THE CREATION AND RESOLUTION OF WORKING HOURS MISMATCHES: THE ROLE OF PERSONALITY TRAITS

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Abstract

The current research uses a nationally representative panel survey data to identify the role played by personality traits (specifically, locus of control and the "big five") on the resolution of work hour mismatches in Australia. While the current literature has mainly focused on the role of observable socio-demographic characteristics, a considerable amount of individual heterogeneity remains unexplained. This research aims to fill part of this gap, by exploring the effect of personality traits in the mismatches' resolution rates. These first provisional results show that personality traits have a non-negligible impact, and that they influence differently how men and women try to resolve their condition of underemployment and overemployment.

Keywords: labour supply, hour mismatches, personality traits, panel data, HILDA

JEL classifications: J21, J22

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Introduction

The recent literature on work hours mismatches has focused on demonstrating that, differently from what the neoclassical theory sustains, workers are not always free to choose their working time (Altonji, 1990; Martinez-Granado, 2004; Reynolds, 2006; Otterbach, 2009): in advanced economies, a big portion of workers faces hours constraints between their desired and the actual time of work. Also, being constrained is usually associated with lower levels of well-being, mental health and job satisfaction. (Bell, Otterbach, and Sousa-Poza 2012; Kugler, Wiencierz, and Wunder 2014; Wooden, Warren, and Drago 2009; Angrave & Charlwood, 2015). Compared with underemployment, overemployment looks to have a more detrimental effect on workers, and it is also more difficult to resolve. Other researches have focused on the determinants of the mismatches. Böheim & Taylor (2003), for example, have demonstrated that both job and family characteristics, such as firm tenure, type of contract, number of children and marital status, are related with being under or overemployed. By controlling for observable characteristics to examine labour supply preferences, Bryan (2002) found out that unconstrained workers' hours are determined differently from those of constrained workers, and that not only wage determines those preferences.

More recently, researchers have explored whether and how constrained workers are able to resolve their mismatches. Böheim & Taylor (2004) showed that both underemployed and overemployed people that change job have the best chances to resolve their mismatches. Also, socio-demographic characteristics are related to reducing or increasing hours in the direction of the preferred hours. For example, overemployed workers with greater financial resources and with higher educational levels have more chances to reduce their hours. Otterbach and Knaus (2019) have recently reached a similar result. By dismantling the resolution of mismatch in its two possible channels (increasing or reducing the actual hours towards the preferred hours or adapting the preferences to the actual hours) they show that people that change job have more possibilities of resolving the mismatches by adapting the actual hours rather than the preferences. According to Böheim & Taylor (2004), socio-demographic and job characteristics cannot explain roughly 40% of the total variance of labour supply preferences and the possibility of falling in mismatch, which rely on unobservable individual specific effects. Also, a big portion of job mobility and resolution rates are due to individual characteristics.

In this paper we aim to fill part of this gap by accounting for the individual heterogeneity, by observing the role of personality traits. We use Australian longitudinal data to uncover how resolution rates vary between individuals with different personality traits. We focus on a short-term resolution (the following year) both for underemployed and overemployed workers.

This paper's contributions to the scarce literature in mismatch resolution are manifold. First, we take in consideration how personality traits determine the resolution oh working hours mismatches. We aim, in this way, to partially shed light on the unexplained individual heterogeneity that shapes the labour supply

preferences. Second, similar to Bryan (2002), we aim to overcome the issue of selection bias of people that first fall in mismatch and then try to resolve it. We do that through an ex-ante matching and fixed effect approach considering the mismatch as treatment. This way, we control for the role of personality traits in falling in mismatch and we observe their causal effect in resolving them. Third, we use two channels of resolution of mismatch: changing job and adjusting the hours of work.

The results show that people react differently to work hours mismatches on the base of their personality traits and asymmetrically per overemployment and underemployment. Especially, underemployed people tend to increase their working hours in the following year, and 'positive' traits (such as internal locus of control or conscientiousness) make people more likely to reduce the mismatches. On the other hand, overemployed people appear to increase their working hours in the following year, and this result is driven by the same positive traits. Finally, there is a strong difference for men and women: psychology looks more influential for women in underemployment, and for men in overemployment.

The paper is structured as follows: section one briefly presents the literature on personality traits as predictor of labour market outcomes. Section two describes the HILDA survey, the dataset used for this research. Section three shows the empirical strategy, focusing on the ex-ante propensity score and fixed effect estimation. Section four focuses on some descriptive statistics about labour supply and working time and preferences. Finally, section five presents and discuss the results.

1. Literature Review: personality traits and labour market outcomes

This paper focuses on the causal effect of personality trait on resolving (or increasing) work hours mismatches. Recently, a part of the economic literature focused on the relationship between personality traits and labour market outcomes. Even if there are still some degrees of uncertainty, researchers agree on the effect of some of these traits on the labour market.

The first trait taken in exam is the locus of control, which is defined as a generalized expectation about the impact of people's actions on the external world (Rotter, 1966). People with internal locus of control (called here 'internals') believe that their actions do have an effect, and what happens to them depends on their own decisions. This make them more proactive persons. People with external locus of control, on the other hand, think that they do not really have control in what happens to them, and what they do cannot change their 'fate'. This believe translates in a more passive approach to life (Weiner 1972). Internal people usually perform better in the labour market, both in terms of type of job and wages (e.g. Cobb-Clarck, 2015; Heineck and Anger, 2010; Piatek and Pinger, 2010; Semykina and Linz, 2007; Osborne Groves, 2005; Goldsmith et al, 1997; Duncan and Dunifon, 1998) and they tend to commit more to find a new job if unemployed (they believe that their efforts would have an effect, so they are more incline to look for it) (Caliendo, 2012; McGee & McGee, 2016)

Emotional stability is the capacity of processing the life events without being overcome by negative emotions like anger, worry, frustration and sadness, as well being personally sensitive (Heckman et al, 2011). Its counterpart, called 'neuroticism', describes anxious people and can be related with emotional pathological disorders and it combines with a perception that the environment is dangerous and threatening (Barlow et al, 2014). Neuroticism is negatively correlated with wages and productivity (Cubel, 2014; Nyhus & Pons, 2004) and with being employed (Fletcher**,** 2013) and positively correlated with blue collar jobs (Ham et al, 2009). Also, neuroticism affects negatively the relationship between income and life satisfaction (Proto & Rustichini, 2015).

Conscientiousness is defined as the propensity to follow socially prescribed norms, to be goal directed, to plan, and to be able to delay gratification (Roberts et al, 2009). It is used as a synonym of efficiency and being diligent. Conscientious people are generally organised, disciplined, methodical and goal directed. They are more likely to correctly perform and to stay focus on their duties and to take initiative to solve issues (Barrick et al, 2002). According to different authors, this is the best predictor of better job performances (Judge, 1999), even if it may depend on the type of job (Baron et al, 2000). This trait is found to be highly correlated with positive occupational achievement (type if job and wages) (Ham et all, 2009) and with being employed (Fletcher**,** 2013). Also, Bakker et al (2011) demonstrated that high levels of conscientiousness are related to higher work engagements, job performances and active learning.

The results on agreeableness, extroversion and openness are more controversial. Agreeableness has to do with social interactions, and it consists in the tendency to agree and go along with others rather than to assert one's own opinions and choices (Jensen-Campbell & Graziano, 2001). Agreeable people are kind, cordial, caring, tolerant and loyal (Corr & Matthews, 2009). It is composed by a continuum between from compassion to antagonism and it influences the self-image and helps to shape social attitudes and philosophy of life towards trust, straightforwardness, altruism, compliance, modesty, and tender-mindedness (Costa, McCrae & Dye, 1991). Different research found out different effects of agreeableness on labour market outcomes. According to Muller and Plug (2006), agreeableness it is negatively correlated with wages and jobs; the interpretation is that competitive markets reward egoistic people rather than altruistic. On the other hand, Cobb-Clark & Tan (2009) found out that agreeableness is positively correlated with being a manager for men, but it has negative outcomes for women, meaning that altruistic women tend to be overcome in the labour market. A way to solve the puzzle is to look at type of job: as Barrick et al (2002) and Borghans et al (2008) demonstrated, agreeable people perform better in jobs which require interpersonal skills and interactions, while antagonistic people, even with high level of consciousness, do bad.

Extraversion defines people that are talkative, sociable, and which have a strong social network, and it is correlated with behavioral facets of sociability, expressiveness, assertiveness, and motivation (Lukaszewski, Rueden, 2015). Adjective used to describe extroverted people are: vigorous, assertive, enthusiastic, spontaneous, exuberant, talkative (Corr & Matthews, 2009). In the labour domain, this trait is

expected to be related with interest at work, with entrepreneurial and social behavior and with leadership positions (George, Helson & John, 2011). Langelaan et al (2006) found a positive correlation between high level of extraversion and work engagement, defined as a fulfilling, work-related state of mind, characterized by high levels of energy while working, dedication, inspiration, pride, and challenge, and absorption on the duty.

Finally, openness describes open-minded people who like to try new experiences, ideas and feelings. "The trait of Openness can be characterized by descriptors such as imaginative, spontaneous and adventurous. Individuals who are high on this trait tend to be curious, imaginative and unconventional. People scoring lower in this dimension tend to be cautious and more conservative in their thinking". (Corr & Matthews, 2009, p. 534). McCrae (1996) found out a positive correlation between this trait and political ideas. Open people tend to be liberal, tolerant progressive, and generally they belong to the left-wing, while closeness is correlated with authoritarianism. Historically, openness has been considered in two domains: the cultural one, as the result of a liberal and progressive education (often correlated with higher class status), and the cognitive one, as the ability of learning a reason (McCrae & Costa, 1997). In this second conceptualization, openness is usually related with divergent and creative thinking. As per labour market outcomes, openness is related with low interest for routine duties and details and seek for autonomy and creative jobs (George, Helson & John, 2011). It seems to be positively correlated with wages, suggesting that being creative, unconventional and artistic is important for men and women working in all types of occupations (Muller and Plug, 2006). It also easies unemployed women to find a job (Uysal, 2011). Caliendo, Fossen and Kritikos (2011) examined the relation between personality traits and the probability of being and surviving as entrepreneur, and they found out that self-entrepreneurs are usually open and extravert.

To conclude, it appears that personality traits shape the labour marker history of workers. Our starting point is that also the resolution of work hours mismatches can be predicted, in part, by personality traits. We expect that people with internal locus of control, which are supposed to be more proactive, are more likely to resolve the. Conscientious people, namely efficient workers which tend to follow the rules, are generally expected to be in full-time and permanent job. If we assume that working more hours is more socially acceptable than working few hours (at least for men, Powdthavee, 2018), conscientious people may be more likely to resolve underemployment but, at the same time, to remain in overemployment (a sort of a negative effect of being too much diligent). Also, diligent people that need money for themselves or for the family are more likely to accept long hours. Finally, agreeable people are found to suffer more in competitive markets. So, we expect them to be more likely to increase their mismatches than their counterparts (the so-called 'antagonistic'). Extroversion and openness are generally related to high level jobs (Langelaan, 2016; Borghans, 2018; Nieß & Zacher, 2015), so we expect them to be negatively related to underemployment and, potentially, positively related with overemployment.

2. The dataset

Outcomes

The dataset used in this study is the Household, Income and Labour Dynamics in Australia (HILDA), a panel survey data representative of the Australian population. The HILDA survey is one of the few panel data that collect information in these different fields: work, family and psychological characteristics. Started in 2001, with a national probability sample of Australian households, this survey follows, every year, around 2000 individuals, for a total of 18 waves. Our study follows the same individuals from wave 1 to wave 17. We kept in the operative sample all the individuals older than 25 and younger than 60. The rationale of this choice is not only to follow people in the working age. As Cobb-Clark has demonstrated in a study conducted on HILDA (2012, 2013), personality traits and the locus of control are reasonably stable between this age range. Especially, locus of control is pretty much fluid before 25, while it generally tends to drop after 60. (look at figure 3 in Appendix). Compared with other panel data, HILDA contains a specific question to observe the working time preferences. Specifically, respondents are asked: "If you could choose the number of hours you work each week, *and taking into account how that would affect your income*, would you prefer to work … fewer hours than you do now? about the same hours as you do now? or more hours than you do now?". This question also takes in account the possibility of reducing (or increasing) the wage if changing hours, which leads to a more precise information. Secondly, mismatched respondents are asked to say how many hours they would like to work, so we also know the amount of the mismatch.

The main outcomes considered take in exam how many hours people work in t and in t+1 and the probability of changing job. The change in the actual worked hours represents the more precise and objective information, since it takes in account how effectively mismatched workers modify their mismatch. Finally, we observe the probability of changing job the year after the mismatch.

Psychological variables

The psychological variables present in the HILDA are the so called 'big five' and the locus of control[2]. The dataset contains derived variables for the big five, extrapolated from the items after a factor analysis. We run our own factor analysis for the locus of control.

While there is still a debate on the stability of personality traits over the life, we considered these traits as generally stable. Specifically, following Cobb-Clark (2012, 2013), both the big five and the locus of control can be considered as basically stable in the working age (from 25 to 60). However, since there is still a certain amount of variability along the waves, the most important choice was how to measure these them. The most

[2] Locus of control is not exactly considered a personality trait, but for simplicity I'll use this term for it and the big five.

used way is to simply take in account the values from one specific wave and to suppose they will be stable (see, for example Cobb-Clark 2009). In the HILDA, locus of control is measured in 6 waves, while the personality traits in 5 waves. Therefore, we decided to take the average from all the waves, leading to values from 1 (low scores) to 7 (high scores. This means to have a stable single value for each individual along the waves. The rationale is to reduce the measurement error: people may pick a number one year and a similar number in the following wave. Using the averages leads to reduce this error and getting closer to the 'real' value[3]. Once having the averages, we standardized them.

The second step is to build the psychological variables. There are different possibilities. Usually, they are considered as continuous variables (for example: Powdthavee, 2014). Nandi & Nicoletti (2014), instead, computed them as dummy variables. This means having a low and a high score for every trait. For example, locus of control would be divided in external vs internal, while emotional stability as neurotic vs emotionally stable. We decided to divide the standardized variables in quartiles in this way:

- Locus of control. It is usually divided in locus of control external and internal. Here we have: strong external, weak external, weak internal and strong internal.
- Emotional stability. This trait is generally dichotomized as being emotionally stable vs being neurotic. Therefore, our groups are: strong neurotic, weak neurotic, weak emotionally stable, strong emotionally stable.
- Conscientiousness. Levels of conscientiousness represent in which measure people are efficient and organized. We simply divided it in 4 levels (conscientiousness 1 – 2 – 3 – 4).
- Extroversion is divided in strongly introverted, weakly introverted, weakly extroverted, strongly extroverted.
- Agreeableness. There is not a specific world for the opposite of agreeable. Since it describes altruistic and emphatic people, we used the term 'antagonistic' as its opposite. So, we have: strongly antagonistic, weakly antagonistic, weakly agreeable, strongly agreeable.
- Openness is sub grouped in strongly closed, weakly closed, weakly open, strongly open

In respect to the continuous variable, the quartiles allow to observe if only very high or very low values are actually correlated with our outcomes. For example, we can have a significative role of locus of control in resolving underemployment, but with the quartiles we can see, for example, if the association is valid only for high values (strong internal) or if it is linear. This would lead to a qualitatively different interpretation: in

[3] Other two possible refinements are:

1) Building the averages by using only the values observed within the age range chosen (between 25 and 60), when the traits are supposed to be more stable.

As Cobb-Clark pointed out, people that have suffered from several shocks (both positive and negative) can have jumps or drops in some traits. These observations can simply be dropped.

the first case, only exceptional individual may be able to resolve underemployment, while in the linear association every value on the distribution would have a meaning. Secondly, quartiles lead to more precise information than the median. When we compute a trait as a dummy above or below the median, all the values that lie in the middle will be assimilated to the values close to the extremes. Quartiles resolve this issue. Also, differently than dichotomizing the traits (like did Nicoletti, 2014), this way leads to a more precise information. By using only two groups, the observations closest to the center will be arbitrarily assigned to the lower or the higher group, at the same level of the extremes. There might be one or more central groups that are influential to the results. On the other hand, in respect the continuous variables, we can appreciate if it is only one specific group of the four to have an effect. Let's say that only people with strong internal locus of control can resolve a mismatch: this information can potentially disappear with the continuous variables.

Other independent variables

Family characteristics and job-related variables are correlated with working time preferences, as demonstrated by Böheim & Taylor (2004) and Bryan (2002). For example, the probability of overemployment raises with education and decreases with wage. Also, tenure, type of contract, being part of a trade union can increase or decrease the probability of over and underemployment. Since we are estimating in fixed effect (see below), we need to take in consideration all the time varying variables that can affect the mismatch. Therefore, our variables are: age, suffering from a disability that affect job possibilities, family income, having a partner, having children below 4 or below 14.

3. Methodology

Following the previous literature, we aim to identify some causal effects of personality traits on the mismatch's resolution probability. The biggest challenge in observing the role of personality traits on labor market outcomes is to take in account their endogenous nature. Any type of labour market outcome is necessarily related to personality traits, as per other personal characteristics. If we hypothesize, for example, that people with internal locus of control are more likely to resolve underemployment, we also should expect that they are less likely to end up in underemployment. This necessarily leads to a big selection-bias issue.

In order to extrapolate the causal effect of personality traits on resolving mismatch, we consider being mismatched as treatment, while our outcomes are the number of hours worked and the probability of changing job. In this way, we try to control for selection into mismatch[4]. Thus, after limiting the treated sample to the common support, we matched our treated observations with five unconstrained workers,

[4] Previous estimates of mismatch resolution focus only on mismatched individual. In doing so, they are assuming away the selection process into mismatch.

which acted as non-treated group in our identification strategy. The idea is to find those unconstrained workers that are most similar to the mismatched ones and then use them as counterfactual. After that, we applied a difference-in-difference estimation to observe, in the following year, how mismatched workers changed their actual hours, and the probability of changing job, compared to the control group. For example, this consists in observing, for a given measure of hours worked, how many hours mismatched people will increase or reduce in t+1 compared to the very similar unconstrained workers.

Let $\Delta hours_j^T$ denote the change in hours worked by individual j that is mismatched (treatment group) and let $\Delta hours_j^C$ be the unconstrained workers (control group) that most closely matches the characteristics of j:

$$\delta_{ATET} = \frac{1}{N} \sum_{j=1}^{N} (\Delta hours_j^T - \Delta hours_j^C) \qquad (1)$$

Where N is the number of observations. In this way, every observation which contains a mismatch is observed in t_0 and t+1 and matched with 5 similar individuals from the control group. In our sample, we consider every mismatch as t_0 and their corresponding non-treated individuals, independently of the year/wave in which they are observed. Then, we computed the difference in hours worked and in the probability of changing job in the following year compared to the control group.

Naturally, the goodness of this estimation relies on the capacity of our variables of matching properly the two groups of individuals. The variables taken in account in the matching procedure come from the literature on this field (see, for example (Knaus & Otterbach, 2019). First, we used a set of *socio-demographic variables*: age, family income, having a partner, level of education, suffering from a disability, and having children under the age of 12 or 4. Then, we took in consideration some *work-related characteristics*: type of occupation, type of contract (permanent, temporary or self-employed) and tenure of job. Finally, we matched all the individuals according to their psychological traits (the big five and the locus of control).

Then, we estimated a DID with individual fixed effects:

$$y_{jt} = \alpha_{jt} + \beta\left(MISMATCH_j * POST_t\, t\right)_j + \gamma X_{jt} + \mu_j + \varepsilon_{jt} \qquad (2)$$

In this specification, y_j represents our outcomes (hours worked and changing job) and MISMATCH * POST is the difference in difference estimator. Since we are using fixed effect estimates, our regression analysis contains those variables which change is supposed to affect our outcomes. Therefore, X contains: age, having a partner, having children younger than 5 or 14, suffering from a disability and family income.

Note that the fixed effect μ_j takes in account all the observed and unobserved time-unvarying characteristics. Therefore, ε_{it} represents the time varying unobservables, and also the biggest threat to the

goodness of our identification strategy (see robustness check). With (2), we compare very similar workers and we observe how they behave if they feel mismatched compared to unconstrained workers.

After that, we interact the difference in difference estimator with the personality traits in order to examine how people with different traits react to underemployment and overemployment. With the matching procedure, we eliminate the unobservable characteristics that lead workers to fall in mismatch and are able to isolate the role of personality traits on resolving mismatch. It is like if our treatment group was exogenously selected, namely, like if these workers were randomly pushed into mismatch. Then, we examine whether these traits have an effect in resolving the mismatch.

In order to really observe the effect of possessing a specific trait, we divided all the traits in quartiles and interacted them with the difference in difference estimator. Therefore, taking the example of locus of control, the final specification is:

$$y_{j(t+1)} = \alpha_{jt} + \beta_1\left(MISMATCH_j * POST_t * LOC_{1j}\right)_j + \beta_2\left(MISMATCH_j * POST_t * LOC_2\right)_j + \beta_3\left(MISMATCH_j * POST_t * LOC_3\right)_j + \beta_4\left(MISMATCH_j * POST_t * LOC_4\right)_j + \gamma X_{jt} + \varepsilon_{jt} + \mu_j \quad (3)$$

Here, the locus of control is decomposed in 4 groups according to their position in the distribution. The all the groups are interacted with the difference in difference estimator. The same procedure is applied to the big five. Finally, we see if the different coefficients β are statistically different from each other's[5]. We run these estimations dividing the samples per overemployment and underemployment and, then, per sex. Then, we considered each personality trait separately.

4. Descriptive statistics

The descriptive analysis illustrates some information about the amount of mismatch in Australia, and how the psychological traits affect the labour supply preferences.

Figure 1 shows the rates of mismatched and unconstrained workers from 2001 and 2017. Constrained workers represent a big amount of the total workers, with around 30% of workers being overemployed and

[5] We performed a Wald test between the coefficient β 1 and 4 (namely, the lowest and the highest quartiles) under the null hypothesis that they are not different. For example, it consists in testing strong external locus of control with strong internal locus of control. We run a test for each of the six traits.

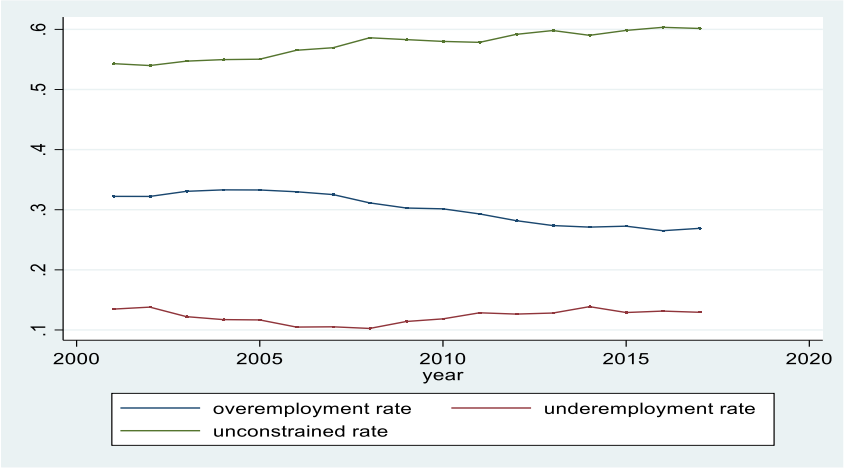

Figure 1. Rates of underemployed, overemployed and unconstrained workers over the years

15% being underemployed. The figure also reveals that the fraction of mismatch type remains relatively stable over the time, with a small but constant increase of unconstrained workers.

Figure 2 shows the average weekly hours worked for all the workers (for males and females), the hours worked by underemployed and overemployed people, and the hours they would like to work. It is interesting to note that, while underemployed workers' preferences align to the average full-time hours, overemployed preferences stabilize a bit lower.

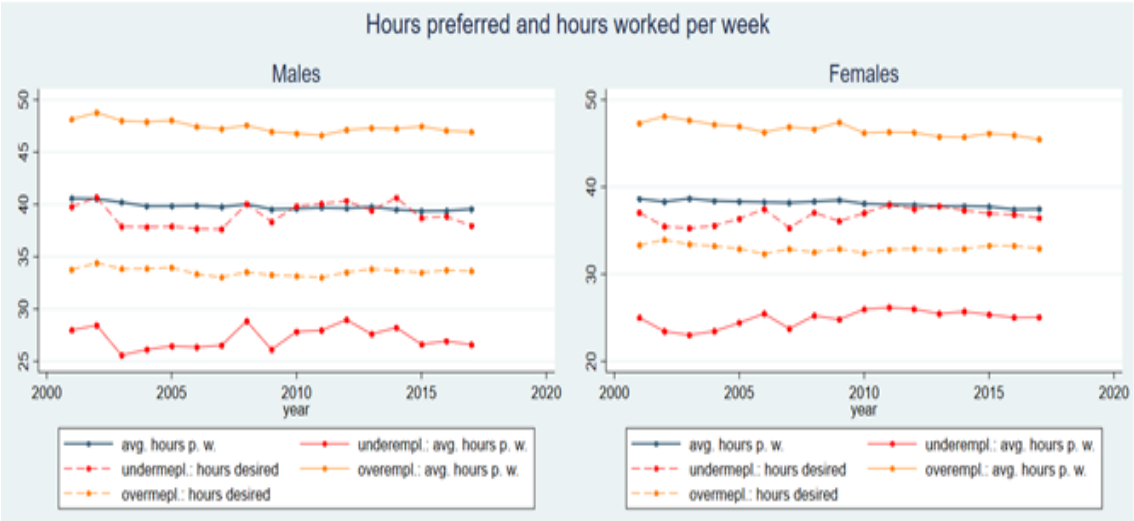

Figure 2. Hours preferred vs hours worked per week

Table 1 show how the groups of mismatched workers differ in some characteristics from the unconstrained ones. Overemployed people tend to be a bit older, and they would prefer much less hours. As expected, they have the highest incomes but, surprisingly, the lowest level of education. Finally, overemployment looks to have the most detrimental effect on life and job satisfaction.

Table 1. Means differences constrained vs unconstrained workers.

OVEREMPL.		**UNCONSTR.**		**UNDEREMPL.**	
Age	42.73	Age	41.61	ge	40.73
hours worked (x week)	47.03	hours worked (x week)	37.55	hours worked (x week)	26.17
hours would like to work	33.31	hours would like to work	37.55	hours would like to work	37.95

family income	2.106	family income	1.882	family income	1.342
education decile	4.785	education decile	5.274	education decile	5.802
job satisfaction	-0.250	job satisfaction	0.172	job satisfaction	-0.187
life satisfaction	-0.0502	life satisfaction	0.144	life satisfaction	-0.0988
number of children	1.652	number of children	1.674	number of children	1.693
Observations	114417				

Table 2 show the average hours worked per week, and the hours desired per personality trait. Each trait is dichotomized in low and high (for example, locus of control external vs internal). The difference of the means is then tested with a t test. The table show that personality traits influence the labour supply and the preferences of the workers. People with internal locus of control, high level of antagonism and openness tend to prefer and work more than their counterparts. On the other hand, extroverted and emotionally stable workers prefer less hours.

Table 2. Means of hours preferences and hours worked per personality trait.

		LOCUS OF CONTROL	**EMO.STABILITY**	**COSNCIOUSNESS**
Hours desired	LOW	35.8482	36.9129	37.02605
	HIGH	36.45338	35.76425	35.69312
	diff.	-.6051774***	1.148658***	1.33293***
	T TEST	-8.031316	.855751***	.9771142***
Hours worked	LOW	38.20437	39.42232	39.49793
	HIGH	39.50562	38.56657	38.52081
	diff.	-1.301252***	15.46294	17.91783
	T TEST	-14.78791	9.864606	11.24472

		EXTROVERSION	**AGREEABLENESS**	**OPENNESS**
Hours desired	LOW	36.84255	37.90306	36.52155
	HIGH	35.83361	34.89368	36.10438
	diff.	1.008946***	3.009381***	.4171754***
	T TEST	1.083138***	3.242595***	0.0427856
Hours worked	LOW	39.54928	40.69379	38.98632
	HIGH	38.46614	37.4512	38.94353
	diff.	13.56905	40.78956	5.608229
	T TEST	12.48017	37.61745	0.4927788

The same information about hours preferences is reported in fig. 3 and 4, but with a life-span perspective. They show that the trend is very similar for every trait, with a peak of hours desired after the entrance on the labour market, and a second lower peak around 45-50, when, arguably, the wages are the highest. On the other hand, some traits have a considerable impact on the preferences. Especially, agreeable people prefer the lowest weekly hours, while low conscientious and neurotic people stabilize a bit higher than the average.

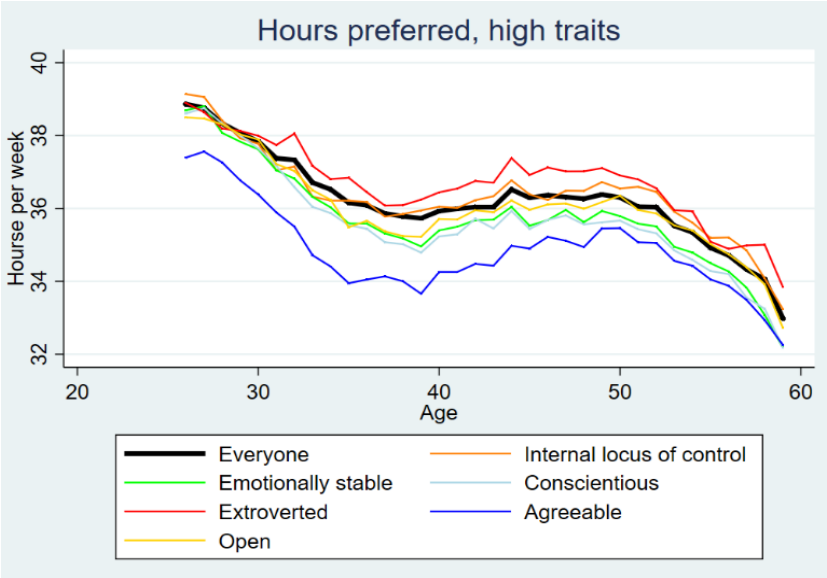

Figure 3. Hours preferred by workers (males and females).
Notes: the lines show the preferences according to the personality traits. Here we used the 'high' traits, for example internal locus of control, or conscientiousness.

Finally, extroverted and internals are the ones with the highest hours.

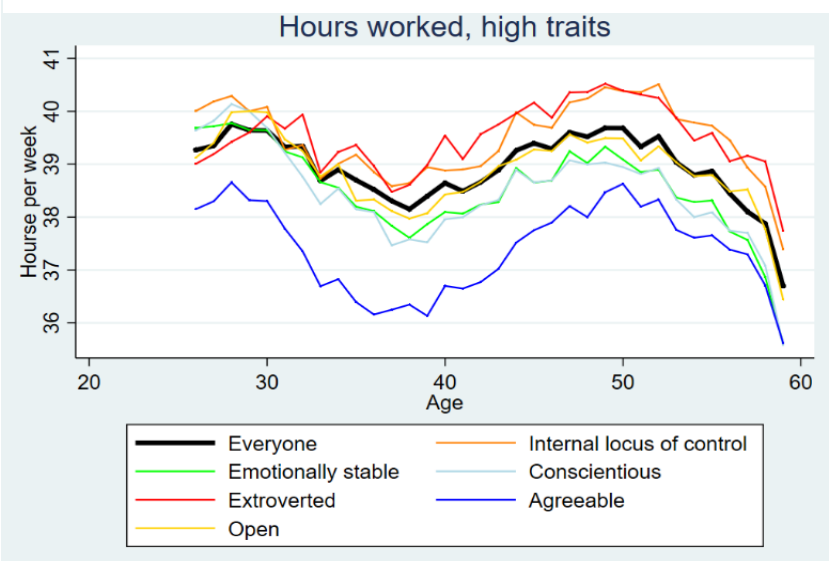

Figure 4. Hours worked (males and females).
Note: see fig. 3

5. Results

5.1. Underemployment

We begin focusing on underemployment. Table 3 presents the average difference in difference estimates of underemployed people compared to unconstrained ones.

[Table 3 here]

What emerges is that underemployed workers tend to work more hours in t+1, with a higher effect on males with respect to unconstrained workers. As expected, the number of hours worked reduces over the age and with people having a child below 4 (especially for women). On the other hand, it appears that being underemployed doesn't particularly affect the job mobility.

[Table 4 here]

Tab 4 reports the interaction between the difference in difference estimator and the personality traits. Results show that the best predictor of underemployment resolution is internal locus of control. Internal people can work about more than double hours than externals in t+1, both males and females. For males it also predicts the probability of changing job. Also, the more 'sociable' traits (extroversion, agreeableness and openness) have an effect only on women, while conscientious only for men.

Generally speaking, results on underemployment are not very surprising. We see that, in general, workers that feel underemployed tend to work more in the following year. For women, having an internal locus of control, being extroverted, agreeable and open is related with working more hours in t+1. Internal locus of control defines the expectancy that our own actions control the rewards and the outcome we get. In the workplace, internal locus is usually related with promotions, salary increases and general career advancement (Spector, 1988). Caliendo (2014), for example, found out that unemployed 'internal' people tend to put more efforts in looking for a job, which translates in more hiring rate and higher wages. Similarly, we expect that, in case of underemployment, 'internal' workers would activate more than their counterparts to resolve their situation, which will translate in higher mismatches resolutions rates.

Interpretations of extroversion and openness are less straightforward. Extroversion has already been demonstrated to have some positive effects on labour market outcomes. Fletcher (2013) showed that extraversion is positively correlated with being employed, while Caliendo, Fossen and Kritikos (2011) found a positive correlation between this trait and being entrepreneur. We have also seen that extroverted people tend to be more work committed (Langelaan et al, 2006), that they perform better in job which require social skills (Borghans et al, 2008). We can assume that extroverted workers tend to escape from low-hours and to converge in higher-status jobs, where falling in leadership positions and where social interactions are more required. Cooper and Payne (1967) have also demonstrated that extroverted workers tend to withdraw more than introverted from routine tasks. A possible cognitive interpretation is that extroverted have higher arousal threshold. This means that, to feel challenged and stimulated, extroverted need more stimulus from the world, while introverted ones need more psychological resources to deal with social interactions, reason why they are more likely to prefer more routine tasks. Other possible explanations are that extroverted people have higher social network to rely on in case they are looking for a new job, or that they can perform

well in job interviews. Secondly, they possess higher social skills and they are considered to be more assertive, which means that they can obtain easier the conditions they want also within the same job.

Interpretation of openness is a bit different. Nieß (2015) considers open-mind workers characterized by intellectual ability, flexibility and divergent thinking. In a longitudinal study, they showed that they have higher job mobility and that they converge into managerial and professional positions. This can easily explain why open-mind people easily get out from low-hours job. We assume that they easily end up into higher position with more hours. A second reason of the effect of openness is that it describes the need of new challenges and new experiences. Therefore, open people are expected to need more constantly to move across jobs, tasks or positions (Ng et al, 2007).

Agreeableness is the only one result which directly contrasts our expectations. Agreeable people tend to be more altruistic and emphatic, that usually translates in a disadvantage in the labour market (Nyhus & Pons, 2005). Therefore, we expected antagonistic workers, especially women, to be more likely to resolve underemployment. On the other hand, we know that the trait agreeableness performs well where interaction skills are required (Borghans et al, 2017). Probably, a more specific investigation on the type of job of underemployed women and its resolution is required.

The only two traits with an effect on men are locus of control and conscientious. The result on locus of control is explained the same way the one for women. It is also related with more chances of changing job. Similarly, conscientiousness is also related with increasing the working hours for men. Conscientious people are generally work-oriented and, as demonstrated by (Ham et all, 2009), they tend to have higher salaries and better jobs. We can assume that high level of conscientiousness push workers towards full-time and well-paid job. Conscientious individuals are also able to stay focus on their task and to delay gratification, characteristics that make them more likely to resolve a condition of underemployment.

What still remains to explain is why there is this gender gap. It looks like that the more self-oriented traits (locus of control and conscientiousness) make men able to resolve underemployment, while women need the more 'social' traits (extroversion and agreeableness). As hypothesized by Semykina & Linz (2010), this can reflect an implicit discrimination present in the labour market. The idea is that women have more difficulties in 'asserting themselves', therefore they need further resources which are not required for men.

5.2. Overemployment

Table 5 presents the result of overemployed workers compared to similar workers who don't feel mismatched.

[Table 5 here]

The first unexpected result relies on the fact that, in general, overemployed people tend to work more and not to change their job in the following year. As expected, the table shows that hours worked increase with income (if the job is well-paid people tend to work more) and decrease when having children (people with little children tend to work less), especially for women. Apparently, according these results, overemployed people seems to increase the extent of their mismatch in the following year.

[Table 6 here]

The table shows that the increasing hours-trend of overemployed people is driven by males with 'positive' high traits, like internal locus of control, emotional stability and conscientiousness.

Agreeableness here shows a more expected result: it still increases the hours of work, but we assume this is because agreeable people have more difficulties in get what they want. Interestingly, the results for overemployment are significative only for males (apart from internal locus of control, which is significative also for women).

These results were, in general, more surprising. First, we didn't expect overemployed workers to work more and not to change their jobs. But more interestingly, this result look to be carried out by overemployed men with positive traits (locus of control, emotional stability, conscientious and extroversion). Our first hypothesis is that there are many cases of workers that are in a specific time of their life in which they would prefer to work less, but they need to work more. The reasons can be several (and we remand to a more specific research on overemployment to find it out): young people which want to live alone and need money to pay the rent, workers that need extra income to maintain the family, workers that need to focus on work to push their career, and so on. A second possible explanation is that workers which find 'good job', like managerial, well-paid, creative or various jobs, tend to keep them even if they would prefer to work less. The specific reason related to the various personality traits would need more attention, but we can make some hypothesis.

We assume that conscientious and internal workers are more career-oriented, and they prefer to remain in overemployment than to renounce to good opportunities. Emotional stability looks more related with taking responsibilities, therefore we can expect that emotionally stable men that feel overemployed tend to work more because they need to maintain their families. Emotional stability is also related with the capacity of postponing gratification, so it's arguably that these workers may decide to push on their career in the youth and to 'relax' later on. Opie & Henn (2013) found out that emotional stability and conscientiousness are related with higher level of work engagement and that these help to moderate the conflict demand associated with work and family life.

The reason for which extroverted workers tend to remain stuck in overemployment can be explained with the same reasons expressed before. These workers tend to get higher status jobs, with managerial and

leadership positions. Descriptive statistics also showed that extroverted workers together with antagonistic ones) work the most. Finally, also agreeable is related with working more, however, in this case we think it is related to the fact that agreeable people are less assertive and capable of imposing their conditions at work.

Why is there a huge gender bias? We saw that positive personality traits are generally related to increasing hours (both in underemployment and overemployment), but they are more relevant for women in underemployment and for men in overemployment. We can assume that there is a sort of a social and economic pressure to work more, which is stronger for men. As Powdattawee demonstrated (2018), working longer hours is more socially acceptable then working short hours, but this is true only for men. For women, the rule is not to work too much. We can imagine that men which feel overemployed can decide intentionally to remain stuck in the mismatch to 'carry out their duties', but this is not valid for women. This could explain why some positive personality traits are positively related with resolving underemployment, but negatively related with resolving overemployment.

6. Conclusions

While the current literature has mainly focused on the role of observable socio-demographic characteristics, a considerable amount of individual heterogeneity remains unexplained. This research aims to fit part of this gap, by exploring the role of personality traits in the resolution of working hours mismatches. These first provisional results demonstrated that personality traits do affect if and how mismatched workers behave. Especially, resolution of underemployment relies on 'social' personality traits (extroversion and agreeableness) for women, while locus of control and conscientiousness for men. On the other hand, results show that overemployed workers generally tend to increase their mismatch, and that this trend is mainly driven by males with 'positive' traits, namely internal locus of control, emotional stability, conscientiousness and extroversion.

The biggest problematic of such a broad approach is that we couldn't focus on each single trait more specifically. We found different causal effects for each trait on the resolution of the mismatches, however, it's remains difficult to explain how this happens. We remand, for future research, to a narrower approach, by focusing on the specific traits and the specific job characteristics. Also, a lot of clarification would be made by knowing whether the mismatch is intentional or not (for example, whether a person is trying to resolve it or not). A different dataset may shed light on these dynamics.

7. Robustness checks

To be done

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Appendix

Table results

Table 3: Difference in difference estimator for changing hours and job if underemployed

	HOURS	HOURS	CH. JOB	CH. JOB
	MALES	FEMALES	MALES	FEMALES
Underemployment	1.674***	1.184***	-0.003	-0.000
(DID estimator)	(0.00)	(0.00)	(0.53)	(0.97)
Age	-0.154***	-0.066***	-0.007***	-0.006***
	(0.00)	(0.00)	(0.00)	(0.00)
No disability	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Disab. affecitng job	-1.957***	-1.680***	-0.009	0.008
	(0.00)	(0.00)	(0.33)	(0.40)
Family income	1.921***	1.845***	-0.002	-0.006*
	(0.00)	(0.00)	(0.50)	(0.06)
Single	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Partnered	0.316	-2.084***	0.007	0.024**
	(0.17)	(0.00)	(0.50)	(0.03)
No kids below 14	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
0 to 4 years	-3.413***	-5.021***	-0.016*	-0.039***
	(0.00)	(0.00)	(0.09)	(0.00)
5 to 14 years	-0.984***	-2.281***	-0.011	-0.018**
	(0.00)	(0.00)	(0.14)	(0.02)
Constant	39.746***	36.930***	0.451***	0.413***
	(0.00)	(0.00)	(0.00)	(0.00)
N	60762	59180	56774	54487

p-values in parentheses
* $p < .10$, ** $p < .05$, *** $p < .01$
Effect of being underemployed on the probability of changing job and the hours worked in the following year
Notes. "HOURS" refers to the number of hours workers work more in t+1. "CH. JOB" refers to the probability of changing job in t+1.

Table 4: Underemployment and personality traits

	MALES	FEMALES	MALES	FEMALES
	HOURS	HOURS	CH. JOB	CH. JOB
Strong external locus	0.853***	0.276	0.014	-0.012
	(0.00)	(0.36)	(0.22)	(0.27)
Weak external locus	1.315***	0.806***	-0.030***	-0.013

	(0.00)	(0.00)	(0.01)	(0.28)
Weak internal locus	1.229***	1.183***	0.005	-0.003
	(0.00)	(0.00)	(0.72)	(0.84)
Strong internal locus	1.776***	1.572***	-0.018	0.005
	(0.00)	(0.00)	(0.19)	(0.73)
test	0.048	0.005	0.074	0.334
N	62751.000	60883.000	58469.000	56112.000

	HOURS	HOURS	CH. JOB	CH. JOB
Strongly neurotic	1.179***	0.506*	-0.002	-0.001
	(0.00)	(0.09)	(0.88)	(0.96)
Weakly neurotic	1.129***	1.100***	-0.021*	-0.022*
	(0.00)	(0.00)	(0.07)	(0.08)
Weakly emo. stable	1.310***	1.479***	-0.000	-0.007
	(0.00)	(0.00)	(1.00)	(0.59)
Strongly emo. stable	1.326***	0.673**	-0.004	-0.001
	(0.00)	(0.03)	(0.75)	(0.92)
test	0.747	0.704	0.887	0.974
N	62751.000	60883.000	58469.000	56112.000

	HOURS	HOURS	CH. JOB	CH. JOB
Conscientiousness 1	1.117***	0.921***	-0.015	-0.020
	(0.00)	(0.01)	(0.21)	(0.10)
Conscientiousness 2	0.755**	0.767***	0.002	0.009
	(0.01)	(0.01)	(0.87)	(0.44)
Conscientiousness 3	1.320***	0.672**	-0.018	-0.007
	(0.00)	(0.04)	(0.13)	(0.60)
Conscientiousness 4	2.060***	1.354***	0.006	-0.014
	(0.00)	(0.00)	(0.69)	(0.27)
test	0.048	0.350	0.268	0.759
N	62751.000	60883.000	58469.000	56112.000

	HOURS	HOURS	CH. JOB	CH. JOB
Strongly introverted	1.136***	0.505	-0.002	-0.017
	(0.00)	(0.11)	(0.88)	(0.16)
Weakly introverted	1.207***	0.508*	-0.008	-0.005
	(0.00)	(0.09)	(0.48)	(0.66)
Weakly extroverted	1.109***	0.839***	-0.002	0.003
	(0.00)	(0.01)	(0.87)	(0.77)
Strongly extroverted	1.506***	1.816***	-0.018	-0.014
	(0.00)	(0.00)	(0.17)	(0.29)
test	0.431	0.004	0.364	0.854
N	62751.000	60883.000	58469.000	56112.000

	HOURS	HOURS	CH. JOB	CH. JOB
Strongly antagonistic	1.181***	0.265	0.006	-0.005
	(0.00)	(0.48)	(0.66)	(0.69)
Weakly antagonistic	1.307***	0.649**	-0.015	-0.003
	(0.00)	(0.04)	(0.18)	(0.78)

Weakly agreeable		1.697***	1.304***	-0.006	-0.022*
		(0.00)	(0.00)	(0.64)	(0.06)
Strongly agreeable		0.702**	1.240***	-0.012	-0.000
		(0.04)	(0.00)	(0.34)	(0.98)
test		0.286	0.039	0.321	0.777
	N	62751.000	60883.000	58469.000	56112.000
		HOURS	HOURS	CH. JOB	CH. JOB
Strongly closed		0.847***	0.284	-0.003	0.007
		(0.01)	(0.34)	(0.81)	(0.55)
Weakly closed		1.553***	0.421	-0.005	-0.005
		(0.00)	(0.17)	(0.70)	(0.66)
Weakly open		1.198***	0.814***	0.004	-0.009
		(0.00)	(0.01)	(0.73)	(0.43)
Strongly open		1.380***	2.387***	-0.029**	-0.026*
		(0.00)	(0.00)	(0.03)	(0.07)
test		0.236	0.000	0.153	0.073
	N	62751.000	60883.000	58469.000	56112.000

p-values in parentheses. ="* p<.10 ** p<.05 *** p<.01"

Table 5: Difference in difference estimator for changing hours and job if overemployed

	MALES	FEMALES	MALES	FEMALES
	HOURS	HOURS	CHANGE JOB	CHANGE JOB
Overemployment	1.145***	1.116***	-0.012***	-0.005**
	(0.00)	(0.00)	(0.00)	(0.05)
Age	-0.215***	-0.182***	-0.005***	-0.005***
	(0.00)	(0.00)	(0.00)	(0.00)
No disability	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Disab. affecitng job	-0.645***	-1.362***	-0.012**	0.000
	(0.00)	(0.00)	(0.03)	(1.00)
h_income	0.971***	0.970***	-0.002	-0.008***
	(0.00)	(0.00)	(0.19)	(0.00)
partner=0	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
partner=1	0.702***	-1.633***	0.007	0.022***
	(0.00)	(0.00)	(0.18)	(0.00)
no kids below 14	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
0 to 4 years	-3.482***	-4.856***	-0.007	-0.026***
	(0.00)	(0.00)	(0.13)	(0.00)
5 to 14 years	-1.099***	-1.818***	-0.013***	-0.008**
	(0.00)	(0.00)	(0.00)	(0.05)
Constant	48.512***	48.136***	0.310***	0.318***
	(0.00)	(0.00)	(0.00)	(0.00)
Observations	172974	150468	164611	141809

p-values in parentheses
Effect of overemployed on the probability of changing job and the hours worked in the following year
* $p < .10$, ** $p < .05$, *** $p < .01$
Notes. See table 3

Table 6: Underemployment and personality traits

	MALES	**FEMALES**	**MALES**	**FEMALES**
	HOURS	HOURS	CH. JOB	CH. JOB
Strong external locus	1.074***	1.176***	-0.017***	-0.003
	(0.00)	(0.00)	(0.00)	(0.68)
Weak external locus	1.197***	1.566***	0.003	-0.004
	(0.00)	(0.00)	(0.58)	(0.53)
Weak internal locus	1.623***	1.333***	-0.010**	-0.015***
	(0.00)	(0.00)	(0.03)	(0.00)
Strong internal locus	1.897***	1.719***	-0.032***	-0.009*
	(0.00)	(0.00)	(0.00)	(0.06)
test	0.000	0.019	0.047	0.452
	HOURS	HOURS	CH. JOB	CH. JOB
Strongly neurotic	1.083***	1.418***	-0.016***	-0.017***
	(0.00)	(0.00)	(0.00)	(0.01)
Weakly neurotic	1.641***	1.236***	-0.012**	-0.009
	(0.00)	(0.00)	(0.02)	(0.11)
Weakly emo. stable	1.478***	1.622***	-0.010**	-0.008*
	(0.00)	(0.00)	(0.03)	(0.10)
Strongly emo. stable	1.709***	1.615***	-0.018***	-0.000
	(0.00)	(0.00)	(0.00)	(0.92)
test	0.001	0.366	0.806	0.035
	HOURS	HOURS	CH. JOB	CH. JOB
Conscientiousness 1	1.228***	1.512***	-0.019***	-0.007
	(0.00)	(0.00)	(0.00)	(0.28)
Conscientiousness 2	1.479***	1.248***	-0.004	-0.014**
	(0.00)	(0.00)	(0.44)	(0.01)
Conscientiousness 3	1.501***	1.411***	-0.016***	-0.007
	(0.00)	(0.00)	(0.00)	(0.21)
Conscientiousness 4	1.709***	1.687***	-0.018***	-0.006
	(0.00)	(0.00)	(0.00)	(0.18)
test	0.013	0.416	0.866	0.963
	HOURS	HOURS	CH. JOB	CH. JOB
Strongly introverted	1.343***	1.486***	-0.014***	-0.011*

	(0.00)	(0.00)	(0.00)	(0.07)
Weakly introverted	1.347***	1.189***	-0.011**	0.000
	(0.00)	(0.00)	(0.03)	(0.98)
Weakly extroverted	1.424***	1.496***	-0.014***	-0.009*
	(0.00)	(0.00)	(0.01)	(0.09)
Strongly extroverted	1.846***	1.693***	-0.018***	-0.012**
	(0.00)	(0.00)	(0.00)	(0.01)
test	0.006	0.296	0.623	0.814

	HOURS	HOURS	CH. JOB	CH. JOB
Strongly antagonistic	1.334***	1.213***	-0.009	-0.001
	(0.00)	(0.00)	(0.10)	(0.85)
Weakly antagonistic	1.592***	1.325***	-0.017***	-0.007
	(0.00)	(0.00)	(0.00)	(0.22)
Weakly agreeable	1.341***	1.276***	-0.016***	-0.015***
	(0.00)	(0.00)	(0.00)	(0.00)
Strongly agreeable	1.685***	2.024***	-0.015***	-0.008*
	(0.00)	(0.00)	(0.00)	(0.10)
test	0.066	0.000	0.366	0.388

	HOURS	HOURS	CH. JOB	CH. JOB
Strongly closed	1.430***	1.166***	-0.006	0.002
	(0.00)	(0.00)	(0.24)	(0.79)
Weakly closed	1.351***	1.248***	-0.008	-0.013**
	(0.00)	(0.00)	(0.12)	(0.03)
Weakly open	1.535***	1.743***	-0.024***	-0.009*
	(0.00)	(0.00)	(0.00)	(0.07)
Strongly open	1.619***	1.553***	-0.014***	-0.010**
	(0.00)	(0.00)	(0.00)	(0.03)
test	0.331	0.066	0.262	0.118

p-values in parentheses. ="* p<.10 ** p<.05 *** p<.01"

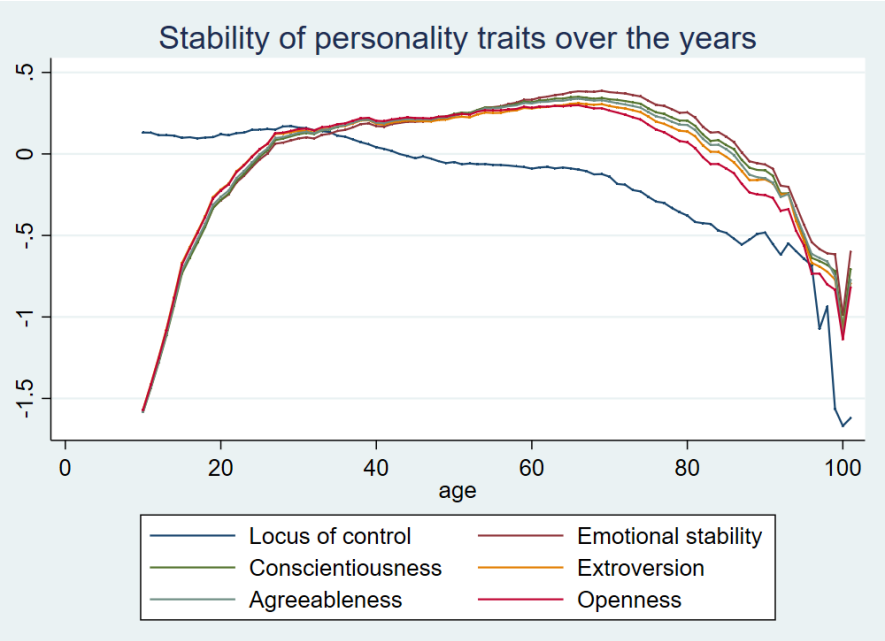

Figure 5. Stability of personality traits over the life-span.