to analyse the association between job task content and marital plans. It enriches the body of research that focuses mainly on the link between structural changes in the labour market and fertility (Bogusz et al., 2024; Matysiak et al., 2023) by looking at another aspect of family dynamics. The findings reveal that men in highly routine jobs who are the most at risk from the recent structural labour market changes and have worse economic prospects are also more likely to report no marital plans for the next three years. The findings suggest gender differences in the job–union formation link, which is in line with the previous research finding that men's worse economic prospects have a more negative impact on the chances of union formation than women's economic prospects have on their chances of union formation.

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Tables and figures

Appendix

Table 2 Estimated average marginal effects from the multinomial logistic regression models of respondents' marital plans (outcomes *no*, *don't know*, *yes*). Separate models for men and women. Czech Household Panel Survey, Waves 1–5 (2015–19). Respondents aged 18–54 years in non-marital partnerships. N = 547 men and 798 women.

	Men						Women					
	Model I.A.1			Model II.A.1			Model I.A.2			Model II.A.2		
VARIABLES	**No**	**Don't know**	**Yes**	**No**	**Don't know**	**Yes**	**No**	**Don't know**	**Yes**	**No**	**Don't know**	**Yes**
Standardised values of routine	0.051*	-0.023	-0.029	0.048*	-0.022	-0.026	-0.019	-0.011	0.030*	-0.027	-0.008	0.035**
	(0.030)	(0.020)	(0.029)	(0.027)	(0.021)	(0.027)	(0.018)	(0.013)	(0.017)	(0.017)	(0.012)	(0.016)
Standardised values of manual	-0.020	-0.009	0.028	-0.037	-0.007	0.044*	0.041*	-0.023	-0.018	0.005	-0.013	0.008
	(0.025)	(0.019)	(0.024)	(0.025)	(0.020)	(0.024)	(0.022)	(0.017)	(0.022)	(0.022)	(0.017)	(0.021)
Standardised values of analytical	0.009	-0.004	-0.006	0.024	-0.001	-0.024	-0.008	0.020	-0.011	0.002	0.013	-0.015
	(0.023)	(0.016)	(0.022)	(0.022)	(0.016)	(0.022)	(0.020)	(0.013)	(0.019)	(0.018)	(0.013)	(0.018)
Standardised values of social	-0.009	0.009	0.000	-0.023	0.015	0.008	0.019	-0.043***	0.023	0.009	-0.042***	0.032*
	(0.035)	(0.023)	(0.034)	(0.033)	(0.023)	(0.033)	(0.019)	(0.014)	(0.018)	(0.018)	(0.014)	(0.017)
Age category (ref. 18-24)												
25-34				-0.037	0.030	0.007				-0.164***	0.058	0.106**
				(0.063)	(0.049)	(0.068)				(0.054)	(0.036)	(0.054)
35-44				0.105	0.046	-0.150**				0.019	0.072	-0.090
				(0.072)	(0.056)	(0.074)				(0.066)	(0.045)	(0.062)

45-54	0.328***	-0.031	-0.297***	0.121	0.047	-0.168**
	(0.079)	(0.055)	(0.079)	(0.074)	(0.050)	(0.068)
Child in the household (ref. No)						
Yes	0.028	0.003	-0.032	0.106***	-0.023	-0.083**
	(0.053)	(0.039)	(0.050)	(0.040)	(0.030)	(0.038)
Divorced/widowed (ref. No)						
Yes	-0.048	0.014	0.034	0.067	-0.002	-0.065
	(0.065)	(0.051)	(0.068)	(0.049)	(0.037)	(0.048)
Currently working (ref. No)						
Yes	-0.139**	0.001	0.137***	-0.041	-0.019	0.061*
	(0.057)	(0.044)	(0.052)	(0.039)	(0.031)	(0.036)
Cohabiting (ref. Yes)						
No	0.302***	-0.029	-0.272***	0.227***	0.066**	-0.293***
	(0.048)	(0.035)	(0.045)	(0.036)	(0.027)	(0.033)
Relationship/cohabitation duration (ref. up to 3 years)						
More than 3	0.040	-0.029	-0.011	0.034	0.009	-0.043
	(0.045)	(0.033)	(0.044)	(0.037)	(0.027)	(0.036)
Missing	0.013	0.088	-0.101	-0.109*	0.153**	-0.044

				(0.081)	(0.073)	(0.078)				(0.064)	(0.060)	(0.062)	
Education (ref. Low)													
Medium				-0.030	-0.026	0.055				-0.060	0.014	0.046	
				(0.049)	(0.038)	(0.047)				(0.041)	(0.030)	(0.039)	
Tertiary				-0.095	-0.014	0.109*				-0.147***	0.085**	0.062	
				(0.063)	(0.049)	(0.063)				(0.051)	(0.040)	(0.048)	
N	547	547	547	547	547	547	798	798	798	798	798	798	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors in parentheses.

Table 3 Estimated average marginal effects from the multinomial logistic regression models of respondents' marital plans (outcomes *no*, *don't know*, *yes*) with routine task intensity categorized into quartiles. Separate models for men and women. Czech Household Panel Survey, Waves 1–5 (2015–19). Respondents aged 18–54 years in non-marital partnerships. N = 547 men and 798 women.

	Men						**Women**					
	Model I.B.1			**Model II.B.1**			**Model I.B.2**			**Model II.B.2**		
VARIABLES	**No**	**Don't know**	**Yes**	**No**	**Don't know**	**Yes**	**No**	**Don't know**	**Yes**	**No**	**Don't know**	**Yes**
Routine task intensity (ref. 2nd quartile)												
1st quartile	-0.001	0.025	-0.024	-0.009	0.023	-0.014	0.026	-0.058	0.031	0.024	-0.060	0.036
	(0.060)	(0.046)	(0.061)	(0.057)	(0.046)	(0.057)	(0.056)	(0.042)	(0.053)	(0.053)	(0.040)	(0.050)
3rd quartile	0.071	-0.043	-0.028	0.037	-0.047	0.010	0.030	-0.072*	0.041	0.024	-0.050	0.026
	(0.057)	(0.039)	0.056	(0.054)	-0.047	(0.054)	(0.052)	(0.039)	(0.050)	(0.050)	(0.040)	(0.047)
4th quartile	0.199 ***	-0.038	-0.160 ***	0.144**	-0.030	-0.113*	-0.032	-0.067*	0.099*	-0.046	-0.067*	0.112**
	(0.064)	0.044	0.059	(0.062)	(0.046)	(0.058)	(0.053)	(0.039)	(0.051)	(0.049)	(0.037)	(0.047)
Standardised values of manual	-0.030	-0.008	0.038	-0.041*	-0.008	0.049**	0.039*	-0.022	-0.017	0.006	-0.015	0.009
	(0.025)	(0.018)	(0.024)	(0.024)	(0.019)	(0.024)	(0.022)	(0.017)	(0.022)	(0.022)	(0.018)	(0.021)
Standardised values of analytical	0.017	-0.008	-0.009	0.029	-0.004	-0.026	-0.008	0.014	-0.006	0.002	0.007	-0.009
	(0.023)	(0.016)	(0.023)	(0.022)	(0.017)	(0.022)	(0.020)	(0.013)	(0.019)	(0.019)	(0.013)	(0.018)
Standardised values of social	-0.029	0.011	0.018	-0.037	0.017	0.019	0.022	-0.033**	0.011	0.015	-0.034**	0.019
	(0.036)	(0.023)	(0.035)	(0.033)	(0.024)	(0.033)	(0.019)	(0.014)	(0.018)	(0.017)	(0.014)	(0.017)
Age category (ref. 18-24)												

25-34	-0.034	0.031	0.003	-0.157***	0.054	0.103*
	(0.063)	(0.048)	(0.068)	(0.054)	(0.037)	(0.054)
35-44	0.105	0.044	-0.148**	0.029	0.071	-0.100
	(0.072)	(0.055)	(0.074)	(0.066)	(0.046)	(0.062)
45-54	0.324***	-0.028	-0.296***	0.131*	0.046	-0.177***
	(0.079)	(0.056)	(0.079)	(0.074)	(0.050)	(0.068)
Child in the household (ref. No)						
Yes	0.023	0.007	-0.030	0.107***	-0.024	-0.082**
	(0.053)	(0.040)	(0.050)	(0.040)	(0.030)	(0.038)
Divorced/widowed (ref. No)						
Yes	-0.046	0.015	0.031	0.066	-0.002	-0.065
	(0.065)	(0.051)	(0.068)	(0.049)	(0.037)	(0.048)
Currently working (ref. No)						
Yes	-0.133**	-0.003	0.136***	-0.038	-0.019	0.057
	(0.057)	(0.046)	(0.053)	(0.039)	(0.031)	(0.036)
Cohabiting (ref. Yes)						
No	0.292***	-0.030	-0.262**	0.230***	0.065**	-0.295**

						*						*
				(0.049)	(0.036)	(0.046)				(0.036)	(0.027)	(0.033)
Relationship/cohabitation duration (ref. up to 3 years)												
More than 3				0.039	-0.028	-0.011				0.034	0.008	-0.042
				(0.045)	(0.033)	(0.044)				(0.037)	(0.027)	(0.036)
Missing				0.011	0.091	-0.102				-0.108*	0.149**	-0.041
				(0.081)	(0.074)	(0.078)				(0.064)	(0.060)	(0.062)
Education (ref. Low)												
Medium				-0.033	-0.029	0.063				-0.052	0.011	0.040
				(0.049)	(0.038)	(0.047)				(0.042)	(0.030)	(0.040)
Tertiary				-0.104	-0.019	0.122*				-0.133**	0.089**	0.044
				(0.064)	(0.049)	(0.064)				(0.052)	(0.042)	(0.050)
N	547	547	547	547	547	547	798	798	798	798	798	798

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors in parentheses.

Fig. 3 Predictive margins (with 90% Cis) of routine task intensity for respondents' marital plans, based on models with control variables, separate for men and women. Czech Household Panel Survey, waves 1–5 (2015–19). Respondents aged 18–54 years in non-marital partnerships. Restricted sample – only people who are currently working. N = 442 men and 517 women.

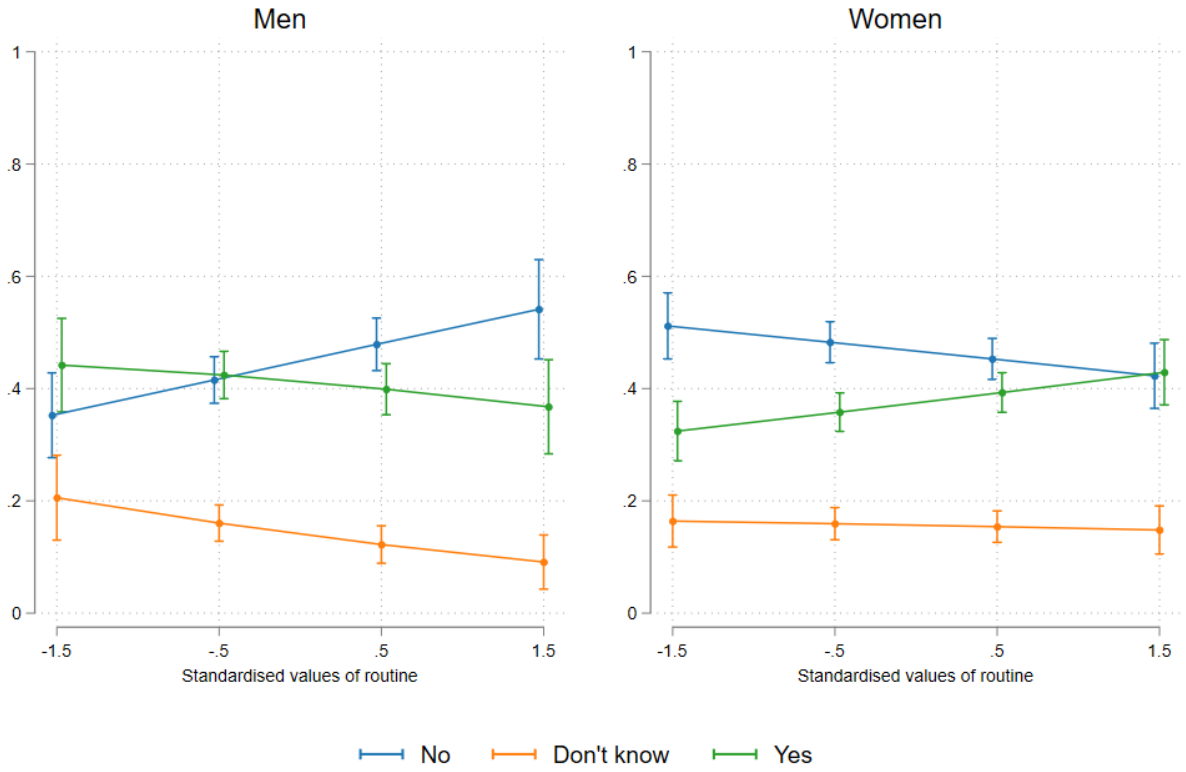
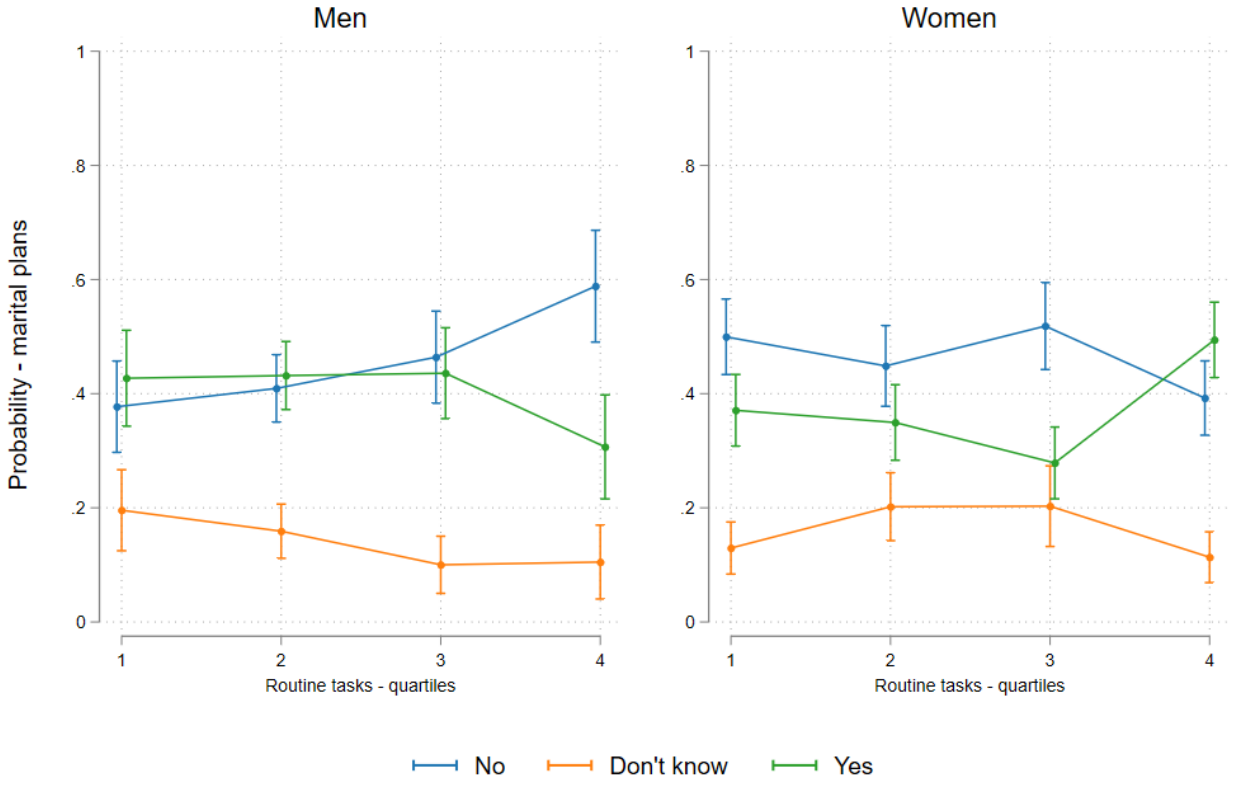


Fig. 4 Predictive margins (with 90% Cis) of routine task intensity (categorised into quartiles) for respondents' marital plans, based on models with control variables, separate for men and women. Czech Household Panel Survey, waves 1–5 (2015–19). Respondents aged 18–54 years in non-marital partnerships. Restricted sample – only people who are currently working. N = 442 men and 517 women.



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