Minds for the Market: Non-Cognitive Skills in Post-Soviet Countries·

Anna Kochanova†

Maryam Naghsh Nejad‡

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Abstract

We analyze the effect of socio-political and economic institutions on the development of non-cognitive skills of individuals. We exploit the breakdown of the Soviet Union as a quasi-natural experiment, and apply a difference-in-difference strategy. We focus on three post-Soviet countries, Armenia, Georgia and Ukraine, and compare personality traits of individuals that were born at least a decade before the collapse of the Soviet Union with those that were born shortly before or later, relative to individuals from the other developing countries that had never gone through the same institutional changes. We find significantly higher scores of extraversion; openness and agreeableness for younger generations of people that lived fewer years or never lived under the communist regime. Our findings suggest that institutions can shape the non-cognitive skills of individuals, and thus highlight a channel, through which institutions impact economic development.

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† Cardiff University, Cardiff Business School. Aberconway Building, CF103EU, Cardiff, UK. Phone: +44(0)2920876627. Email: kochanovaa@cardiff.ac.uk.

‡ University of Technology Sydney. Level 2, Building 5, Block D, 1-59 Quay St., Haymarket NSW 2000, NSW, Australia. Email: Maryam.NaghshNejad@uts.edu.au and Institute of Labor Economics (IZA), Bonn, Germany.

1. Introduction

Socio-political and economic institutions play a significant role for economic growth and development (Rodrick et al., 2004; Acemoglu et al., 2005). Institutions are also related to culture (Tabellini, 2010; Alesina and Giuliano, 2015) and determine social preferences of people (Alesina and Fuchs-Schundeln, 2007; Aghion et al. 2010; Kim et al., 2015). In this paper, we ask whether institutions shape personality traits of people[1] .Personality traits or non-cognitive skills such as consciousness are arguably as important as education levels in determining one's success in labor market and other life outcomes and together they form the human capital portfolio. (see Almund et al., (2011) for an overview). The impact of institutions on innate abilities highlights a channel through which institutions stimulate economic development. It also explains why institutional change in a country may take a long time to create economic differences, given that personality traits of adults tend to be stable with age (Cunha and Heckman, 2007; Cobb-Clark and Schurer, 2012).

To examine the relationship between institutions and non-cognitive skills, we make use of drastic institutional differences between the communist era and the transition period after the breakdown of the Soviet Union. The soviet was known for its strong educational system and high levels of human capital; however, education is only one aspect of human capital. The non-cognitive skills are established as the other important aspect of human capital portfolio of an individual. However, the inputs into non-cognitive skills are not as clear and while they can be formed in a classroom (Dahmann and Anger, 2014 and Kautz and Zanoni, 2014), the inputs from the environment the individual lives in (Almund et al., 2011) and therefore the institutions are likely to impact these skills. The Communist Party regime of the USSR controlled the entire economy and society[2] of fifteen republics for about seventy years. Its collapse was sudden, unpredictable and shocking. Everything, from livelihoods and day-to-day life to social, market and political organization, changed in a very short period of time (Milanovic, 1998). While loyalty to the bureaucracy of the Communist Party and conformism was the key to achieving life success in the command economy (Cook et al. 1998; Langenecker, 2001), other skills became needed to succeed in the new, though imperfect, market-driven economies. As ideology propaganda in schools, youth organizations (Little Octobrists, Young Pioneers, and Komsomol), at work and media was abolished, and people could act freely and express opinions, economic success became less

[1] We use the terms non-cognitive skills, personality traits and personal skills interchangeably throughout this paper. As a brief introduction, we use big five personality traits: extraversion, conscientiousness, stability, openness, agreeableness.

[2] The censorship and party control of media, banned entrepreneurship and market interactions between firms, highly monitored migration and foreign travel are some of the examples of the closed society of the USSR.

dependent on state and more on individual initiative, which presumably impacted personality skills of individuals.[3] Post-Soviet countries, therefore, provide a unique arena to study the consequences of institutional changes on non-cognitive skills formation.

We use data from Skills Toward Employment and Productivity (STEP) survey for Armenia and Georgia, and Ukraine, three former Soviet Republics, and a few developing countries that had never undergone through the similar institutional changes. Applying a difference-in-difference strategy, we compare personality trait scores of individuals that were born at least fifteen years before the collapse of the USSR with those of younger people that lived in the new environments.[4] After controlling for various individual characteristics and a full set of year of birth fixed effects, we find that the scores of extraversion, openness and agreeableness of the younger generation are significantly higher. The analysis using birth cohorts also shows that the longer individuals lived in the previous regime the lower their non-cognitive skills scores. These results are robust to a range of specification checks and sample restrictions.

These results are particularly important given the extensive existing literature on the importance of non-cognitive skills on labor market outcomes. (Chamorro-Premuzic & Furnham, 2003; Fletcher, 2013; Gensowski 2018; Heineck & Anger, 2010; Mueller & Plug, 2006; Nyhus & Pons, 2005). For instance openness to experience has been positively related to labor market outcomes; Zhao et al., 2010 associate this trait to creativity and entrepreneurship. Furthermore, conscientiousness has received a lot of attention in the literature being associated to better health behaviors, academic performance (Chamorro-Premuzic & Furnham, 2003; Furnham, Chamorro-Premuzic, & McDougall, 2003; Kappe & van der Flier, 2012; Noftle & Robins, 2007; Trapmann, Hell, Hirn, & Schuler, 2007) and higher wages at the beginning for young workers (Fletcher, 2013; Nyhus & Pons, 2005). Agreeableness is argued to be associated with economic preferences such as reciprocity and altruism (Becker et al., 2012), or pro-sociality (Hilbig et al., 2014), which are fundamental to socioeconomic development (e.g. Bigoni et al., 2016) and population well-being (Post, 2005).

Our findings suggest that two generations of individuals from former Soviet Union have different levels of some personality traits scores. The post-Soviet generation seems to acquire better non-cognitive skills in order to adapt to new political and economic institutional arrangements. These results are also in line with the literature on management (Cook et al., 1998; Langenecker,

[3] The regime change was not smoothed, and former soviet republic went into long economic stagnation (Murrel, 1996; Milanovic, 1998; Roland, 2000). Georgia, in addition, experienced civil war and military conflict in Abkhazia and South Ossetia; Armenia participated in conflict with Azerbaijan over Nagorno-Karabakh.

[4] We take a fifteen years threshold based on the literature arguing that personality forms during the childhood and adolescence (Roberts and DelVecchio, 2000; Cunha and Heckman, 2007; Cobb-Clark and Schurer, 2012; Specht et al. 2014). This threshold, however, is not critical for our analysis, as we show in the birth cohort analysis and robustness checks.

2001; and Linz and Chu, 2013) arguing that managers from the former Soviet Union lacked social and interpersonal skills needed to succeed in the market economy. It implies that certain personality traits of individuals are inherently depended on institutions and are shaped according to their returns in the economy.

In addition to the literature on the role of institutions, this paper adds to the studies on non-cognitive skills formation. The existing studies argue that a part of individuals' personality is inherited with genes (nature), while another part is formed through environments (nurture). Sociological and psychological literature generally agrees that culture (Triandis and Suh, 2002), living environments (Hopwood et al. 2011), peers (Reitz et al., 2014), investment in social institution such as work, marriage, and family (Roberts et al., 2005) develop personality together with genetics.[5, 6] In this paper we show that broadly defined economic and political institutions can form non-cognitive skills of individuals.

We are aware of one other paper that is closely related to our study. Friehe et al. (2015) use the reunification of East and West Germany as a natural experiment and analyze whether individuals that lived in East and West Germany before the fall of the Berlin Wall in 1989 exhibit differences in the non-cognitive skills. They find significant results for locus of control, openness, conscientiousness, and stability.[7] Our paper, however, is different in two important ways. First, the unique experience of the Soviet Union lasted much longer, which assures that even the oldest individuals in our study (born in 1948) were born in the USSR and, more importantly, were raised by parents who also were born under the same regime. Second, in contrast to the GDR, which received a great support from West Germany after reunification, the regime change in Soviet republics was much abrupt and without outside support.

This study also contributes to the further understanding of post-Soviet societies by shedding light on the personality differences between the soviet and post-soviet generations. Existing studies, for example, suggest that there is a *happiness gap* between the transition and advanced economies, especially for the older generations (Guriev and Zhuravskaya, 2009; Easterlin, 2009). Given that some personality traits correlate with subjective well-being (e.g., Boyce and Wood, 2011) this paper might help to explain this gap. Finally, understanding the personality differences of people leaving

[5] Cunha and Heckman (2007) build a theoretical skills formation model to support these observations.

[6] There is also emerging empirical evidence on the relationship between micro environments on non-cognitive skills. For example, Peter (2013) shows that mothers' involuntary job loss negatively affects behavior of children, and positively affects internal locus of control of adolescents. Dahmann and Anger (2014) find that educational system can have effects on personality trait formation. In contrast to this research, we are looking on the global changes in the environments.

[7] Instead of "neuroticism" personality trait from the Big Five inventory (McCrae and Costa, 1999), in this paper we use the exactly opposite trait (emotional) "stability."

in different institutional environments can help improve the policies designed to develop labor markets and economies of states going through transition.

The rest of the paper is organized as follows. In section two we describe the mechanism through which institutions would impact the formation of non-cognitive skill. In section three we present our data and data sources. Section four we describe the empirical methodology and identification strategy. Section five presents the results, discussion and robustness checks, and final section concludes the paper.

2. Institutions and non-cognitive skill formation: Mechanisms

Almund et al., (2011) overview a model of non-cognitive skill formation based on works of Roberts (2006) in personality physiology. Based on this model, personality traits affect behavior through effort and are derived from an optimization problem as a response to constraints, information, and preferences. They then extend their model to include the impact of situations. Situation or environment impact the set of possible actions an individual can take and therefore it defines their action. They define situation both as a physical environment that an individual faces and also the network or the social setting that an individual is located at. Based on this model, personality depends on genetics or endowments, constraints, and situations or environment. (Cunha and Heckman, 2007, 2009) show that the personality traits develop by varied forms of investment (i.e. parental investment, schooling, etc.), and would depend on the situations individuals face.

Here we argue that personality traits or non-cognitive skills formed under different sets of institutions such as the soviet union and what followed after its collapse would impact the so called situation, the social network, and the constraints that parents, and individuals faced and therefor impacts their non-cognitive skills.

We use PISA to test if there are any raw correlations between economic and political institutions and non-cognitive skills. PISA assesses internationally the knowledge and skills of 15 years old students in schools. Here, we use the last wave of the survey, completed in 2012, which covers 62 countries, and includes question related to personality of students[8]. We focus on the two skills that are more or less similar to conscientiousness and openness traits from STEP. The exact questions and the description of this data are available in the Appendix A and B respectively. When we plot

[8] These are perseverance – the willingness to work on problems that are difficult; openness to problem solving – the willingness to engage with problem solving; locus of control – whether the attribute failure in mathematics to themselves or to others; and motivation to learn mathematics.

non-cognitive skills measures against economic freedom indicator of non-OECD countries we observe a strong positive correlation.

[Figure 1 here]

3. Data

Psychologists have developed wide-ranging tests to measure non-cognitive skills, but the most widely accepted are the big-five personality traits including Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (Goldberg, 1992, 1993). The data measuring personality traits of individuals are generally scarce especially so for developing countries. For developed countries the data from the household surveys such as SOEP for Germany, BHPS for the Great Britain, and HILDA for Australia have been used to study non-cognitive skills of individual and its impacts on their life outcomes. Here, for our main analysis we use the Skills Toward Employment and Productivity (STEP) measurement survey, conducted by the World Bank in 2012 and 2013. It covers twelve developing countries. Recently, the questions on personality traits were also included in the World Values Surveys (WVS) and Programme for International Student Assessment (PISA). We use the latter to correlate non-cognitive skills of individuals with indicators measuring institutional quality across countries. We prefer STEP to WVS, since it covers post-Soviet countries, Armenia, Georgia and Ukraine, while WVS has non-cognitive skills measures only for Georgia and no other transition country.

3.1 STEP survey and the definitions of non-cognitive skills

STEP's questionnaire was developed to target population in lower income countries (Pierre et al., 2014).[9] The data are representative for urban population of age 15-64,[10] and have detailed information on individual and household characteristics that are comparable across countries from different geographical regions.

As STEP is an ongoing project, the data are currently available for only twelve countries. Besides Armenia, Georgia and Ukraine, the rest countries are Macedonia, Bolivia, Colombia, Ghana, Kenya, Laos, Sri Lanka, Vietnam and one Chinese province Yunnan, located in the south-west of China on the border with Laos and Vietnam.. Although the nine countries had their own

[9] The survey aims to mimic OECD's Programme for International Assessment of Adults Competencies (PIAAC) for developing countries. More information about STEP is available at http://microdata.worldbank.org/index.php/catalog/step/about.

[10] The following categories of population are excluded: residence of institutions such as prisoners, hospitals, etc.; residence of senior homes and hospices, residents of college dormitories, halfway homes, worker's quarters; persons living outside of the country at the time of data collection. The survey also provides individual weights, which we use in our regression analysis.

development troubles over history, none of them experienced the same abrupt regime change and transition, as did Armenia, Georgia and Ukraine after the collapse of the Soviet Union. China, for example, is still gradually moving from planned towards market economy.

We focus on so-called the Big Five personality traits (extraversion, conscientiousness, openness, stability and agreeableness. The STEP survey defines each of the skill from the Big Five traits using 3 questions. Specifically, extraversion is defined as one's tendency to be sociable, talkative and dominant in a social situation. Conscientiousness indicates the quality of being organized, responsible and hardworking. Openness is associated with being open to new intellectual and cultural experiences. Agreeableness is the tendency to be good-natured, generous and cooperative. Out of these five, we would expect agreeableness and conscientiousness to be most closely related to survey response behavior because they best capture willingness to cooperate and diligence with tasks. The survey respondents provide self-assessment of how a specific question describes their personality on a scale from 1 (almost never agree) to 4 (almost always agree). In total there are 24 questions related to these personality traits. Each non-cognitive skill measure combines 3 – 4 corresponding questions. To construct a summary measure for each trait, we take a first principal component to aggregate them into one variable. (see Cobb-Clark and Schurer 2012, Elkins, Kassenboehmer, and Schurer 2017, Kassenboehmer, Leung, and Schurer 2018, Kassenboehmer and Schurer 2018). For each country, thus, the scores are standardized with zero mean and one standard deviation, where higher values stand for better social skills. Appendix A provides the exact formulations of questions corresponding to each non-cognitive skill. Table 1 presents summary statistics of our non-cognitive skills measures and pairwise correlations between them.

3.2 Other data sources

PISA aims to monitor and assess internationally the knowledge and skills of 15 years old students in schools. The last wave of the survey, completed in 2012, covers 62 countries, and includes question related to personality. These are perseverance – the willingness to work on problems that are difficult; and openness to problem solving – the willingness to engage with problem solving. Both measures are constructed from five related question. Students answer how a specific question describes their personality on a scale from 1 (*very much like me*) to 5 (*not all like me*), and then simple average is computed, where higher scores indicate higher perseverance. The exact questions are in the Appendix A.

4. Empirical methodology

4.1 Empirical specification

To examine how the collapse of the Soviet Union affected non-cognitive skills of people, we apply a generalized difference-in-difference (DID) approach and compare younger and older generations of individuals from former Soviet Union republics with individuals from other countries. To allow for more flexibility in our regression analysis we consider nine age cohorts. The first cohort consists of older individuals who were born between 1948 and 1956; this cohort will be our reference group. Individuals born between the following years form the next four cohorts: 1957-1961, 1962-1966, 1967-1971 and 1972-1976. These individuals in Armenia, Georgia and Ukraine have developed their non-cognitive skills during the communist regime or by the adolescence (the age 15) in 1991 when the collapse of the Soviet Union happened. The last four cohorts consist from younger individuals born between years 1977-1981, 1982-1986, 1986-1991 and 1992-1997.[11] These individuals in former Soviet Union republics developed their non-cognitive skills partially or entirely after the regime collapse. This definition of age cohorts is based on a view that non-cognitive skills tend to develop mostly in childhood and adolescence (Roberts and DelVecchio, 2000; Cobb-Clark and Schurer, 2012, Specht et al. 2014). At the same time the use of cohorts allows for flexibility and observing the evolution of the changes in non-cognitive skills development over age cohorts. We interact each cohort besides the reference group with the dummy variable indicating Armenia, Georgia or Ukraine and estimate the following specification:

$$y_{icn} = \alpha + \sum_{n=2}^{9} \beta_n \, Cohort_n \times PostSoviet_c + \gamma X_{ic} + \mu_c + \theta_j + \varepsilon_{ic} \qquad (1)$$

Where y_{ic} is the non-cognitive skill of individual *i* from country *c, and cohort n* (extraversion, conscientiousness, openness, stability and agreeableness). $Cohort_n$ is the dummy variable indicating age cohort *n*, and 0 otherwise. $PostSoviet_c$ is the dummy variable that equals 1 for Armenia, Georgia and Ukraine, and 0 for the rest countries. X_{ic} is the vector of individual-specific characteristics; μ_c is the country fixed effects; θ_j year of birth fixed effects and ε_{ic} is the error term satisfying the usual assumptions.

In ideal case, we expect the coefficients β_2, β_3, β_4 and β_5 to be insignificantly different from the reference group, and the coefficients β_6, β_7, β_8 and β_9 to be positive and significantly different from the reference group. However, we might expect a gradual increase of the magnitudes of the effects over the age cohorts. For instance, individuals in former Soviet Union republics from

[11] We drop individuals that were born in 1947 and 1998, as we have only a few of them.

the sixths cohort might demonstrate lower effects than individuals from the last ninth cohort that were born after the regime collapse.

Instead of a linear or quadratic age trend or age cohort fixed effects, we control for the full set of year of birth fixed effects θ_j. In this way we account for a discreet variability of non-cognitive skills during the lifetime, and for possible alteration of personality traits with age (Soto et al., 2008).

The vector X_{ic} includes the following variables: indicators for gender; total years of education; indicators for marital status: married, divorces, separated or widowed (reference group is single); indicators for employment status: employed or unemployed (reference group are individuals that are out of labor force); proxies for household wealth: number of rooms and indicator for ownership of a house or apartment; proxies for family environment: indicator an individual whose parents actively participated in his/her life in this childhood, indicator for an individual that lived with both parents at age 12, the number of siblings, indicator for an individual that had an economic shock before age 15, and indicators for socio economic status of an individual at age 15 (middle or high); and indicators for education of mother and father being higher than ISCED 1. These control variables can correlate with non-cognitive skills measures mitigating omitted variable bias, and they also ensure the homogeneity of our sample. Appendix A details definitions of employed variables. In all specifications we use robust standard errors clustered at the country – year of birth level.

Finally, we remove outliers-observations and outliers-cohorts from the analysis. To detect outliers-observations, we estimate specification (1), predict residuals and remove the top and bottom 1 percent of the distribution separately for each country. After this procedure, we compute average scores of a non-cognitive skill measure for each year of birth cohort. Since specification (1) includes year of birth fixed effects, these average scores should not be too different from each other. We, therefore, define outliers-cohorts as the top and bottom 1 present of the distribution of average scores for birth cohorts, and remove them from the sample.

4.1. Identification assumptions and selection issues

The crucial identification assumption in DID estimations is that the distribution of non-cognitive skills across ages is similar in treated and control groups of countries if there were no transition. Accounting for the full set of year of birth dummy variables, and the rich set of individual-specific characteristics in the empirical specification help us mitigate this concern. To ensure further homogeneity of our countries we perform two procedures. First, we estimate the following specification for each country separately:

$$y_i = \alpha + \sum_{n=2}^{9} \beta_n \, Cohort_n + \gamma X_i + \varepsilon_i, \qquad (2)$$

Where all variables are defined as above. We then check whether the coefficients β_n exhibit the same patterns for each country.[12] We observe that these coefficients for FYR Macedonia are going to the opposite direction from the coefficients for other countries when dependent variable is extraversion. We also obtain that the coefficients for Kenya are opposite to those for other countries when dependent variable is conscientiousness and agreeableness. Therefore, we remove entirely these two countries from our analysis. Another reason to remove FYR Macedonia from our sample is that although it had experienced a socialist regime, but it was somewhat different from the USSR.

Second, we estimate specification (2) for our treated and control groups of countries separately to observer the behavior of the coefficients β_n and ensure that the identification comes from the right source. According to the literature on personality traits, the scores should be more stable for older cohorts in all countries (common pre-trends assumption). The effect of the collapse of Soviet Union should come from the trends for younger cohorts in Armenia, Georgia and Ukraine being different from other countries. The coefficients β_n show the conditional mean scores of non-cognitive skills for eight age cohorts relative to the first age cohort of individuals born in 1948-1956. Figure 2 plots the estimates of these coefficients for each personality trait. The vertical line marks a cohort of individuals that were born between 1972 and 1976, the last cohort that spent their entire childhood and adolescence under the communist regime.

[Figure 2 here]

The graphs show that non-cognitive skills are not very stable in general, and in particular for younger cohorts, as the coefficients β_6, β_7, β_8 and β_9 are more different from zero than the coefficients β_2, β_3, β_4 and β_5 almost for all personality traits. Changes in the trend slopes for individuals that were born after 1976 are the most evident in treated countries for extraversion and openness; and for agreeableness for the last two cohorts. Importantly, the trends in the coefficients for the treated and control groups of countries seem to be similar for older cohorts. This validates the assumption of common pre-trends necessary for DID identification, with one remarkable exception. The scores of stability for younger individuals relative to older individuals are increasing in post-Soviet countries, but decreasing in the control group of countries. This result is consistent with Donnellan and Lucas (2008) reporting that stability decreases with age in Germany, but increases in Britain, while for the other personality traits from Big Five the authors find similar trends in two countries. Due to this fact, we drop stability personality trait from our analysis, as identification of the effect of institutions would come from the wrong source.

[12] The results are available upon request.

Thus our farther analysis proceeds with only four personality traits: extraversion, conscientiousness, openness and agreeableness. While our control group consists from individuals seven of countries: Bolivia, Colombia, Ghana, Laos, Sri Lanka, Vietnam and one Chinese province Yunnan.

Finally, we acknowledge that our data might face at least three selection issues. First, STEP focuses on urban population only. If urban population in Armenia, Georgia and Ukraine has disproportionately better personal skills than rural relative to other countries, then the effects we are trying to identify in this study could be overestimated. In the countries from our sample the percent of urban population varies from 18%-25% in Sri Lanka and Kenya to 67% in Bolivia and 76% in Colombia, while in Georgia it is 53% and 63% in Armenia. The fact that our control group consists from both relatively urban and rural of countries helps to mitigate the concern. Second, the potential limitation of the data is that only current residents of countries are surveyed, and we do not have information on their or their relatives' migration background. Given that immigrants self-select themselves into immigration (e.g. Abramitzky, 2013; Kaestner and Malamud, 2014), decision to migrate might be associated with stronger personality skills, although the literature is still salient on this issue. On the one hand, if the collapse of the Soviet Union induced emigration from Armenia and Georgia, the results of our analysis could be underestimated. But on the other hand it is possible that those with higher opportunities and better personal skills remained in the country. In this case two opposite effects offset each other. Third, the children that were born around 1991 year might be very different. In line with Chevalier and Marie (2016), it could be that these children were negatively selected and perform worse and have lower personality traits scores than children born in better times. As a robustness check we exclude individuals born in 1989-1992 years to see how it influences the results.

5. Results and Discussion

5.1. Baseline results

Table 2 offers the estimates of the coefficients on the interaction terms between eight age cohorts and $PostSoviet_c$ dummy variable for four non-cognitive skills. All individual and household characteristics as well as year birth fixed effects are controlled, but not reported. As expected almost all coefficients β_2, β_3, β_4 and β_5 are not significantly different from zero. Individuals that were born in 1982 and after in post-Soviet countries exhibit significantly higher scores of extraversion than older generations in comparison to other developing countries. Similar positive trends we find for openness and agreeableness. Individuals that were born between 1977-1981 and

1992-1997 in Armenia, Georgia or Ukraine demonstrate higher scores for openness, while those born between 1987-1997 show higher scores for agreeableness. The effects are particularly high for the youngest generation born after 1991. However, we do not find significant effects for conscientiousness. Thus we find that the change of institutional environments caused by the collapse of the Soviet Union has had positive effect on some personality traits of people.

The results discussed in this section are robust to various specification checks and sample restrictions, which we will explain in the following section.

[Table 2 about here]

5.2. Robustness checks

In this section we present the results from a battery of robustness and sensitivity checks. First, we test for placebo treatment effects. We implement this test in three ways. First, we randomly assign year of birth to people; second, we randomly assign country of residence; and third, we assign randomly both year of birth and country to all individuals from our sample.

We test whether the results are driven by individuals located in capital cities; by potentially vulnerable regions in Armenia and Georgia (these are regions in Armenia and Georgia that potentially were the most vulnerable shortly before or after the collapse of the Soviet Union. These include Armenian region Syunik, which is the closest to Nagorny-Karabach autonomous republic – a disputable land between Armenia and Azerbaijan; Lori region that had a devastating earthquake in 1988; Georgian region Adjara, which was subject to the coup and ethnic armed clashes; neighboring Adjara regions (Guria and Samtskhe-Javakheti), and the regions neighboring Abkhazia (Samegrelo-Zemo Svaneti) and South Ossetia (Shida Kartli and Racha-Lechkhumi-Kvemo Svaneti))

We test if our results are robust to the exclusion of individuals that were born either before the important events in the control countries. We exclude from the sample individuals that were born in the year or before the following events: Laos 1954 (independence from France and start of communism), Vietnam 1976 (reunification of South and North Vietnam), Bolivia 1982 (transition to democracy), Colombia 1957 (transition to democracy), Ghana 1957 (independence from UK), Kenya 1963 (independence from UK), and Sri Lanka 1948 (independence from UK).

We conduct estimations based on a matched sample of controls based on individual characteristics.

6. Conclusion

The importance of personality traits on various life outcomes such as education, participation in crime, labor market participation and labor market outcomes have been emphasized and

investigated by a large body of recent literature. However, the question of how these non-cognitive skills develop in an individual has received less attention. Both inheritance and environment affect the formation of personality traits. Whether and how these traits are affected by the socio-political and economical institutions that one faces in the society are the contributions of the current paper.

This paper analyses the effects of institutions on the personality traits of individuals who lived under different sets of regimes. In particular we are focusing on three post-soviet countries: Armenia, Georgia, and Ukraine. We compare non-cognitive skills of individuals that were born at least fifteen years before the collapse of the Soviet Union with those that were born later. The formation of personality traits during the childhood and early adolescence has been discussed and supported in a large body of literature in psychology and economics (as discussed in section 1). The research design in this paper is based on this assumption. Applying a difference-in-difference empirical strategy, we fine that Individuals that were born in 1982 and after in post-Soviet countries exhibit significantly higher scores of extraversion, openness and agreeableness than older generations in comparison to other developing countries. These results are consistent through various robustness checks. These results are in line with the works of Cook, et al (1998), Langenecker (2001), Linz, and Chu (2013) who show that the managers in the Soviet Union lacked interpersonal, and teamwork skills. Similarly, we argue that the socio-politico-economical system that was the Soviet Union did not encourage the same type of non-cognitive skills that we have found crucial for success in the market economies. However, we find that after the collapse of the soviet, the new generation quickly has adopted these skills. The finding of this paper emphasizes yet another channel through which institutions affect economic outcomes: through formation of non-cognitive skills. Thus, after institutions are likely to affect outcomes far after their own date. Moreover, these findings are relevant to implementing large array of policies including those for the labor markets in the post transition countries.

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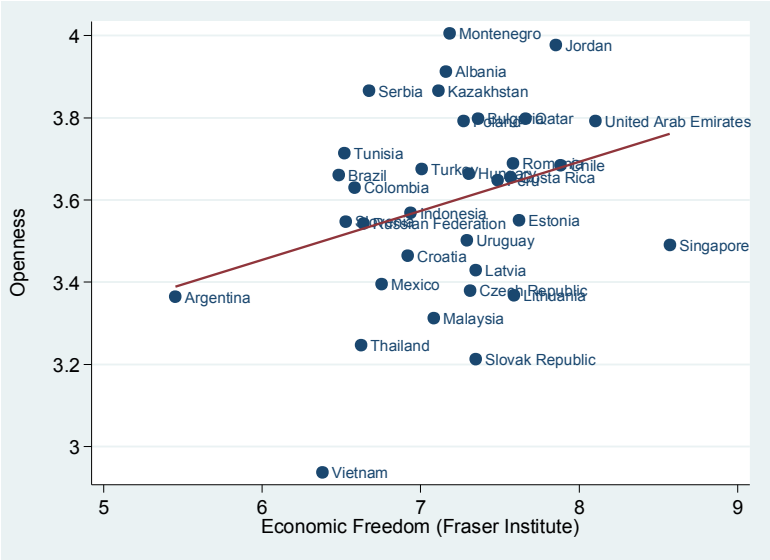
Figures and Tables

Figure 1: Non-cognitive skills (PISA) and Economic Freedom



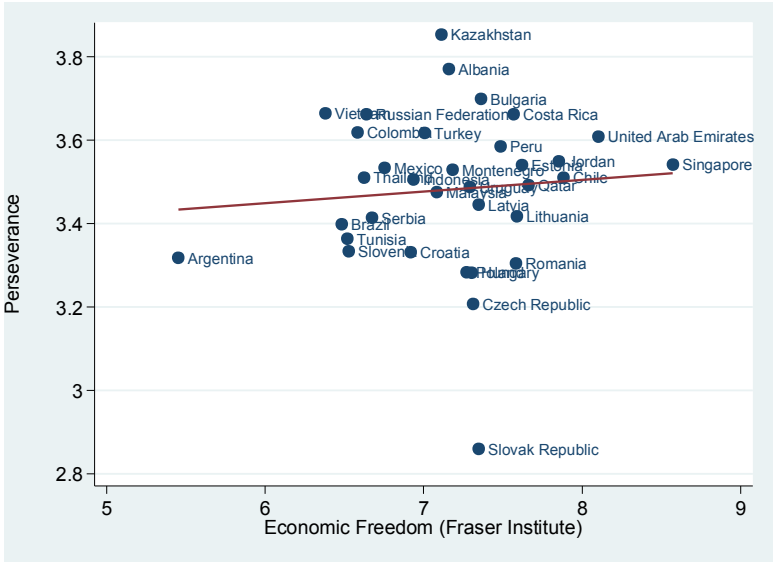
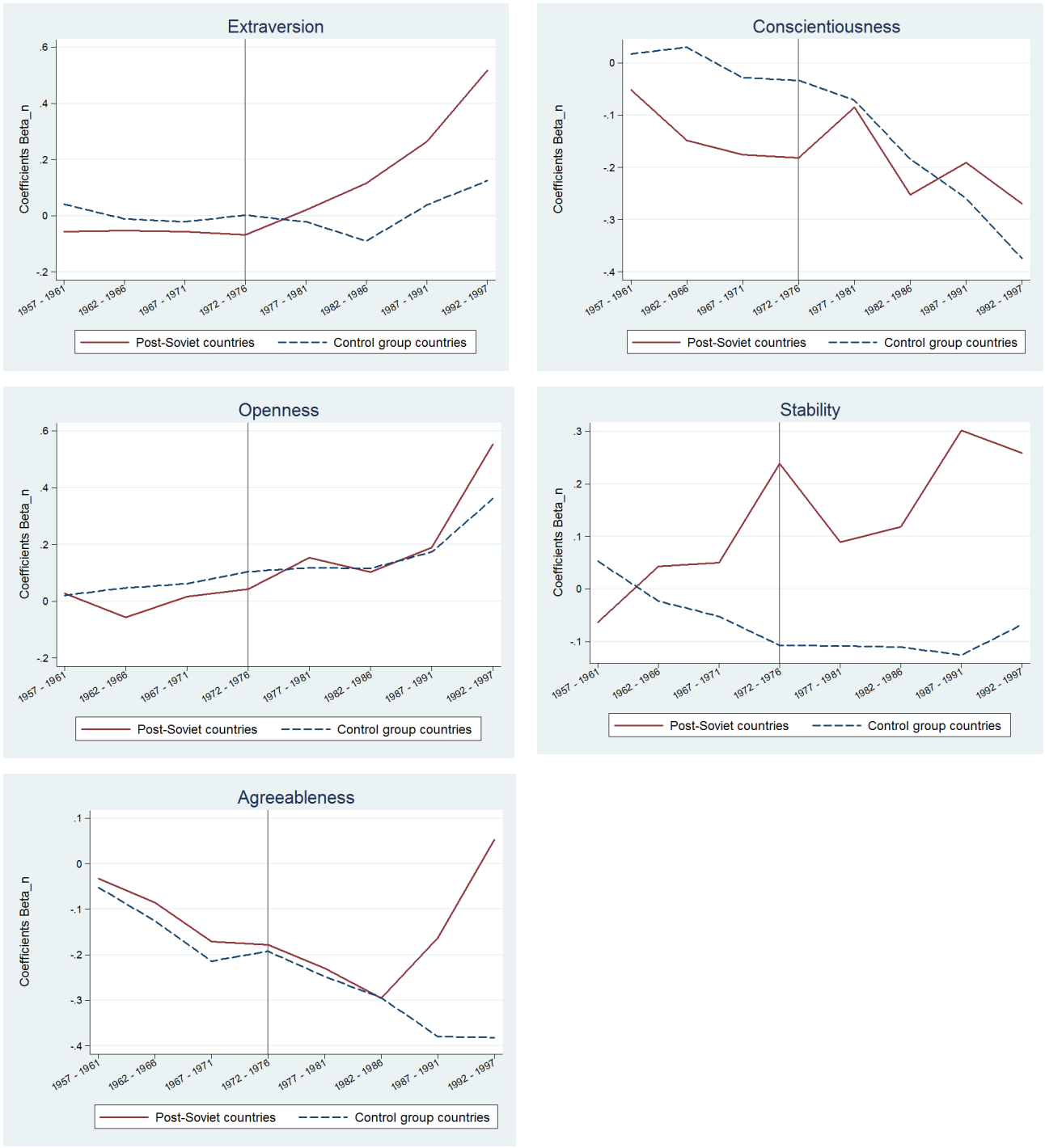


Figure 2: Conditional mean scores of non-cognitive skills relative to the reference group



Note: This figure plots the coefficients β_n for treated and control groups of countries from estimation of specification (2). Vertical line marks the last cohort of people who spend their entire childhood and adolescence (until age 15) under the communist regime.

Table 1: Pairwise correlations of non-cognitive skills

		1	2	3	4
1	Extraversion				
2	Conscientiousness	0.15*			
3	Openness	0.25*	0.30*		
4	Stability	-0.004	0.05*	0.03*	
5	Agreeableness	0.22*	0.30*	0.28*	-0.02*

*** indicates significance at the 1% level

Table 2: The effects of institutional change of non-cognitive skills

	Extraversion	Conscientiousness	Openness	Agreeableness
	(1)	(2)	(3)	(4)
1957-1961*Post-Soviet	-0.096	-0.050	0.071	0.046
	(0.068)	(0.077)	(0.060)	(0.063)
1962-1966*Post-Soviet	-0.041	-0.149*	-0.023	0.064
	(0.068)	(0.077)	(0.054)	(0.063)
1967-1971*Post-Soviet	-0.024	-0.097	0.068	0.066
	(0.064)	(0.073)	(0.064)	(0.077)
1972-1976*Post-Soviet	-0.067	-0.104	0.052	0.025
	(0.063)	(0.066)	(0.063)	(0.062)
1977-1981*Post-Soviet	0.045	0.040	0.161***	0.026
	(0.073)	(0.078)	(0.060)	(0.065)
1982-1986*Post-Soviet	0.199***	-0.016	0.096	-0.002
	(0.068)	(0.070)	(0.060)	(0.068)
1987-1991*Post-Soviet	0.163**	0.072	0.102	0.127*
	(0.071)	(0.076)	(0.062)	(0.067)
1992-1997*Post-Soviet	0.314***	0.016	0.266***	0.264***
	(0.058)	(0.081)	(0.070)	(0.075)
Other Controls	YES	YES	YES	YES
N observations	24,502	24,532	24,564	24,533
R2 adjusted	0.025	0.061	0.116	0.029

Note: This Table reports the results from estimation of the specification (1) for the dependent variables indicated in the headlines. The controlled variables defined in the text and Appendix A, country and year of birth fixed effects are included, bur not reported. Panel A reports the results from baseline regressions. Panel B reports the results from the specification, where birth cohorts are interacted with Armenia and Georgia dummy variable. The reference cohort group is those individuals that were born during 1977-1991. Standard errors are clustered at the country-year of birth level. Reported R2 is adjusted for the number of covariates. *** indicates significance at the 1% level, ** - at the 5% level, and * - at the 1% level.

Appendices

Appendix A: Variables and definitions

Variable	Description
Non-cognitive skills from STEP	
Extraversion	Average score of replies to the following questions: Are you talkative? Do you like to keep you opinion to yourself? Are you outgoing and sociable?
Conscientiousness	Average score of replies to the following questions: When doing a task, are you very careful? Do you prefer relaxation more than hard work? Do you work very well and quickly?
Openness	Average score of replies to the following questions: Do you come up with ideas other people haven't thought of before? Are you very interested in learning new things? Do you enjoy beautiful things, like nature, art and music?
Stability	Average score of replies to the following questions: Are you relaxed during stressful situations? Do you tend to worry? Do you get nervous easily?
Agreeableness	Average score of replies to the following questions: Do you forgive other people easily? Are you very polite to other people? Are you generous to other people with your time or money?
Other controls from STEP	
ArmGeo	Indicator variable that equals 1 if an individual is from Armenia or Georgia.
Born before	Indicator variable equals 1 for the individuals born in or before 1976, equals 14/15 for those born in 1977, equals 13/15 for those born in 1978, …, equals 1/15 for those born in 1990, and equals 0 for those born in or after 1991.
Schooling	The number of years of education
Married	Indicator variable that equals 1 if an individual currently is married (in mono or polygamy units)
Divorced	Indicator variable that equals 1 if an individual currently is divorced.
Separated	Indicator variable that equals 1 if an individual currently is separated.
Widowed	Indicator variable that equals 1 if an individual is widowed.
N of rooms	The number of rooms in the household house.
House owned	Indicator variable that equals 1 if a household owns the house.
Siblings	The number of siblings that individual has.
Parental	Indicator variable that equals 1 if parents always or almost always encouraged an individual when it was a child in school.
Employed	Indicator variable that equals 1 if an individual is employed.
Unemployed	Indicator variable that equals 1 if an individual is unemployed.
Father Mother	Indicator variable that equals 1 if an individual at age 12 lived with both parents

	(including step parents).
Mother educ	Indicator variable that equals 1 if mother has education ISCED 2 and above.
Father educ	Indicator variable that equals 1 if father has education ISCED 2 and above.
Shock	Indicator variable that equals 1 if an individual experienced an economic shock at age 15.
Middle status	Indicator variable that equals 1 if an individual had a middle socio-economic status at age 15.
High status	Dummy variable indicating if an individual had a high socio-economic status at age 15
Non-cognitive skills from PISA	
Pervasiveness	Average score of replies to the following statements: When confronted with a problem, I give up easily. I put off difficult problems. I remain interested in the tasks that I start. I continue working on tasks until everything is perfect. When confronted with a problem, I do more than what is expected of me.
Openness	Average score of replies to the following statements: I can handle a lot of information. I am quick to understand things. I seek explanations for things. I can easily link facts together. I like to solve complex problems.

Appendix B: Description of PISA data used in this paper

PISA aims to monitor and assess internationally the knowledge and skills of 15 years old students in schools. The last wave of the survey, completed in 2012, covers 62 countries, and includes question related to personality of students. These are perseverance – the willingness to work on problems that are difficult; openness to problem solving – the willingness to engage with problem solving; locus of control – whether the attribute failure in mathematics to themselves or to others; and motivation to learn mathematics. We focus only on the first two skills, since they are more or less similar to conscientiousness and openness personality traits from STEP. Both perseverance and openness to problem solving measures constructed from five related question. Students answer how a specific question describes their personality on a scale from 1 (*very much like me*) to 5 (*not all like me*), and then simple average is computed, where higher scores indicate higher perseverance. The exact questions are in the Appendix A.