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Unfair inequality, governance and individual beliefs

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Abstract

Unfair inequality arises when incentives are not fairly tied to effort or investment across the socio-economic spectrum. The actual limitations on economic activity from this failure may depend on whether people believe the system is unfair, and how well governing institutions safeguard fair-play. In this paper, I study whether unfair wealth inequality is correlated with beliefs about fairness, and whether good governance can be a substitute in belief formations for decreases in unfair inequality. I find that people in countries with recent increases in unfair wealth inequality are less likely to believe that inequality is due to fair processes. This relationship holds when “fair” determinants of inequality include effort, as well as moral and meritocratic components. The relationship is strongest in countries with poor quality governance. In countries with high quality governance, people appear to be more tolerant of unfair inequality, as it is only weakly reflected in their beliefs about process fairness.

Keywords: Inequality of opportunity, unfair inequality, process fairness, beliefs, governance.

JEL Classification: D63, E71, D31, Z19.

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The working paper series has been produced to stimulate debate on the economic transition and development. Views presented are those of the authors and not necessarily of the EBRD.

1 Introduction

Beliefs about inequality do not always reflect economists' estimates (Chambers et al., 2014; Gasparini and Cruces, 2013; Gimpelson and Treisman, 2018; Norton and Ariely, 2011; Verme et al., 2014). Beliefs about determinants of inequality can also be inaccurate. In particular, people's beliefs about whether hard work and ambition are critical for economic success do not necessarily correlate well with the true contribution from these factors (Brunori, 2017). It is important to understand what drives inaccuracy in these beliefs because they can impact economic decision-making and attitudes towards redistribution (Alesina and Giuliano, 2011; Fogli and Veldkamp, 2011; Fernández, 2013). My main contribution is to investigate the hypothesis that institutional quality interacts with experience to influence beliefs. I look specifically at beliefs about whether determinants of economic outcomes are fair. If a person believes that hard work determines outcomes, is that because they have experience of hard work determining outcomes, or because they live in a place where formal institutions function properly?

Beliefs about whether determinants of inequality are fair are important for economic decision making. For example, beliefs about inequality and fairness can affect voter turnout (Birch, 2010) as well as attitudes toward redistribution (Eisenkopf et al., 2013; Durante et al., 2014; Gründler and Köllner, 2017). In the transition region, perceptions of process fairness, especially fairness in government, have been shown to be correlated with life satisfaction (Djankov et al., 2016). Meanwhile, blaming failure on an unfair system can lead to dramatically different equilibrium effort levels than if one believes effort is largely rewarded (Alesina et al., 2012). If people do not believe they can get rewarded for hard work and ability, there may be little incentive for people to “buy into the system”, for example by investing in human capital or building a business. This under-investment can in turn impact growth (Marrero and Rodríguez, 2013). In sum, beliefs about fairness of determinants of economic outcomes are valuable to study because they can impact consequential economic decisions.

There are many reasons why beliefs about determinants of inequality may not coincide with what actually determines inequality. Beliefs about what makes people rich or poor can be heavily influenced by social norms and personal values (Alesina and Angeletos, 2005). Individuals may also hold onto inaccurate beliefs as a way to protect their identity or view of themselves (Bénabou and Tirole, 2011). Alternatively, beliefs about what determines inequality may be biased by the policies and institutions to which individuals are exposed during their life (Hunt, 1996; Alesina and Giuliano, 2015; Wildavsky, 1987). According to this hypothesis, institutional quality interacts with how people experience determinants of inequality in a way that changes their perception of their experience (Piketty, 1995; Bénabou, 2008).

There are two ways in which the interaction between institutions and determinants of inequality can impact beliefs. First, individuals can learn about institutional quality directly. What they learn will either reinforce or undermine the judgments they form as a result of their own experiences with what determines economic success (Bénabou, 2008).¹ For example, Di Tella et al. (2007) show that

¹Bénabou (2008) discusses how “mental constructs” can interact with institutions to generate beliefs.

improving land titling among squatters in Brazil increased the squatters' beliefs about the value of self-reliance for success. As squatters, these people already had dominion and perceived ownership over the land before the intervention. So it was not ownership per se that changed their views, but the interaction of formal recognition from the state with their life experience. Thus, direct contact with institutions can interact with experience to influence beliefs about determinants of economic success.

Second, well-functioning formal institutions can act like an insurance policy, such that the beliefs people hold about ex ante inequality will be influenced by their ex post ability to compensate for it, using the available formal institutions. For example, labor market discrimination is a nearly universal *potential* source of ex ante inequality. In countries with stronger rule of law, people have higher chances of successfully challenging labor market discrimination ex post. Therefore, even if the discrimination does not occur, the existence of a solution to address it can generate a better opinion of the economic system overall (e.g. whether effort pays, independent of one's circumstances).² Thus, people may view the same reality in a different light depending on the formal institutions that frame the situation.

I will test the central hypothesis for this study using two different definitions of fairness.³ One definition I consider is from Rawls (1971), Roemer (1998) and van de Gaer (1993). It combines what are known as the Principles of Compensation and Reward. This framework classifies sources of inequality based on whether or not they are something an individual can control, and for which they take responsibility. Cappelen et al. (2010) refer to this definition of fair as "choice egalitarian". The consensus in this strand of literature is that inequality due to responsibility factors, such as effort, is justified (Principle of Reward). Correspondingly, inequality due to circumstances over which one has no control, is not (Principle of Compensation).

On the other hand, Nozick (1973) contends that for an outcome to be considered fair, it must also be just. Labelling an outcome as fair therefore requires "knowing that it is unpolluted by extortion, robbery, slavery, and so on." Thus, the second definition encompasses the first, and also classifies inequality that stems from moral behavior, such as obeying the law, as fair. Inequality that stems from privilege or dishonest behavior is classified as unfair. This approach is consistent with the meritocratic definition from Sen et al. (2000) and with Konow (2000)'s Accountability Principle – inequality is fair if people get what they deserve (and deserve what they get) based on their choices and actions (Alesina and Angeletos, 2005). Individual endowments from birth that have genetic components, such as intelligence, would also be considered fair determinants of inequality in the meritocratic sense, but not necessarily according to the Principle of Compensation. This second definition is thus a broader definition than the first.

It is valuable to consider both conventions. The first definition is strictly consistent with my mea-

²Bowles (1998) refers to this as the "construal effect", where both the type and quality of institutions have framing effects on beliefs. Another example is the inherent value of prospect of upward mobility (POUM) for the middle class. If the middle class perceive that good institutions benefit them in principal, they may not be as concerned with increases in unfair inequality (Acemoglu et al., 2015; Bénabou and Ok, 2001).

³While classifying the various determinants of inequality as either fair or unfair is subjective, research shows the classification to be consistent within societies (Alesina and Angeletos, 2005).

sure of unfair processes, so it makes more sense to use when checking for inaccurate beliefs. The second is likely more intuitive for respondents, who may aggregate both poor choices as well as circumstances at birth when they think about fair and unfair determinants of inequality.

To capture objectively unfair processes empirically, I use a measure based on the concept of inequality of opportunity (Roemer, 1998). Inequality in the distribution of any economic outcome can be thought of as resulting from a combination of fair and unfair processes. The class of estimator that I use attempts to isolate this unfair portion by focusing on the inequality that can be attributed to circumstances beyond a person's control, such as place of birth and parental background (Bourguignon et al., 2007). The idea is that circumstances at birth should not impact an individual's outcomes. Nonetheless, these factors have been shown to heavily influence outcomes for minority or other disadvantaged groups (Altonji and Blank, 1999; Bertrand and Mullainathan, 2004; Blau and Kahn, 2000). Inequality of opportunity is thus a useful conceptual framework for a measure of unfair inequality in an economy.

Providing these estimates of changes in unfair inequality over time is a second contribution of this paper. I construct estimates for a set of 35 countries in 2010 and 34 countries in 2016. This is important to the literature. Estimates of changes in unfair inequality are rare since collection of sufficient circumstance data is a relatively new effort, especially in large cross country datasets.

For empirical estimates of institutional quality, I use the governance measure from the Worldwide Governance Indicator project. This database includes country-level assessments of formal institutions that directly support the economy: government effectiveness, regulatory quality, rule of law and control of corruption. These institutions should support and protect equal opportunity because, where they are effective, they strengthen the link between effort and outcomes. Formal governing institutions responsible for protecting personal property and limiting gains to corrupt behaviour are particularly relevant.

Unlike past work on this issue (e.g., Denisova et al., 2009), I focus on changes in unfair inequality, rather than levels. Looking at changes gives better insight into whether beliefs about process fairness are updated with experience. If levels of unfair inequality are correlated with beliefs about the determinants of inequality, this can reflect persistence of high levels of unfair inequality, persistent intergenerational beliefs or both. On the other hand, if changes in unfair inequality are correlated with beliefs now, then it suggests that people are updating based on experience. Furthermore, differences in the correlation by institutional quality provide evidence in support of the hypothesis that institutions are important for belief formation. Lastly, I compare results on unfair inequality with results on overall income inequality.

My work also builds on a study by Abras et al. (2013), who also investigate the link between beliefs about fairness and unfair inequality. They find that, in 2006, people are likely to attribute success to an unfair process when inequality of opportunity for jobs is high. My work builds on this by using multiple time periods and levels of institutional quality. I also use wealth instead of jobs for the measure of unfair inequality, a longer-term measure of success, and test two measures of fairness. I thus provide a more in-depth analysis of how unfair inequality is reflected in people's attitudes.

This study adds to the evidence on the interaction between culture and institutions. Beliefs about the processes behind poverty and corresponding attitudes towards work are common themes in studies on the role of culture in economics (see Alesina and Giuliano (2015) for a review). Culture, as we study it in economics, can be defined as “a set of beliefs, values and preferences, capable of affecting behavior, that are socially...transmitted and that are shared by some subset of society” (Mokyr, 2016, p.8). I follow this convention from Alesina and Giuliano (2015) and Mokyr (2016), and distinguish between formal institutions and culture.

My paper is also additional to a study recently published in this journal on determinants of governmental redistribution and the role of perceptions (Gründler and Köllner, 2017). Gründler and Köllner (2017) look at how beliefs may influence redistribution, taking institutions into account. In effect, they ask how beliefs impact policy outcomes. In contrast, I look at belief formation, and how this may be influenced by people’s experiences. My work is thus in the spirit of Bowles (1998) and Piketty (1995), while Gründler and Köllner (2017) focus on the Meltzer-Richard hypothesis (Meltzer and Richard, 1981). Lastly, our two papers do share a common concern for perceived versus actual inequality, but Gründler and Köllner (2017) consider beliefs about overall income inequality, while I consider only the unfair portion of overall inequality. It is important to consider fair and unfair inequality separately, as they likely to have distinct impact on macro-level outcomes such a redistribution and growth (Marrero and Rodríguez, 2013).

I find that my measure for unfair inequality is negatively correlated with beliefs that processes behind inequality are fair, but that the definition of “fair” matters. Survey respondents seem to see process fairness in a broader sense than the mechanics of the objective measurement would indicate. Also, institutional quality matters. The interaction between changes in unfair inequality and level of governance is positive and significant. Thus, if governance is at the level of Central Europe or above, it is more likely that good governance can substitute for reductions in unfair inequality in motivating positive beliefs about success. On the other hand, where governance is at the level of Central Asia, increases in unfair inequality exhibit a negative and statistically significant effect on beliefs that success is fair. In comparison, I find that good governance is not a good substitute in belief formation for higher levels of or changes in overall income equality.

The paper proceeds as follows. First, I describe the methodology used to approximate unfair inequality and describe the empirical specification for the main estimation. Second, I introduce the data and present variable definitions. This is followed by the results and a conclusion.

2 Methods

The analysis requires two stages. First, I calculate a measure of unfair inequality for each country in 2010 and 2016. Second, I use these approximations in a regression to assess the correlation between changes in unfair inequality since 2010 and beliefs about determinants of economic outcomes, today. I also examine the role of institutional quality in this correlation.

2.1 A measure of unfair inequality

To measure the fairness of processes that determine economic outcomes, I rely on the methods in Bourguignon et al. (2007) and in Ferreira et al. (2011). The basic idea is to estimate how much of the inequality in an economic outcome can be explained by individuals' "initial conditions", at birth. Going back to birth neatly separates the impact of exogenous inputs and individual choices on economic success. Initial conditions (circumstances) typically include gender, place of birth and parental characteristics. Bourguignon et al. (2007) applied this method inequality of opportunity for income, using survey data.⁴

Ferreira et al. (2011) extended this methodology from individual income to household wealth. Like Ferreira et al. (2011), I also look at wealth inequality because my data source lacks reliable income data over time.⁵ My measure thus captures the portion of overall inequality in access to household wealth that can be attributed to individuals' initial circumstances. Insofar as household formation is an individual choice with economic consequences, this approach is consistent with the inequality of opportunity theory because it separates out the impacts of an individual's circumstances on their economic well-being. I refer to my measure as "unfair inequality".⁶

Generating the measure requires a reduced form regression of household wealth on respondent circumstances (within each country). The R^2 from this regression serves as the measure of unfair inequality (Ferreira et al., 2011).⁷ In this paper, the R^2 captures the overall explanatory power of circumstances for explaining the kind of household, in terms of total resources, with which a person is associated. Reduced form coefficient estimates correspondingly indicate each circumstance's importance in explaining this relationship.

For the reduced form regression, I follow the convention in the literature and assume that wealth is

⁴This is known as the indirect method. Direct estimation requires defining and measuring opportunity sets. Meanwhile we typically only observe outcomes. The indirect method is thus more feasible. It is also ideal for limited sample survey data such as the LiTS.

The estimation procedure is agnostic about whether intelligence and skill are fair sources of inequality. A large part of intelligence may be beyond an individual's control, but this is not universally considered as unfair. Hence, while intelligence should perhaps be included as a circumstance that confers unfair advantage, it is not a clear component of inequality of opportunity.

⁵Measures based on wealth and income capture different dimensions of the broader concept. Other relevant economic outcomes are educational attainment and employment status. The former has received considerable attention in the labor economics literature. See Willis (1986), in which opportunity is defined as the interest rate on loans to fund education. If these rates are equal, then the people with the most to gain from school will go, regardless of background. My work is consistent with this literature, insofar as circumstances determine interest rates.

⁶I use this very general label to acknowledge that my measure departs from classic, income-based inequality of opportunity estimates.

⁷I cannot use conventional indexes of inequality (e.g. Gini or thiel index) since the wealth variable theoretically takes values from negative infinity to positive infinity and inequality indices are not translation invariant.

a linear function of circumstances, C_{ik} , and effort, E_{ik} , for individual i in country k .⁸

$$y_{ik} = \alpha_k C_{ik} + \beta_k E_{ik} + u_{ik} \quad (1)$$

Circumstances may also influence an individual's economic success indirectly, through effort, such that $E_{ik} = H_k C_{ik} + v_{ik}$. Substituting this back into (1), one obtains $y_{ik} = (\alpha_k + \beta_k H_k) C_{ik} + \beta_k v_{ik} + u_{ik}$, which can be estimated by OLS as

$$y_{ik} = \Psi_k C_{ik} + \varepsilon_{ik} \quad (2)$$

where $\Psi_k = \alpha_k + \beta_k H_k$ and $\varepsilon_{ik} = \beta_k v_{ik} + u_{ik}$. Error terms are bootstrapped. This regression equation gives the reduced form estimate of the overall impact of circumstances on access to household wealth, capturing the direct and indirect (through effort) channels. This is a relative measure. I use a relative measure instead of an absolute measure because the relative measure is more readily interpretable across countries. Moreover, it is directly comparable to a Gini coefficient because they both have a per cent interpretation.⁹

While I use a wealth-based measure for practical purposes, there are also important conceptual advantages to using wealth instead of income, especially in the context of the transition region. First, income is often difficult to measure accurately as the rural poor and informal sector workers often do not have a predictable or easily aggregated income stream. The use of barter further undermines accurate accounting. Second, self-employed or seasonal workers may report income differently than full-time employees. Lastly, although wealth fails to take account of short-run or temporary shocks, it is more reflective of longer-run living standards. In the former communist context, asset-based wealth is particularly important as high-level officials and members of the Communist Party were often given supplements or bonuses in the form of goods or housing rather than cash.¹⁰ Ultimately, income and wealth are complementary outcomes and future research should consider the relative importance of each.

⁸There are also non-parametric methods for quantifying inequality of opportunity. The advantage of the parametric estimation is that it allows us to consider more than one circumstance despite relatively small sample sizes

⁹The effort/circumstances approach has four main weaknesses. First, if one or more important circumstances are missing, this will result in lower bound estimates of the true impacts of circumstances on outcomes (Ferreira et al., 2011). Missing circumstances may include mother tongue, genetically inherited intelligence, quality of parents' education or quality of childhood nutrition. Second, omitted circumstances mean that individual parameter estimates from the first-stage regressions are likely biased. Third, the methodology excludes sources of economic success that are the result of immoral or unethical choices, such as theft and cheating. Lastly, omitted variables may undermine cross-country comparability of the measures if the optimal set of relevant circumstances, and correlation with the error term, varies from country to country. If this is the case, the lower bound estimate of unfair inequality could be further from the true level in some countries than in others.

¹⁰Turkey and western Europe differ in this sense, but the same analysis was conducted in all countries for purposes of comparison.

2.2 Belief estimations

The next stage of the analysis is to look at how changes in unfair inequality are correlated with beliefs about the fairness, and how this correlation varies by institutional quality. This is the main contribution of the paper. I estimate these correlations using cross-country regressions, controlling for baseline (2010) estimates of unfair wealth inequality and income inequality, baseline indicators of macroeconomic health and changes in indicators of macroeconomic health since 2010.

For each of two belief outcome variables (described in more detail below), I estimate two specifications. The first regresses individual beliefs on: baseline level of unfair inequality, $UnfairIneq_{k,t=0}$, the change in unfair inequality since 2010, $\Delta UnfairIneq_k$, income inequality, $Gini_{k,t=0}$, and the change in income inequality since 2010, $\Delta Gini_k$. I also include a vector of additional baseline country controls, $X_{k,t=0}$, which contains GDP per capita, inflation, unemployment and governance. I describe the governance measure I use in the next section. I also include a vector to capture changes in these macro controls between 2010 and 2016, ΔX_k and a dummy variable to control for whether each country is a former communist country or a comparator country.

Lastly, I include a vector of individual controls, Y_{ijk} . Y_{ijk} includes the respondent's age, age squared, educational attainment, employment status and the decile in which the household falls in the wealth distribution in country k . It also includes a variable to capture the median (perceived) economic welfare of the place where the respondent lives. The variable is called $PSUmediandecile_{jk}$.¹¹

Y_{ijk} also contains the circumstances from the estimation of Equation 2. Circumstances include place of birth, parental education and whether one's parent was a member of the Communist Party. Parental education is equal to the highest degree obtained by either parent.¹² Including the circumstance variables directly in the beliefs regression assumes that circumstances have both a direct effect on beliefs and an indirect effect, through $UnfairIneq$. Excluding circumstances when they should be included would make the measure of unfair inequality correlated with the error term, and contribute to bias and inconsistency of the $UnfairIneq$ coefficient estimates. Controlling for parental membership in the communist party is particularly important here, since parents' ideological affiliation is known to influence the next generation's attitudes and perceptions (Alesina and Fuchs-Schündeln, 2007).

The regression is:

$$\begin{aligned} belief_{ijk,t=1} = & \beta_1 \Delta UnfairIneq_k + \beta_2 UnfairIneq_{k,t=0} + \beta_3 \Delta Gini_k \\ & + \beta_4 Gini_{k,t=0} + \beta_5 Y_{ijk,t=1} + \beta_6 X_{k,t=0} + \beta_7 \Delta X_k + e_{ijk,t=1} \end{aligned} \quad (3)$$

¹¹To construct this variable I use a LiTS question that asks respondents to place themselves on a rung of a 10-step ladder, where the poorest 10 per cent of people in the country are on the bottom rung and the richest 10 per cent are on the top rung. I take the median response to this question by PSU, excluding household i .

¹²In the belief regressions, I include the highest education achieved by either parent, rather than educational attainment of each parent. The simplification improves the sample size, mostly due to missing values for mother's education. Results do not change.

where $belief_{ijk}$ refers beliefs according to either definition of fairness, for respondent i in PSU j and country k . $t = 1$ refers to 2016 data, and $t = 0$ refers to 2010 data. Regressions are probits, with standard errors clustered at the country level.

In the second specification I include interactions of institutional quality with unfair inequality and with the gini (overall income inequality). In the equation, governance, which represents institutional quality, is referred to as Gov . The regression is:

$$\begin{aligned}
belief_{ijk,t=1} = & \beta_1 \Delta UnfairIneq_k + \beta_2 UnfairIneq_{k,t=0} + \beta_3 \Delta Gini_k \\
& + \beta_4 Gini_{k,t=0} + \beta_5 (\Delta UnfairIneq_k * Gov_{k,t=1}) \\
& + \beta_6 (UnfairIneq_{k,t=0} * Gov_{k,t=1}) \\
& + \beta_7 (\Delta Gini_k * Gov_{k,t=1}) + \beta_8 (Gini_{k,t=0} * Gov_{k,t=1}) \\
& + \beta_9 Y_{ijk,t=1} + \beta_{10} X_{k,t=0} + \beta_{11} \Delta X_k + e_{ijk,t=1}
\end{aligned} \tag{4}$$

The estimation does not provide strict identification and coefficients are correlations only. The specification reduces concerns about reverse causality because changes in unfair inequality between periods $t-1$ and t cannot be caused by attitudes in period t . But simultaneity bias will still be a problem if past values of the dependant and independent variables are strong predictors of current values.¹³ Omitted variable bias also cannot be ruled out in case the relationship between beliefs and unfair inequality is driven by a process that cannot be accounted for using standard macroeconomic country controls.

3 Data and variable definitions

The data I use for this paper is from the Life in Transition Survey (LiTS), a cross-sectional household survey administered by the European Bank for Reconstruction and Development (EBRD) and the World Bank. I use data from the second and third waves. The data are comparable across 29 former communist countries and 8 comparator middle and high income countries, over two waves. The LiTS is particularly well suited to this study because it has extensive individual-level information on circumstances and attitudes, and covers countries with heterogeneous institutions. The analysis of perceptions and inequality has particular relevance for this sample, and the presence of the comparator countries contributes to generalizability of results.

My sample includes a variety of respondent types, including household heads and non-heads (Table 1). This is different from what is in the literature (e.g., Ferreira et al., 2011), which considers only household heads. Expanding the sample beyond household heads, however, better accommodates the definitions in the LiTS data. This is because looking only household heads requires the

¹³Suppose Y_{t-1} predicts Y_t , and Y_{t-1} and X_{t-1} are determined simultaneously. Then coefficients from a regression of Y_t on X_{t-1} will reflect that simultaneity and the regression will not identify the causal effect of X on Y . See Bellemare et al. (2017) for a full explanation.

assumption that the (self-identified) head is the primary income earner, and that accumulation of household assets is primarily due to the head’s efforts. But headship is not defined in the LiTS, and relying on the self-selection of household heads can be misleading, especially in the case of two-person households (70% of the sample consists of two-person households).

I exclude respondents who are students, retired, working-age children of working-age household heads, and household heads living with working-age parents. Students and retired people have different patterns of income and wealth accumulation, so should not be included in the sample. Meanwhile, including the later two groups would be incompatible with the theory behind estimating inequality of opportunity. Measures based on the inequality of opportunity framework aim to capture the impact of a person’s circumstances at the time they were born, which is determined in part by their parents’ choices (e.g. parental education). They aim to exclude the impact of own choices. Because concurrent parental contributions to household wealth may be a function of the respondent’s own choices, including people in the sample who live with productive parents will introduce bias into the measure.

Table 1: Sample for the paper, from the Life in Transition Survey, 2010 and 2016

Respondent’s relation to household head	Per cent of the sample, by year			
	2010		2016	
	Male	Female	Male	Female
Household head	32.06	27.54	39.87	21.56
Spouse/Partner	4.64	32.25	4.28	30.59
Parent of head or partner	0.44	1.55	0.80	1.85
Sibling of head or partner	0.43	0.52	0.33	0.34
Other adults	0.21	0.36	0.15	0.22
Total	37.78	62.22	45.43	54.57

The final sample has 50,588 observations, which represents 76% of the total non-retired, non-student survey sample. 98.67% of this restricted sample consists of household heads and their spouses/partners. All respondents in the survey data are 18 years or older. Approximately 83 per cent of the restricted sample is between 30 and 60 years old.

3.1 Variable definitions

Each step of the analysis – estimating unfair inequality and analyzing beliefs – has a slightly different set of required variables. First, I describe the variables that are necessary to generate estimates of unfair inequality. Second, I describe the data I use to measure individual beliefs. Finally I discuss the macro indicators used in the main estimation.

3.1.1 Variables required to estimate unfair inequality

My measure of unfair inequality requires a variable to represent household wealth and a set of variables to represent the respondent’s circumstances at birth. For wealth I use an asset index. An asset index is a weighted sum of indicators for ownership of particular durable goods or housing characteristics (Filmer and Pritchett, 2001; McKenzie, 2005; Sahn and Stifel, 2003).¹⁴ The asset index includes 12 indicators (see Table 2) and each country has a unique set of weights (Table A2).

Table 2: Measuring wealth – asset indicators, Life in Transition Survey, 2010 & 2016

Type of asset	Asset
Owned items:	Home (owner)
	Car
	Mobile phone
	Computer
	Bank account
Type of house:	Detached
	Semi-detached
	Apartment
	Other
Utilities in the dwelling:	Heat in the dwelling
	Running water
	Internet

Notes: For type of house, “other” includes hostel, primitive/mobile dwelling, part commercial/industrial, and any other type not listed.

While asset indexes do not capture flows of income, non-quality adjusted asset ownership is simpler to work with for large cross-country samples. Summary statistics for the asset index by country are reported in Table A1. In Table A3, I show that the asset index is correlated with household characteristics – such age, employment status and a whether it is in an urban or rural area – as one would expect.

I use five variables to represent a person’s circumstances at birth: place of birth, gender, father’s education, mother’s education and parental political affiliations. Respondent place of birth incorporates both the opportunities one had as a child, as well as the exogenous part of where one ultimately resides and the opportunities therein. The place of birth variable in the LiTS data is equal to 1 if the respondent was born in an urban area and equal to 0 if they were born in a rural area. Place of birth and place of residence as an adult are significantly correlated in the data: the correlation is 0.63, significant at the 1% level, in 2010, and in the 2016 data, the correlation is 0.39, also significant at the 1% level.

¹⁴The weights for each indicator are from the first principal component of a principal component analysis (PCA). PCA assigns weights so that the first principal component explains the maximum possible variance in the n-dimensional asset space. By construction an asset index has a mean of zero, with negative value capturing wealth of those below the mean and positive values for wealth of those above the mean

Parental background, as captured by parental education and past political affiliation, proxies for multiple components of an individual's circumstances. Parental education can be thought of as the exogenously determined portion of a person's own educational attainment (Griliches, 1979; Heath et al., 1985; Bartels et al., 2002; Krapohl et al., 2014). Parental education also incorporates a measure of the parents' professional and social networks, which can later provide opportunities for a child. Lastly, parental education can impact opportunities to obtain higher quality education, thus impacting rates of return to one's own education and the corresponding economic outcomes (Willis, 1986; Lillard and Willis, 1978). Parental education in the LiTS is categorical and indicates the highest degree a respondent's mother and father received. It takes values 1-4, which indicate no degree, primary degree, secondary degree and tertiary degree.

Parental political affiliation (i.e. whether a parent was a communist party member) captures network effects that are particularly important for the former communist countries in my sample. In former communist countries, party membership was often required for admission into specific schools and professions. Those serving in such professions often received a portion of their payment in assets (Heyns, 2005).¹⁵ This variable is binary, and equal to 1 if the respondent's mother or father was a member of the communist party in their country.

I also include gender as a circumstance, but this is mainly as a control. The LiTS has random selection of the respondent within each household, so respondent gender is also random. This means that non-zero coefficients on the gender dummy will be driven by households with uneven gender balance and by single-person households. Despite this caveat, it would be incorrect to exclude gender from the circumstance vector. I keep it in the estimation, but only report the coefficients in the appendix. Summary statistics of the circumstance variables can be found in Table B1.

3.1.2 Variables required to analyse beliefs about fairness

The main estimation uses respondents' beliefs about fairness as the dependent variable. I define two different belief variables, one for each definition of fairness. The data for these variables come from two LiTS survey questions that lend themselves well to this purpose. For each question, I categorize response options as describing either a fair process or an unfair process.

The first dependent variable, $fair_{control}$, is strictly consistent with the inequality of opportunity framework, where unfair outcomes are those that stem from circumstances outside of our control. Meanwhile inequality due to effort is fair. The question I use for this variable asks respondents to identify the main reason why there are people in need in their country. The answer options include being unlucky, laziness and lack of willpower, injustice in society, that it is an inevitable part of modern life and "other". I categorize being in need due to bad luck or injustice as unfair, because these describe determinants out of a person's control.¹⁶ Meanwhile, being in need due to lack of

¹⁵The parental political affiliation circumstance is omitted from estimations for countries where it is not relevant, such as Turkey or western European comparator countries.

¹⁶Note that while luck may be statistically fair, the colloquial use of the term is to express something that is not

effort is considered fair because the bad economic situation will have stemmed from an individual choice. The last option, people being in need as an inevitable part of modern life, I categorise as a fair process. “Modern life” in former communist countries means a life with free enterprise. In a world with free enterprise, success and failure are more strongly linked to one’s effort and skills. This is in contrast to the communist regime, where economic success was much less linked to an individual’s choices, and outcomes were more equal for reasons not related to effort or technical skill.

The second dependent variable, $fair_{merit}$, overlaps with this, but also reflects meritocratic notions of fairness. For $fair_{merit}$, moral behavior and intelligence are considered fair determinants of inequality. The survey item I use for this variable asks respondents to pick the most important factor determining success in their country. The answer options include effort and hard work, intelligence and skills, political connections, breaking the law and “other”. Success from crime or political connections may be considered unfair as they do not originate from honest work. Correspondingly, gains from effort and hard work or from intelligence and skills may be considered fair, from a meritocratic perspective.

Thus, for the second part of the analysis I recode the questions into binary variables, equal to 1 if the respondent attributes outcomes to fair processes and 0 if they attribute outcomes to unfair processes. Table 3 gives a breakdown of this recoding.

Table 3: LiTS survey items on beliefs about determinants of economic outcomes

Survey question	Response options	Fair process variable code	Share in sample
In your opinion, which of the following factors is the most important to succeed in life in our country now?	Effort and hard work	1	42.16%
	Intelligence and skills	1	29.65%
	By political connections	0	21.27%
	By breaking the law	0	6.92%
	Other	missing	
In your opinion, what is the main reason why there are some people in need in our country today?	Because they have been unlucky	0	10.60%
	Because of laziness and lack of willpower	1	24.16%
	Because of injustice in our society	0	46.16%
	It is an inevitable part of modern life	1	19.09%
	Other	missing	

fair, or something that is undeserved.

3.1.3 Macroeconomic indicators

The macro indicators I use are 2010 and 2016 (or latest available) values from the IMF World Economic Outlook database (WEO). The Gini index data are from the Standardized World Income Inequality Database (Solt, 2016).¹⁷ Using the SWIID entails a trade-off between a full dataset and data quality (Jenkins, 2015). The SWIID uses multiple imputation methods to fill in missing Gini coefficients across years, so reported Gini's for countries with scarce underlying data are likely to be unreliable. My sample includes mostly high and middle income countries, which have fewer data concerns than low income countries. But some countries like Albania or Azerbaijan have known problems with data scarcity. Nonetheless, results are robust to using Gini coefficients from the World Development Indicators database, where I use the last available Gini values for each of 2010 and 2015. I prefer to use SWIID so that I can retain a sufficient number of countries in my estimation for proper specification of the standard errors.

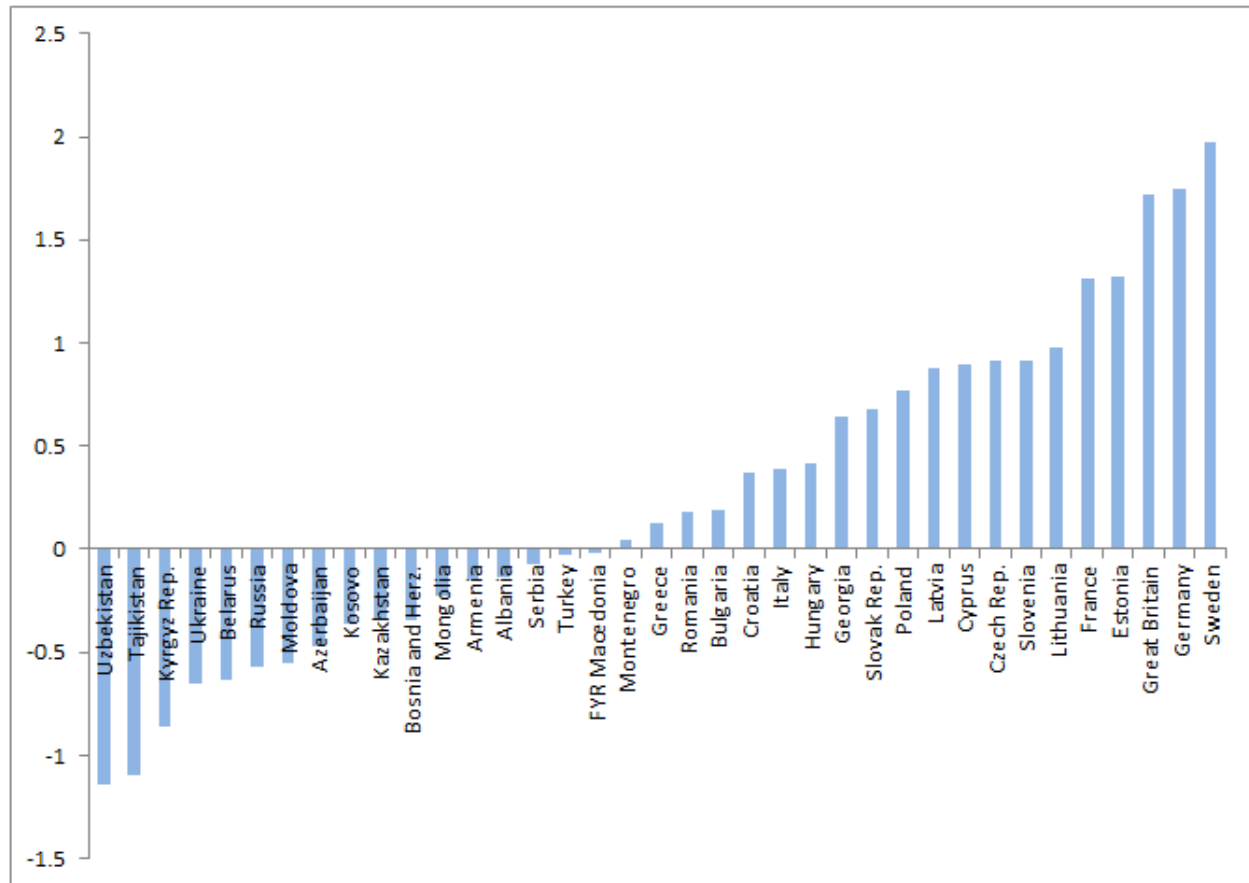
For the institutional quality indicator I use data from the Worldwide Governance Indicators database (Kaufmann et al., 2011).¹⁸ This data includes six indices that each capture different aspects of governance, defined as “traditions and institutions by which authority in a country is exercised” (Worldwide Governance Indicators website). These are government effectiveness, regulatory quality, rule of law, control of corruption, voice and accountability and political stability/absence of violence. Each index is an aggregate measure that uses the Unobserved Components Model to combine data from 32 sources. These sources capture the experiences and views of citizens, entrepreneurs and experts (from the public and private sector) on the quality of various aspects of governance.

Following Easterly and Levine (2016), I average the index scores from this database to obtain a single variable for institutional quality. I restrict the average to include only the four governance indicators that capture quality of formal governing institutions that directly support the economy: government effectiveness, regulatory quality, rule of law and control of corruption. I exclude voice/accountability and political stability/absence of violence because these indices mostly capture citizens' civil liberties, such as freedom of expression, freedom of association and freedom of press, as well as perceptions of the likelihood of social unrest or armed conflict, including terrorism. In contrast to the indicators for economic institutions, I theoretically do not expect these political factors to affect the link between *de facto* unfair wealth inequality and individuals' beliefs about fairness of the wealth generating processes. Figure 1 shows the institutional quality score for the countries in the 2016 LiTS sample.

¹⁷SWIID Version 5.1, released July 2016. Downloaded from <https://dataverse.harvard.edu/dataset.xhtml?persistentId=hdl:1902.1/11992>

¹⁸Downloaded from <http://info.worldbank.org/governance/wgi/home>.

Figure 1: Institutional quality for 2016, by country



Notes: The height of the bars shows the aggregate governance index for each country in the sample. The governance indicator is the average score of four indices from the Worldwide Governance Indicators database (Kaufmann et al., 2011): government effectiveness, regulatory quality, rule of law and control of corruption. Downloaded from <http://info.worldbank.org/governance/wgi/home>. The governance indicators are from 2016 only. N=32. Countries are ordered from the lowest institutional quality to the highest.

For the interactions with changes in inequality, I use only the 2016 values of the governance indicator. Scores are relative and the scale has no inherent value. Individual index scores for each year are normalized to have a mean of zero, such that in the aggregate score I use, values at or near zero indicate an overall average level of institutional quality. Scores below and above zero indicate lower and higher than average institutional quality, respectively. Institutional quality is only weakly correlated with inequality of opportunity (from 2016), as well as change in inequality of opportunity since 2010 (Table 4).

Table 4: Correlation of the governance indicator with unfair inequality

	$\Delta UnfairIneq$ 2010 to 2016	$UnfairIneq$ 2010
Governance	0.129	-0.477
Government effectiveness	0.152	-0.540
Regulatory quality	0.230	-0.439
Rule of law	0.122	-0.474
Control of corruption	0.002	-0.406

Notes: The governance indicator is used as the measure of institutional quality. It is the average score of four indices from the Worldwide Governance Indicators database (Kaufmann et al., 2011): government effectiveness, regulatory quality, rule of law and control of corruption. Downloaded from <http://info.worldbank.org/governance/wgi/home>. The governance indicators are from 2016 only. N=32.

4 Results

4.1 Unfair inequality estimates

Estimates of the measure of unfair inequality for each year appear in Table 5. They are the R^2 from Equation 2 and reflect the portion of overall inequality in access to household wealth that can be attributed to individual circumstances at birth. The table also includes coefficient estimates from Equation 2 and the estimation sample size in each country. Estimates for 2010 appear in columns (2)-(7). Those for 2016 appear in columns (8)-(13).¹⁹

¹⁹Ideally one would account for variation in policy environment, by partitioning the sample into birth cohorts. Policy environment at key points in life can impact lifetime income (labor laws), access to credit (consumer lending policies) and access to affordable assets (trade and subsidy policies). In the LiTS data, small sample sizes makes cohort estimations unreliable. Alternatively, one can restrict the sample to only include only those who were 18 or younger in 1989. Wealth accumulation process may have differed considerably for those who obtained degrees or entered the labour force after the fall of communism. Results from that sample are not considerably different from results using the full sample, and are much less reliable due to smaller sample sizes. Moving the cohort definition around by a few years on either side of 1989 does not change results.

Table 5: OLS regression of wealth on circumstances, Equation 2

Country	2010						2016					
	Born in urban area	Father's education	Mother's education	Member communist party	N	IOp	Born in urban area	Father's education	Mother's education	Member communist party	N	IOp
<i>Central Europe and the Baltic States</i>												
Croatia	0.716*** (0.167)	0.454*** (0.158)	0.547*** (0.164)	0.558** (0.269)	407	0.289	0.922*** (0.209)	0.556*** (0.130)	0.351*** (0.114)	-0.131 (0.192)	792	0.259
Czech	-0.617*** (0.209)	0.18 (0.169)	-0.012 (0.179)	0.288** (0.146)	436	0.039	0.262 (0.302)	0.559** (0.222)	0.048 (0.173)	0.124 (0.141)	900	0.027
Estonia	0.047 (0.229)	0.181 (0.197)	0.420** (0.178)	0.366 (0.293)	334	0.073	-0.168 (0.163)	0.129 (0.158)	-0.099 (0.144)	-0.179 (0.164)	636	0.009
Hungary	0.234 (0.240)	0.528*** (0.165)	0.274 (0.180)	-0.149 (0.436)	379	0.117	0.145 (0.246)	0.702*** (0.146)	0.445*** (0.138)	-0.291 (0.347)	713	0.183
Latvia	-0.113 (0.253)	0.445* (0.230)	0.011 (0.159)	0.053 (0.223)	405	0.028	0.661*** (0.192)	0.183 (0.124)	0.395*** (0.105)	0.003 (0.166)	617	0.089
Lithuania	0.600** (0.250)	-0.113 (0.266)	0.656*** (0.236)	-0.226 (0.399)	208	0.164	0.897*** (0.157)	0.350*** (0.087)	0.363*** (0.099)	0.223 (0.165)	729	0.219
Poland	0.086 (0.168)	0.208 (0.231)	0.253 (0.255)	-0.427 (0.314)	457	0.054	0.004 (0.158)	0.652*** (0.180)	0.178 (0.145)	-1.092** (0.428)	910	0.107
Slovakia	1.160*** (0.157)	0.17 (0.128)	-0.004 (0.116)	-0.017 (0.156)	460	0.141	0.653** (0.273)	0.411*** (0.133)	0.760*** (0.206)	-0.052 (0.172)	729	0.183
Slovenia	-0.831*** (0.209)	0.353*** (0.136)	-0.263 (0.161)	0.026 (0.240)	339	0.09	-0.400** (0.186)	0.025 (0.139)	0.099 (0.112)	-0.402* (0.229)	596	0.019
<i>South-eastern Europe</i>												
Albania	0.512 (0.339)	0.312** (0.151)	0.527*** (0.173)	0.052 (0.219)	448	0.144	1.493*** (0.175)	0.388*** (0.121)	0.268** (0.121)	-0.156 (0.166)	809	0.311
BiH	1.209*** (0.331)	0.474*** (0.162)	0.028 (0.133)	0.293 (0.228)	476	0.239	0.683*** (0.160)	0.285** (0.117)	0.448*** (0.127)	-0.218 (0.196)	834	0.208
Bulgaria	1.175*** (0.237)	0.479*** (0.169)	-0.008 (0.209)	0.226 (0.211)	383	0.193	0.627*** (0.182)	0.643*** (0.127)	0.556*** (0.120)	0.037 (0.171)	703	0.359
Cyprus							-0.017 (0.115)	-0.438*** (0.133)	-0.11 (0.102)		742	0.075
FYROM	0.821*** (0.185)	0.430*** (0.143)	0.283* (0.165)	0.192 (0.273)	433	0.21	0.339* (0.193)	0.571*** (0.118)	0.351** (0.138)	-0.015 (0.167)	716	0.258
Greece							0.494*** (0.150)	0.158 (0.107)	0.17 (0.115)		830	0.06
Kosovo	0.209 (0.259)	0.593*** (0.176)	0.361** (0.150)	-0.152 (0.373)	422	0.159	0.863*** (0.256)	-0.003 (0.133)	0.381*** (0.106)	-0.415 (0.286)	700	0.163
Montenegro	0.682*** (0.242)	0.593*** (0.160)	0.310* (0.181)	0.088 (0.224)	408	0.229	0.561*** (0.149)	0.324*** (0.119)	0.349*** (0.124)	0.137 (0.134)	802	0.149
Romania	1.702*** (0.263)	0.123 (0.219)	0.436* (0.240)	0.123 (0.281)	408	0.282	1.014*** (0.249)	0.694*** (0.167)	0.557*** (0.175)	0.015 (0.268)	644	0.291
Serbia	1.109*** (0.220)	0.412*** (0.139)	0.474*** (0.156)	0.206 (0.182)	545	0.264	0.823*** (0.190)	0.680*** (0.138)	0.278* (0.153)	0.25 (0.264)	650	0.236

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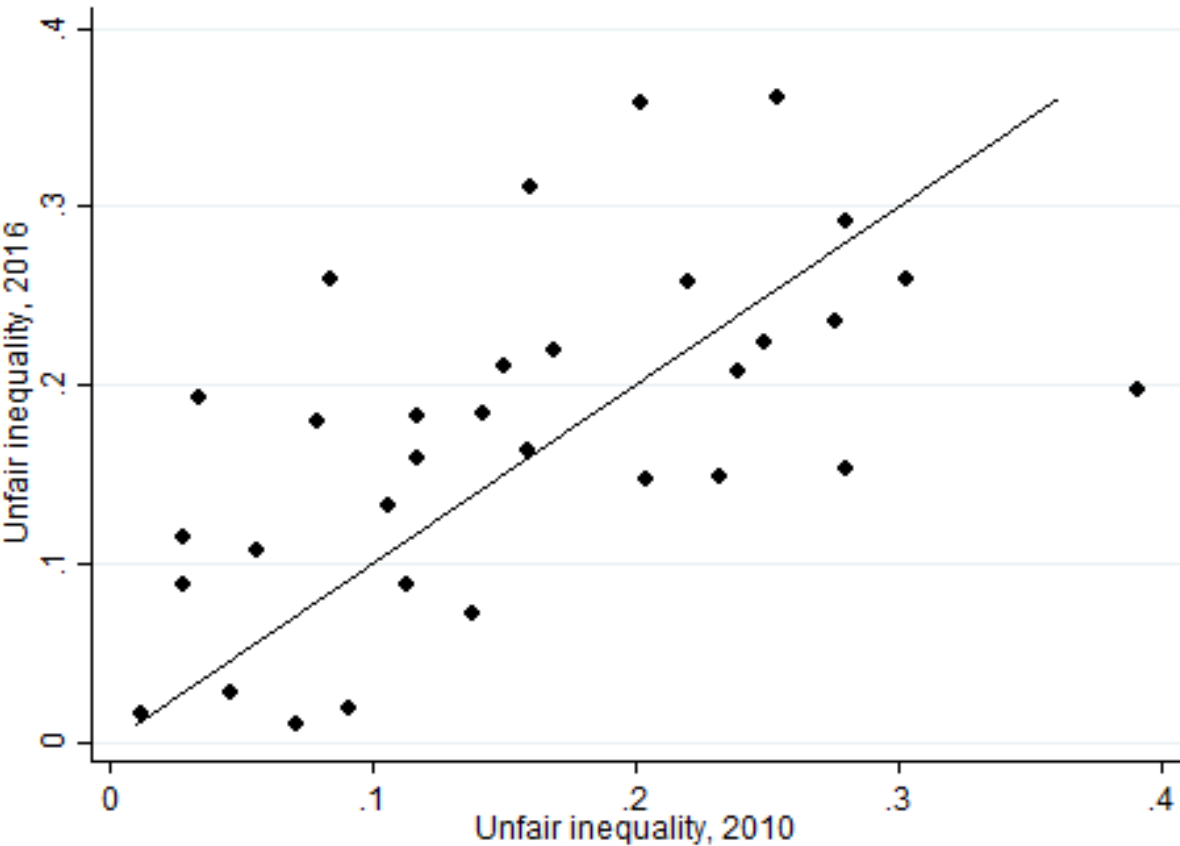
OLS regression of wealth on circumstances, Equation 2; *continued from previous page*

Country	2010						2016					
	Born in urban area	Father's education	Mother's education	Member communist party	N	IOP	Born in urban area	Father's education	Mother's education	Member communist party	N	IOP
<i>Eastern Europe and the Caucasus</i>												
Armenia	0.417 (0.311)	0.364* (0.189)	0.386** (0.171)	0.069 (0.299)	356	0.079	1.037*** (0.146)	0.320** (0.136)	0.06 (0.139)	0.12 (0.153)	578	0.18
Azerbaijan	0.930*** (0.256)	0.08 (0.159)	0.241 (0.170)	-0.012 (0.222)	383	0.112	0.711*** (0.201)	0.235 (0.203)	0.588*** (0.190)	0.353** (0.178)	809	0.088
Belarus	1.182*** (0.341)	0.156 (0.247)	0.145 (0.179)	0.389* (0.212)	352	0.169	0.845*** (0.234)	0.272* (0.146)	0.129 (0.154)	-0.047 (0.169)	786	0.071
Georgia	1.592*** (0.266)	-0.117 (0.240)	0.654*** (0.186)	0.175 (0.264)	367	0.281	0.789*** (0.189)	0.305 (0.207)	0.631*** (0.221)	-0.093 (0.162)	589	0.153
Moldova	1.832*** (0.288)	0.335*** (0.125)	0.008 (0.144)	0.168 (0.250)	364	0.274	1.603*** (0.234)	0.850*** (0.154)	0.054 (0.135)	0.282* (0.155)	612	0.361
Ukraine	1.511*** (0.244)	0.367*** (0.139)	0.242** (0.103)	0.373 (0.275)	568	0.272	1.379*** (0.178)	0.323* (0.176)	0.498*** (0.168)	-0.18 (0.178)	840	0.223
<i>Central Asia</i>												
Kazakhstan	0.772** (0.351)	0.473*** (0.165)	0.2 (0.168)	0.22 (0.273)	413	0.108	1.095*** (0.221)	0.423*** (0.139)	-0.015 (0.138)	-0.213 (0.175)	948	0.132
Kyrgyzstan	1.375*** (0.336)	0.303* (0.179)	0.158 (0.162)	-0.112 (0.196)	480	0.208	1.028*** (0.287)	0.289** (0.139)	0.272* (0.139)	0.517** (0.213)	800	0.147
Mongolia	-0.015 (0.163)	0.092 (0.140)	0.216* (0.130)	-0.183 (0.190)	352	0.03	1.307*** (0.292)	0.494*** (0.125)	0.229** (0.106)	-0.038 (0.176)	903	0.192
Tajikistan	3.034*** (0.389)	0.098 (0.166)	-0.051 (0.136)	0.375 (0.444)	356	0.387	1.724*** (0.428)	0.306** (0.121)	0.181 (0.122)	-0.189 (0.154)	725	0.197
Uzbekistan	0.907** (0.370)	0.12 (0.118)	-0.032 (0.080)	-0.214 (0.214)	526	0.084	1.583*** (0.256)	0.268 (0.193)	0.485*** (0.179)	0.254 (0.270)	655	0.259
<i>Comparator countries</i>												
France	-0.547*** (0.177)	-0.156 (0.156)	-0.131 (0.122)		510	0.043						
Germany	-0.133 (0.167)	-0.490* (0.266)	0.249 (0.227)		598	0.014	-1.035*** (0.148)	-0.063 (0.090)	-0.177 (0.118)		1138	0.114
UK	-0.141 (0.155)	0.12 (0.109)	-0.032 (0.118)		594	0.009						
Italy	0.766** (0.306)	0.205* (0.118)	0.323** (0.134)	0.224 (0.140)	571	0.107	1.272*** (0.291)	0.284** (0.143)	0.331** (0.133)	-0.001 (0.204)	827	0.159
Sweden	-0.192 (0.182)	-0.072 (0.112)	0.145 (0.100)		576	0.005						
<i>Without regional classification</i>												
Russia	0.766** (0.306)	0.205* (0.118)	0.323** (0.134)	0.224 (0.140)	571	0.107	1.272*** (0.291)	0.284** (0.143)	0.331** (0.133)	-0.001 (0.204)	827	0.159
Turkey	0.699** (0.281)	0.249 (0.182)	0.485*** (0.138)		548	0.145	0.673* (0.362)	0.591*** (0.132)	0.347** (0.147)		1139	0.21

Notes: Standard errors in parentheses. *** (**, *) indicates significance at 1% (5%, 10%) level. Gender is included in the regression but not reported in the table. See the appendix for details.

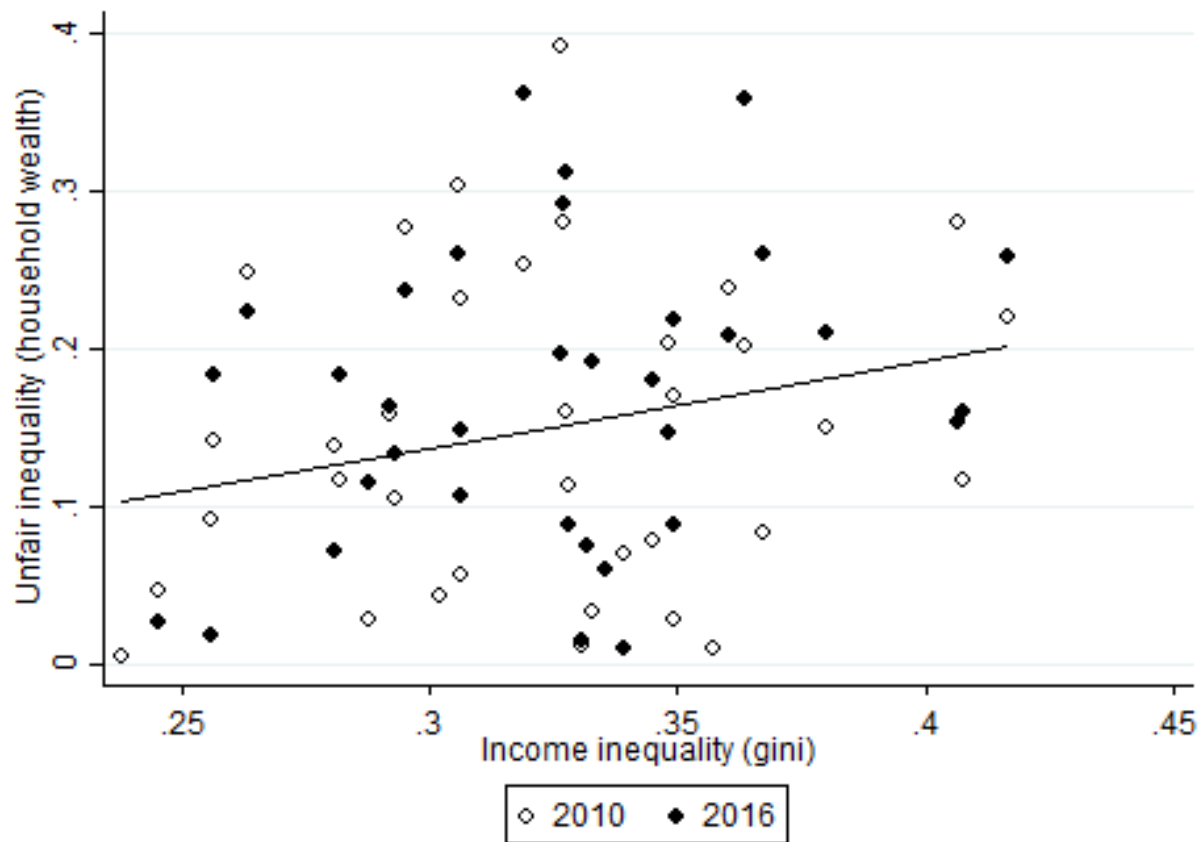
Across countries in 2010, I find that individual circumstances explain between 0.5 and 38.7 per cent of the variation in access to household wealth. In 2016 the range was between 0.9 and 36.1 per cent (Figure 2). These are wide ranges and there is considerable variation within regions. For example, in 2016, countries in South-eastern Europe had unfair inequality levels that were both among the lowest and highest levels overall for that year. In some countries with low GDP and high inequality, such as Azerbaijan, the unfair inequality measure is in fact lower than in some wealthier countries (Figure 3). In cases like these, there are so few opportunities to build wealth that there is little variation in access to household wealth that needs explaining – everyone is suffering equally from lack of opportunity.

Figure 2: Unfair inequality (household wealth) in 2010 and 2016



Notes: Estimates of unfair wealth inequality from Equation 2, 2010 and 2016 values. The 45° line highlights increases and decreases over time.

Figure 3: Correlation of unfair inequality (household wealth) and income inequality



Notes: Estimates of unfair wealth inequality from Equation 2 graphed against the Gini index. The Gini indexes are 2010 and 2016 values from the SWIID database (Solt, 2016). The line plots the linear regression of *UnfairIneq* on the Gini coefficient.

My estimates of unfair inequality are in a similar range as other studies that also calculate relative measures, whether income or wealth is used at the economic outcome of interest. The closest study to mine methodologically, Ferreira et al. (2014), reports similar values to me but with a slightly wider range. Their measures, from 1995-2005, are calculated for household wealth using household heads. They range from 0.03 in Bangladesh to 42.41 per cent in Mozambique. 88% of their estimates fall within the range of estimates in my study.²⁰

My unfair inequality measures are also positively correlated with IO (using income) in Brunori (2017), which also provides greater overlap with my cross-country sample. Correlations with estimates in other studies depends on the year. For example, I reject the hypothesis that my ranking

²⁰The overlap between our samples includes only two countries: Armenia and Turkey. Their 1995, 2000 and 2005 estimates for Turkey are 0.19, 0.21 and 0.14. My 2010 and 2016 estimates for Turkey are 0.15 and 0.21. My 2010 and 2016 estimates for Armenia are 0.08 and 0.18, respectively, while they provide 2000 and 2005 estimates of .02 and 0.002. The difference in estimates can be due to the different samples, assets, circumstances and/or years of data used.

of countries in 2010 is the same as the ranking in these other studies, but fail to reject for 2016 estimates.²¹ The lack of consistent correlation with other studies does not undermine my estimates *per se*: there are many different approaches to measuring unfair inequality (generally referred to as “inequality of opportunity”), and they are not all correlated (Ramos and Van de Gaer, 2017). Moreover, rank correlations will likely be different between years since unfair inequality will go up or down differently across countries.

I now move to discuss changes in unfair inequality over time. 13 countries display a decrease and 19 display an increase in unfair inequality between 2010 and 2016. The overall average has gone up by approximately 2 percentage points. However, with the exception of South-eastern Europe, maximum values in all regions have declined by as much as a half.

There are a number of factors that can explain a change in unfair inequality in household wealth. The most important determinants for this paper are access to product markets and access to jobs, which I briefly explain here. I include a discussion of other possible causes in Appendix D. A causal analysis of determinants of unfair inequality in each country is beyond the scope of this paper.

First, access to product markets is important because the wealth index used to calculate the unfair inequality measure includes ownership of durable goods. If access to durable goods is low, and prices are high, it will be more difficult for people with lower circumstances to obtain the products. When access is high (prices are low) ownership of durables equals out across circumstance groups, and one would see the measure of unfair inequality go down. Changes in access to durable goods can be triggered by trade agreements. Trade agreements can reduce prices on tradables such as electronics and cars, which in turn helps close the gap in ownership of these goods.

There are a few examples of changes in trade arrangements in my sample. The inception of the Commonwealth of Independent States Free Trade Area features prominently. The trade agreement was signed in 2011, with different countries ratifying the treaty up until 2015, and we see that unfair inequality went down in five of the 9 ratifying states. But not all ratifying nations saw large reductions in unfair inequality. In Russia, the net gains to the trade area would have been offset by international sanctions, which started in early 2014 and would have resulted in lower circumstance households potentially being priced out of key product markets. These events, linked to access to product markets, could thus lead to changes in the importance of circumstances for determining household wealth.

Second, changes in unemployment can increase competition for labor, which in turn reduces the importance of circumstances for individual outcomes (Becker (1971)). From another angle, when labor income is independent of circumstances, there will be a more even distribution of assets across households with varying backgrounds, all else equal. A potential example of this relationship may be seen in Serbia. Unemployment in Serbia finally starts coming down during the study period - from a peak of 24% in 2012 down to 15.26% in 2016 International Labour Organization (ILO)

²¹Using Wilcoxon matched-pairs signed-rank tests, I fail to reject difference in ranking between my 2016 measure and IO measures in Marrero and Rodríguez (2012), in Checchi et al. (2010) and in Ferreira et al. (2014). A fourth study, Palomino et al. (2019), provides 2010 measures using the EU-SILC. But they only report absolute values, so I cannot compare rankings with my relative estimates.

(2019). This corresponds with an estimated 11% drop in unfair inequality. These examples are of course not definitive, but they nonetheless give an idea of what may impact the link between circumstances and outcomes.

The coefficient estimates from Equation 2 show how important each circumstance is for unfair inequality each year. Some cross country patterns emerge. Both father and mother's education has increased importance in 2016. In some countries mother's education appears to now be more important than father's education for explaining wealth outcomes (i.e. Lithuania, Slovakia, Azerbaijan, Georgia, Ukraine and Russia). In 2010, parental education is mostly insignificant. Meanwhile, being born in an urban area is very important for explaining wealth across countries and years. It plays a major role in Central Asia and South-eastern Europe, despite decreases since 2010. It is interesting to see that the coefficient of urban birthplace is negative in both 2010 and 2016 for Germany and Slovenia, which means that in these countries wealth accumulation has been greater for those who were born in rural areas. In contrast, in western Europe more generally, as well as Cyprus and many CEB countries, place of birth does not appear to matter for wealth outcomes.

The result on the relative importance of birthplace is in contrast to previous work on other countries, in particular in Latin America (Ferreira and Gignoux, 2011). In that work, the authors find parental educational attainment to be by far the most important circumstance. This has important policy implications for the transition region as it suggests that addressing urban/rural differences would go further in addressing inequality than would addressing a legacy of under-educated parents. A deeper analysis is needed to determine the ways in which changes in each coefficient estimate reflects the larger macro factors discussed.

4.2 Beliefs about determinants of inequality

Results from the main regression for this study are in Table 6. The first two columns pertain to $fair_{merit}$. The last two pertain to $fair_{control}$. All regressions include controls for country characteristics.

Table 6: Correlates of beliefs about determinants of inequality,
Equation 3 and Equation 4 probit coefficients

	Dep var: $fair_{merit}$		Dep var: $fair_{control}$	
	(1)	(2)	(3)	(4)
Δ Unfair Ineq. (2016-2010)	-0.967 (0.946)	-2.858*** (0.853)	-0.684 (0.588)	-1.292 (1.199)
Unfair Inequality (2010)	-0.988 (0.811)	-2.925*** (0.867)	-0.124 (0.429)	-0.790 (1.060)
Δ Gini (2016-2010)	-1.568 (3.777)	2.291 (1.743)	-1.982 (2.119)	-1.486 (2.703)
Gini (2010)	-0.161 (1.432)	2.290* (1.244)	0.016 (1.275)	0.819 (1.445)
Governance (2016)	-0.102 (0.140)	2.624*** (0.400)	-0.080 (0.138)	0.949 (0.673)
Δ Unfair Ineq. (2016-2010)*Gov. (2016)		3.230** (1.566)		1.314 (2.070)
Unfair Inequality (2010)*Gov. (2016)		1.773 (1.209)		0.661 (1.790)
Δ Gini (2016-2010)*Gov. (2016)		-15.064*** (5.221)		3.182 (10.501)
Gini (2010)*Gov. (2016)		-8.519*** (1.254)		-3.075 (2.297)
Own economic success variables	Yes	Yes	Yes	Yes
Circumstance variables	Yes	Yes	Yes	Yes
Country controls for 2010 and 2016	Yes	Yes	Yes	Yes
Pseudo R-squared	0.072	0.085	0.030	0.031
N	20,824	20,824	20,464	20,464

Notes: Columns (1) and (3) show results for Equation 3 using the two different measures of fairness. Similarly, columns (2) and (4) show results for Equation 4. Standard errors clustered at the country level are in parentheses. *** (**, *) indicates significance at 1% (5%, 10%) level. The Gini indexes are 2010 and 2016 values from the SWIID database (Solt, 2016). The governance indicator is the average of the scores of 2016 indicators for government effectiveness, regulatory quality, rule of law and control of corruption, taken from the Worldbank's Worldwide Governance Indicators database. The macroeconomic country controls include 2010 levels and 2016-2010 changes for GDP per capita, unemployment, inflation, polity 2 and a dummy for former communist countries. The polity 2 score contains values from the Polity IV Project database, all other macro variables are measures from the IMF World Economic Outlook database.

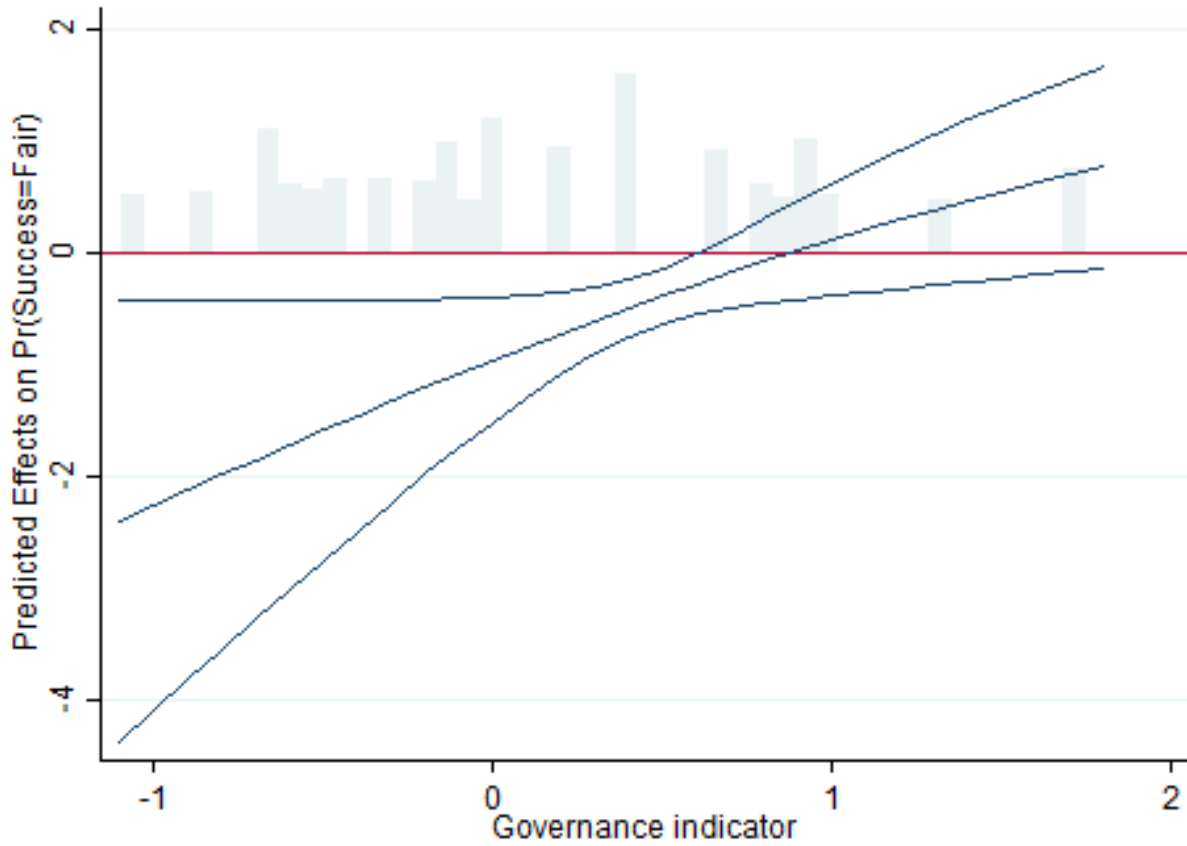
The first result is that definitions of fairness appear to matter for whether estimates of unfair inequality are correlated with beliefs about fairness of processes. Because $fair_{control}$ more precisely matches the theoretical framework behind the measure of unfair inequality, one would expect it to be more strongly correlated with unfair inequality than $fair_{merit}$. But this is not the case: while unfair inequality appears to be negatively correlated with $fair_{control}$, the coefficients are not significant at conventional levels. Interactions of unfair inequality with institutional quality are also not significant.

Alternatively, $fair_{merit}$, which accounts for moral and meritocratic drivers of success being fair, does appear to be correlated with unfair inequality. As hypothesized, this correlation depends on institutional quality. In column 2, both levels of and changes in unfair inequality are negatively correlated with $fair_{merit}$.²² These results tell us that the negative relationship between unfair inequality and $fair_{merit}$ holds in countries with average institutional quality. As the institutional quality improves, this effect is mitigated, as is shown by the positive and significant result on coefficient on $\Delta UnfairIneq * Gov$. The correlations are strong and sizable compared to other macro controls such as unemployment and GDP per capita.

Figure 4 illustrates this dynamic for an average respondent. The figure plots the marginal effect of a change in unfair inequality on $fair_{merit}$, at each level of institutional quality, holding all other covariates at their sample means. Impacts on the probability of viewing determinants of inequality as fair are on the vertical axis. Levels of institutional quality are on the horizontal axis. The vertical bars show the density of countries at each level of governance. This figure illustrates that changes in unfair inequality exhibit a negative and statistically significant relationship with beliefs, only as represented by $fair_{merit}$, especially in countries with low levels of institutional quality (governance scores less than 1). For my sample, this includes countries such as Tajikistan, Kyrgyz Republic and Belarus. Figure 5 displays the same calculations, but pertaining to $fair_{control}$. As in the regression results, the figure shows no meaningful correlation between unfair inequality and $fair_{control}$, even in countries with poor quality of institutions.

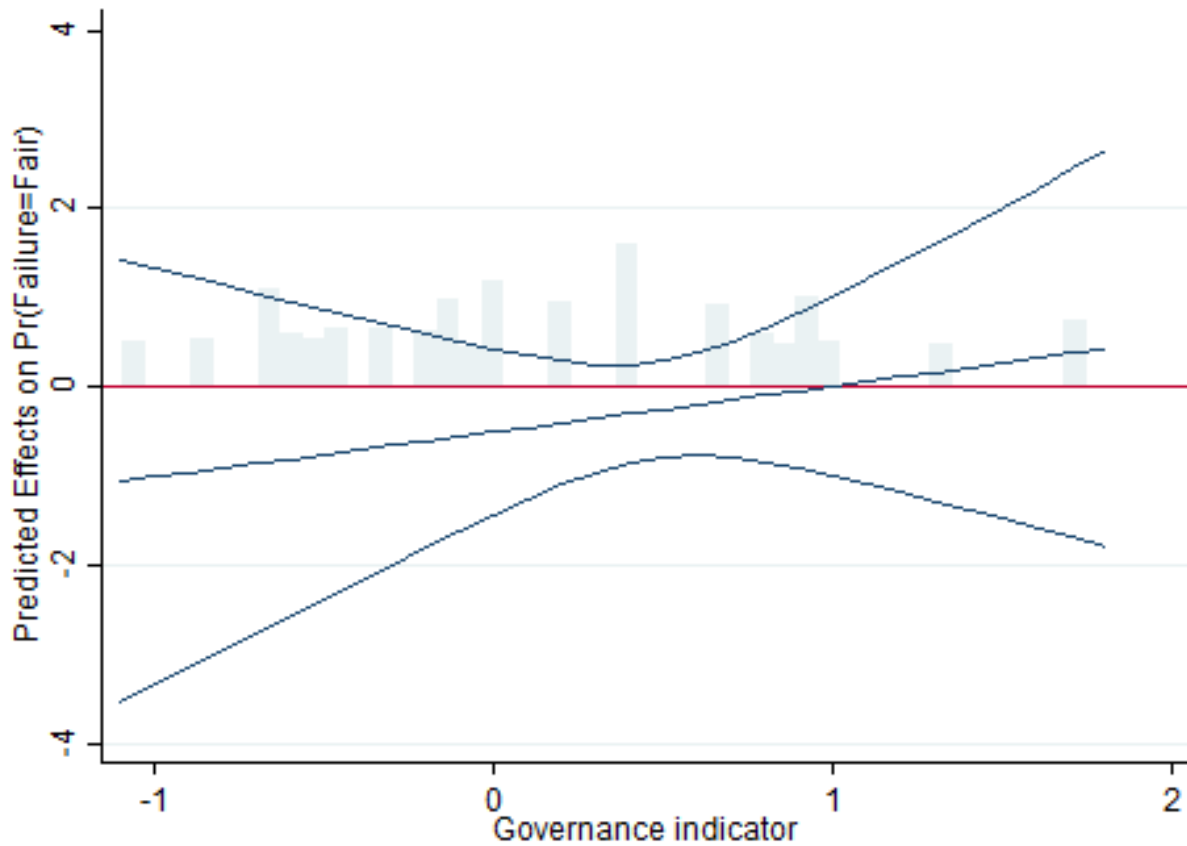
²²While the coefficients on $UnfairIneq$ and $\Delta UnfairIneq$ are insignificant in column 1 of Table 6, they become larger and significant in column 2, which includes the interactions with institutional quality. This indicates that the heterogeneous effects by institutional quality counteract each other in the column 1 estimation.

Figure 4: Marginal Effects of Change in *Unfair Ineq* on $\text{pr}(fair_{merit}=1)$, Conditional on Governance, Full Model, 95% CIs



Notes: Depicted are conditional marginal effects of change in unfair wealth inequality on the probability of perceiving economic outcomes as being due to fair processes, using $fair_{merit}$, together with the density histogram, computed from Column 2 of Table 6, Equation 4.

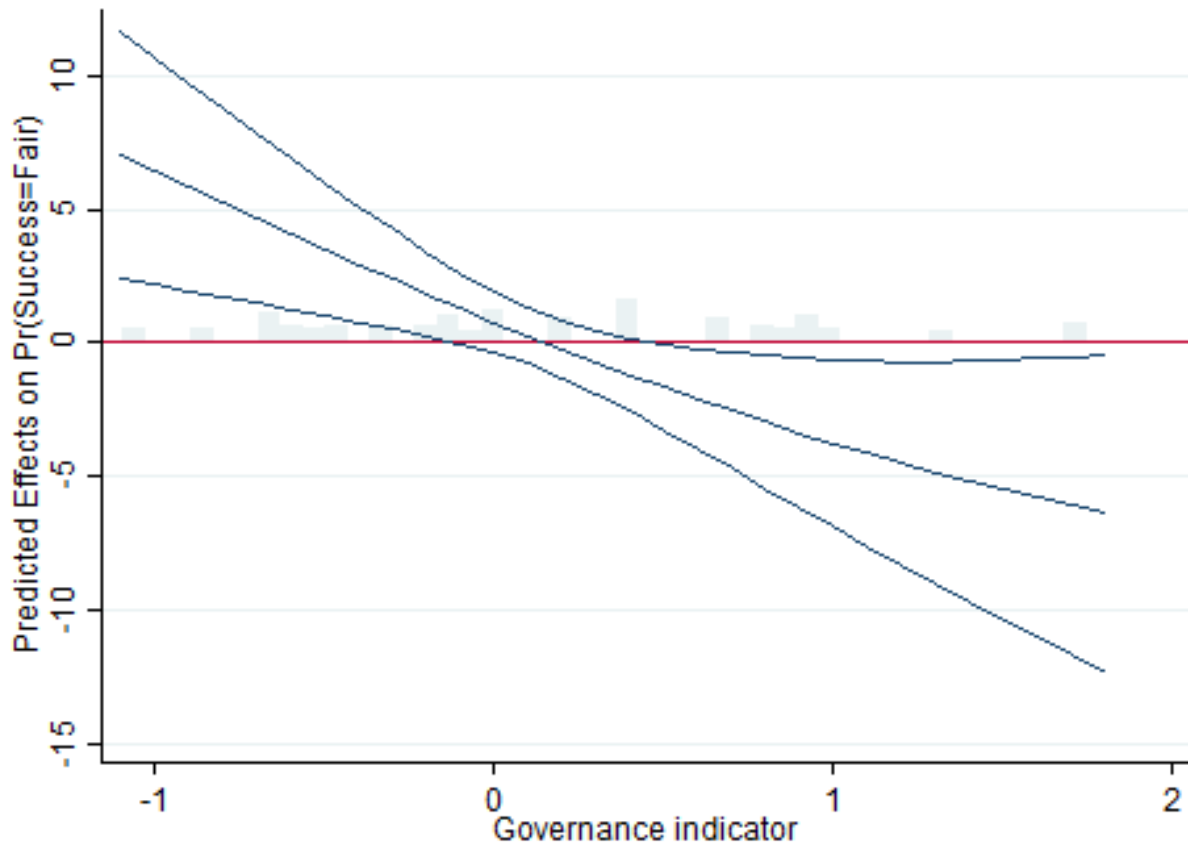
Figure 5: Marginal Effects of Change in *Unfair Ineq* on $\Pr(\text{fair}_{\text{control}}=1)$, Conditional on Governance, Full Model, 95% CIs



Notes: Depicted are conditional marginal effects of change in unfair wealth inequality on the probability of perceiving economic outcomes as being due to fair processes, using *fair_{control}*, together with the density histogram, computed from Column 4 of Table 6, Equation 4.

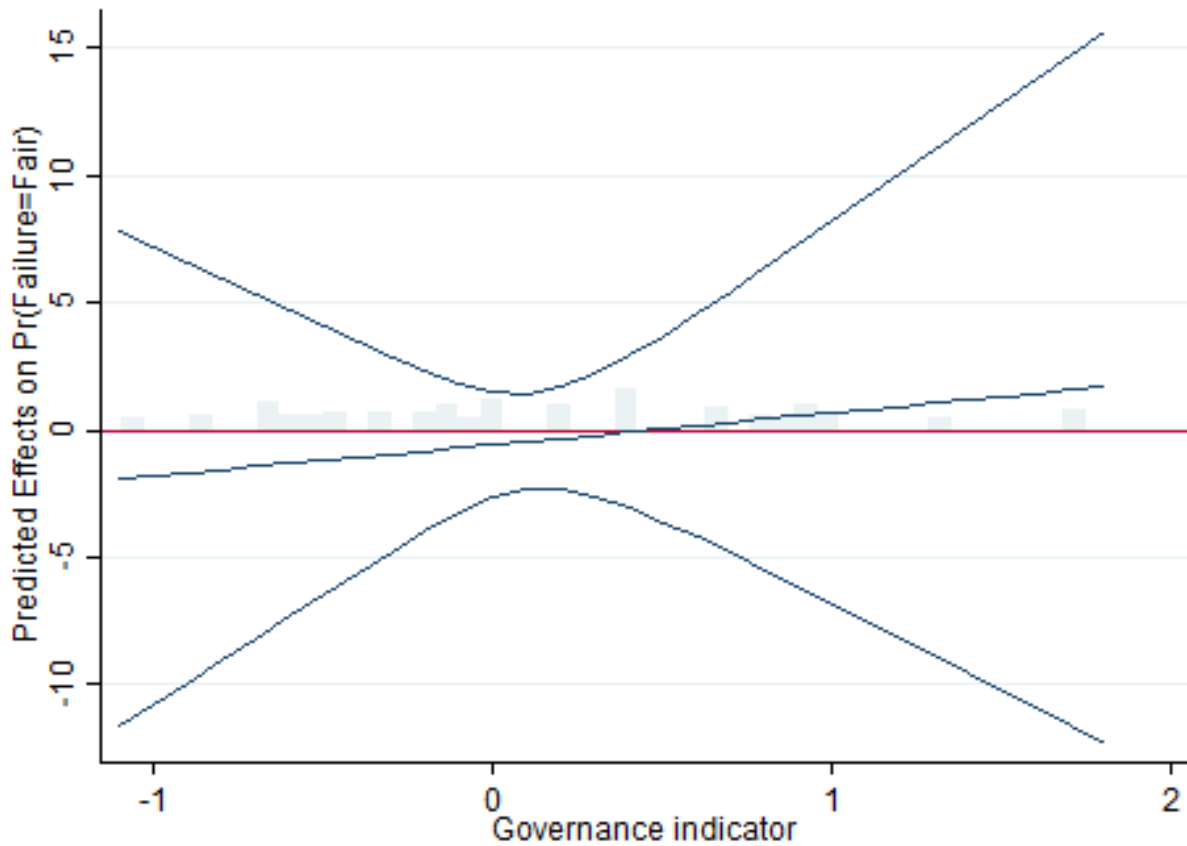
Correlations between overall income inequality and *fair_{merit}* follow the opposite pattern. I show this in Figure 6 and Figure 7. In countries with average institutional quality, both $\Delta Gini$ and *Gini* are (insignificantly) positively correlated with beliefs about fairness of processes. Where governance is better, however, this relationship is negative. The effect is especially strong for $\Delta Gini * Gov$, which has a coefficient that is nearly twice that of *Gini * Gov*.

Figure 6: Marginal Effects of Change in $Gini$ on $\text{pr}(fair_{merit}=1)$, Conditional on Governance, Full Model, 95% CIs



Notes: Depicted are conditional marginal effects of change in income inequality on the probability of perceiving economic outcomes as being due to fair processes, using $fair_{merit}$, together with the density histogram, computed from Column 2 of Table 6, Equation 4.

Figure 7: Marginal Effects of Change in *Gini* on $\Pr(\text{fair}_{control}=1)$, Conditional on Governance, Full Model, 95% CIs



Notes: Depicted are conditional marginal effects of change in income inequality on the probability of perceiving economic outcomes as being due to fair processes, using *fair_{control}*, together with the density histogram, computed from Column 4 of Table 6, Equation 4.

Note that the results for income inequality capture the combined effect of both fair and unfair changes in income inequality. This is because the gini combines income inequality that arises from circumstances (unfair income inequality) as well as that which arises from choices (fair income inequality). Reducing overall income inequality may have mixed results if fair income inequality improves beliefs about fairness, but unfair income inequality has the opposite effect. The former relationship appears to be the dominant effect captured by the regression results, but it is not definitive. Also, it could be the case that fair and unfair income inequality have opposite effects in the interaction with governance - yielding the overall negative result we see in Table 6.

5 Discussion and Conclusion

Since beliefs about determinants of inequality have been shown to impact economic decision-making, it is important to understand how these beliefs are formed. Particularly important is whether people believe that determinants of inequality are fair. The main contribution of the paper is to test the hypothesis that formal institutions act in conjunction with reality to inform individuals' beliefs about fairness of economic outcomes. I study these issues with a sample of former communist countries and comparator countries, using the Life in Transition Survey.

For my main result, I find that levels of, and changes in, unfair wealth inequality are in fact reflected in beliefs about fairness, but that the correlation depends on the quality of formal institutions in a country. In particular, the evidence suggests that good institutions can substitute for objectively fair determinants of inequality in creating beliefs that processes in the economy are fair. In countries with average institutional quality, higher baseline levels of unfair wealth inequality are associated with more pessimistic beliefs about fairness of processes. Also, beliefs are more pessimistic in countries with larger *increases* in unfair inequality since 2010. In such countries, an individual is more likely to have experienced arbitrarily restricted opportunity sets, and may also be able to recall a period when this was not the case. Recent experience together with recall of a better time could motivate them to more harshly assess the fairness of the current system. Thus, a negative correlation between beliefs about fairness and increases in unfair inequality is consistent with the idea that people observe changes relative to a reference point and update beliefs accordingly.

Income inequality exhibits a different pattern from that of my measure of unfair wealth inequality – people in countries with higher levels of income inequality tend to believe that success can be attributed to fair processes.

Importantly, these relationships only hold for a definition of “fair” that includes effort as well as merit and moral behavior. The correlation with my measure of unfair inequality does not hold for a definition of “fair” that includes only effort (with “unfair” factors being those outside an individual’s control). We learn from this that while beliefs about determinants of inequality are not strictly correlated with reality, they are not completely uncorrelated. This is useful to keep in mind when thinking about how changes in unfair inequality might impact behavior.

Besides inequality, respondents in countries with less unemployment also have higher probabilities of believing that inequality is due to fair processes.²³ The results on income inequality and unemployment are particularly interesting when taken together. Other scholars have speculated that some level of income inequality is good because it allows people to gain from their efforts (Marrero and Rodríguez, 2013; Mirrlees, 1971). Without the chance to achieve more than someone else, there is less incentive to work hard or invest. That higher income inequality leads to a higher probability of believing that outcomes are due to fair processes provides some support for this idea. Lower unemployment also increases belief in fair processes. This suggests that it is not just unfair access to household wealth, but abundance of opportunities at all levels of the income distribution that give people faith in the fairness of the system.

These results suggest that reducing both unfair inequality in access to household wealth, as well as overall income inequality, can improve sentiment about determinants of inequality. This, in turn, can have impli-

²³Results available upon request.

cations for support of market-oriented reforms. But the relationship varies substantially depending on the quality of a country's formal institutions. For countries with better governing institutions, the strength of (and perhaps faith in) the institutions may compensate for increases in unfair inequality. Meanwhile, reducing unfair inequality in countries with below average governing institutions without addressing problems with institutional quality can have a strong detrimental effect on beliefs. In effect, improvements in governance must accompany or precede any ambitious reforms for reducing unfair inequality (e.g. inequality of opportunity).

My results have important implications for how we think fair and unfair inequality may influence individual choices. It is argued that both high inequality of opportunity and high income inequality can cause mass discontent and civil unrest. Further, people become frustrated with their inability to achieve what others achieve in their society. As I show in this paper, the relationship between unfair inequality and beliefs is not straightforward. A mapping between individuals' beliefs and actions is needed. Such a mapping can help us understand how to use information about beliefs to inform the need for and potential impacts of specific policy interventions.

A Using an asset index to measure wealth

The convention in the literature for assessing wealth from a household survey is to use an asset index (Filmer and Pritchett, 2001; McKenzie, 2005; Sahn and Stifel, 2003). An asset index is a weighted sum of binary asset indicators. An asset indicator captures whether a household possesses a particular (durable) good or housing characteristic. For example, let us denote asset indicators as a_{nj} , where n pertains to any given asset for household j . Suppose the survey asks about five assets: car, microwave, color television, computer and mobile phone. If household j owns a color television, a_{1j} , a microwave, a_{2j} , and a car, a_{3j} , then their asset index score, A_j , would be $A_j = \delta_1 a_{1j} + \delta_2 a_{2j} + \delta_3 a_{3j}$.

The weights for the asset index are taken from the first principal component of the n -dimensional asset space (using the command "pca" in Stata). The weights depend simultaneously on each indicator's uniqueness and by maximizing the n -dimensional space defined by the asset list. Assets which are the least correlated with the others (i.e. not being owned in conjunction with a common collection of other assets) will receive a greater weight, attributing a higher score to someone with more unique assets. This goes beyond assuming that the more items someone owns the richer they are. Nevertheless, the use of this method to construct an asset index is limited by the assumption that the value of an asset corresponds to its uniqueness. By construction an asset index has a mean of zero, with negative value capturing wealth of those below the mean and positive values for wealth of those above the mean.

Even though an asset index can be a useful proxy for levels of well-being, it may not be well-suited to studying inequality if the index suffers from clumping or truncation (McKenzie, 2005). If an insufficient number of assets is used to construct the index, then households will be clumped together in a small number of groups. Having too few groups limits the amount of useful information about inequality that can be inferred from the asset index. A second potential issue is that of truncation of the asset index distribution, which can arise if there are not enough assets in the index that allow one to distinguish between the poor and the very poor, or between the rich and the upper middle class. In order to avoid clumping and truncation, a sufficient number of indicators must be used.

The asset index in this study uses 13 assets available in the LiTS survey in both 2010 and 2016 (Table 2). This list of assets accounts for both a household's durable assets and housing quality indicators. While I use the same list of assets in each of the two years and across countries, I run the PCA separately for each country and for each year. I do this since asset index weights are sample-specific and I am interested in inequality of opportunity estimates within each country. Also, I use the asset index to look at country-specific wealth decile, and relative wealth position in each country may be defined by a different combination of assets.

Table A1 shows the descriptive statistics for each country's resulting wealth variable, by year. The asset index takes values from -7.633 to 9.852 in 2010 and -9.915 to 7.29 in 2016. Note that the median, minimum and maximum in Table A1 cannot be compared across countries. I list these to give a sense of the wealth distribution in each country. I also show histograms of each country's index, by year, in Figure A1 and Figure A2.

Table A1: Measuring wealth – asset index summary statistics

Country	2010				2016			
	SD	Median	Min	Max	SD	Median	Min	Max
<i>Central Europe and the Baltic States</i>								
Croatia	1.670	-0.049	-3.991	2.571	1.527	-0.081	-5.412	2.306
Czech	1.528	0.215	-6.976	1.748	1.691	-0.100	-5.415	2.595
Estonia	1.693	0.688	-4.895	1.642	1.567	-0.745	-2.924	3.761
Hungary	1.688	0.620	-5.465	1.977	1.677	-0.182	-4.417	2.537
Latvia	1.778	0.942	-7.633	1.241	1.636	0.859	-7.076	1.115
Lithuania	1.619	-0.227	-3.497	2.265	1.686	0.528	-5.847	1.620
Poland	1.695	0.812	-6.785	1.675	1.623	0.699	-9.915	1.370
Slovakia	1.491	0.003	-5.969	1.625	1.627	0.714	-7.031	1.238
Slovenia	1.566	0.548	-5.510	1.406	1.485	0.470	-4.270	2.282
<i>South-eastern Europe</i>								
Albania	1.669	-0.075	-3.706	3.244	1.619	0.068	-3.796	2.268
Bosnia and Herz.	1.656	-0.135	-2.602	3.854	1.595	-0.213	-4.118	3.624
Bulgaria	1.675	0.162	-3.828	2.096	1.710	0.369	-5.221	1.970
Cyprus					1.459	0.863	-4.048	1.141
FYROM	1.580	0.089	-3.963	3.566	1.539	0.430	-4.524	2.245
Greece					1.537	0.579	-6.424	1.425
Kosovo	1.607	0.453	-4.857	2.291	1.534	-0.040	-3.389	4.324
Montenegro	1.509	0.005	-3.822	2.872	1.522	0.395	-5.418	1.778
Romania	1.901	0.395	-4.105	2.620	1.873	0.191	-4.583	2.466
Serbia	1.775	-0.113	-3.778	3.124	1.767	-0.387	-5.144	2.575
<i>Eastern Europe and the Caucasus</i>								
Armenia	1.661	-0.482	-2.730	3.479	1.468	-0.007	-3.448	2.141
Azerbaijan	1.536	0.711	-2.381	4.093	1.573	-0.169	-3.883	4.813
Belarus	1.650	0.567	-6.269	1.526	1.638	-0.372	-5.838	2.195
Georgia	1.769	0.298	-2.619	3.380	1.714	0.078	-3.048	3.232
Moldova	1.876	-0.446	-2.850	4.150	1.795	-0.226	-2.736	3.707
Ukraine	1.801	0.371	-4.207	2.855	1.715	0.538	-5.116	1.690
<i>Central Asia</i>								
Kazakhstan	1.827	0.781	-3.570	2.667	1.699	-0.549	-3.044	2.406
Kyrgyzstan	1.653	-0.726	-1.638	4.951	1.714	-0.433	-2.096	5.657
Mongolia	1.540	-0.511	-2.379	3.873	2.030	-0.796	-2.499	4.172
Tajikistan	1.693	-0.910	-1.326	9.852	1.605	-0.366	-0.957	7.291
Uzbekistan	1.648	-0.594	-1.157	6.842	1.699	-0.634	-1.657	4.724
<i>Comparator countries</i>								
France	1.597	0.468	-5.851	1.363				
Germany	1.654	-0.630	-4.477	2.267	1.627	0.490	-2.951	2.219
UK	1.683	0.396	-5.679	1.702				
Italy	1.479	0.163	-5.977	2.316	1.400	-0.490	-3.649	2.439
Sweden	1.610	-0.215	-2.449	2.908				
<i>Without regional classification</i>								
Russia	1.759	0.612	-6.718	1.540	1.721	0.984	-6.416	1.152
Turkey	1.691	-0.004	-3.007	3.139	1.632	0.747	-5.888	1.810

Figure A1: Histograms of asset index for working age individuals (18+) in 2010, by country

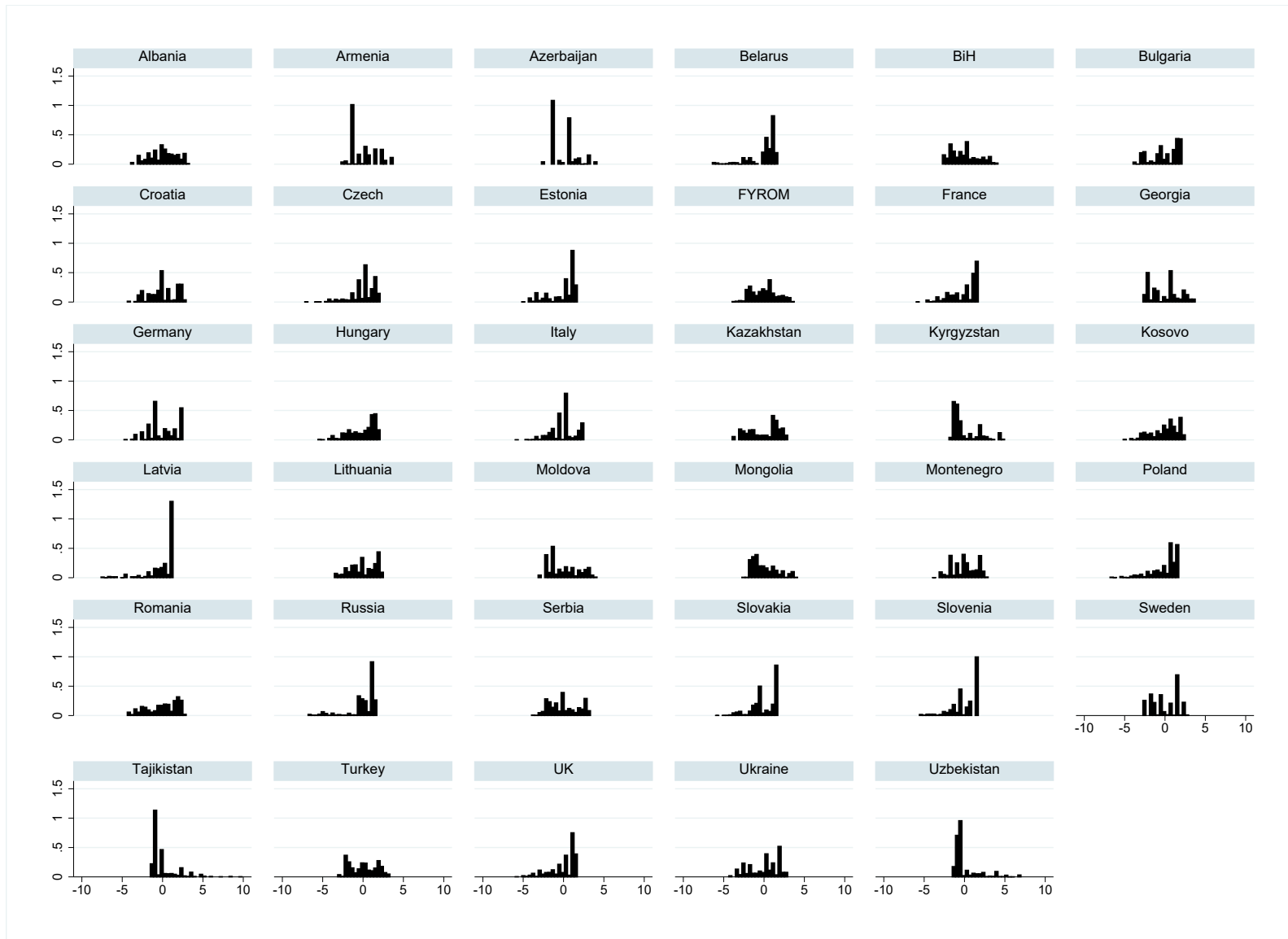
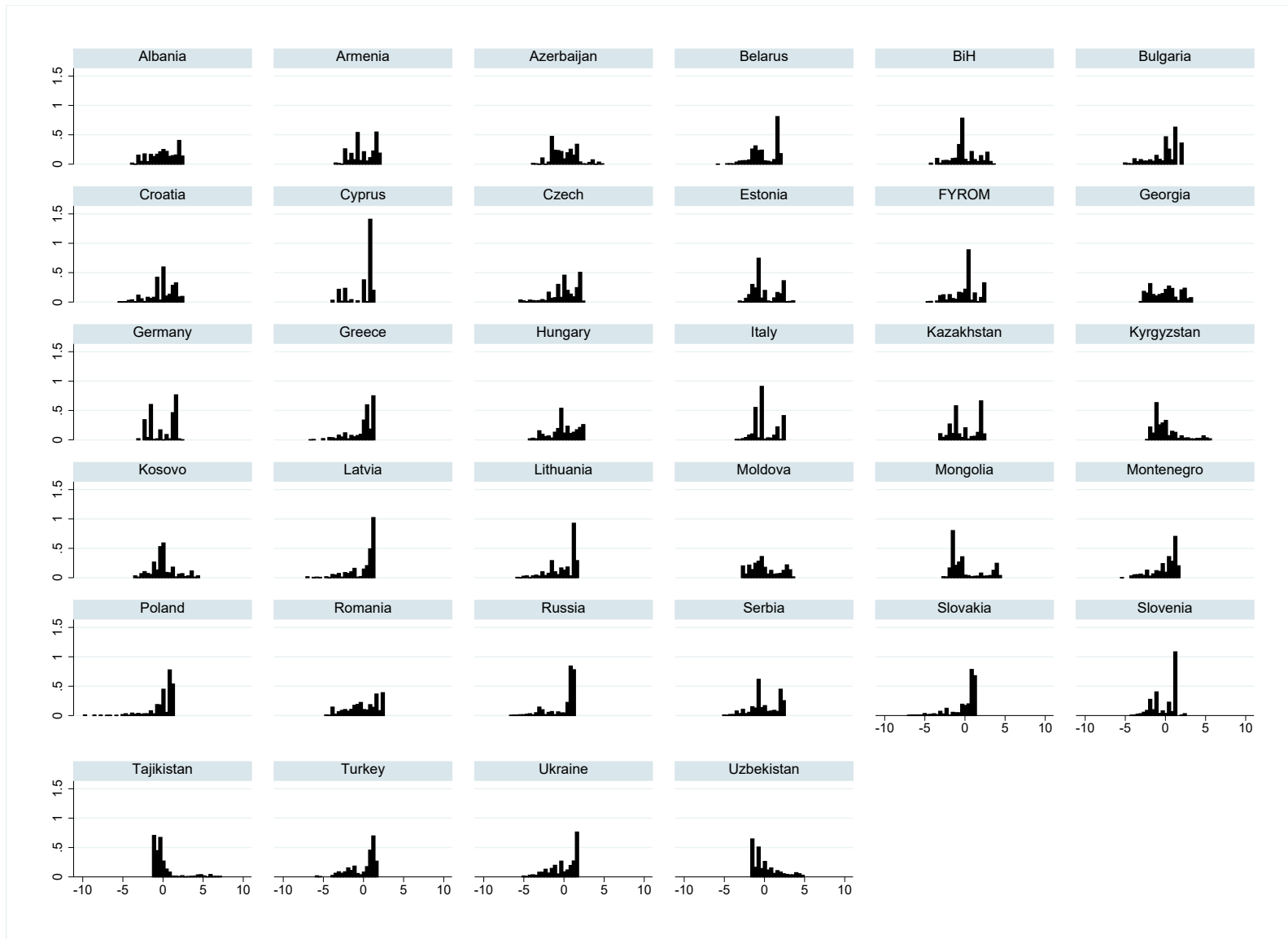


Figure A2: Histograms of asset index for working age individuals (18+) in 2016, by country



My asset indexes are mostly free of clumping. But they do display truncation at the top and bottom in many instances. This will limit the extent to which variation in the index will capture the very poor or the very rich. Truncation at the top occurs for wealthier countries, such as Germany, as well as in Latvia, Russia and Ukraine (2016), meaning that many households near the middle of the income distribution in those countries own all the assets in the survey and the index fails to distinguish between the upper middle class and the rich. Since I am more interested in the factors that contribute to the inequality between the poor and the middle class, this is not of concern in this case. Nonetheless, care should be taken when comparing the results from wealthier countries with the rest of the sample, since the variation being explained by circumstances in these countries is coming almost exclusively from the left tail of their respective asset distributions.

There is also some truncation at the bottom in Kyrgyz Republic, Tajikistan and Uzbekistan, making it difficult to distinguish between the poor and very poor. Lastly, while Azerbaijan, Georgia and Lithuania suffer from some clumping, the density functions of most of the indexes are relatively smooth (McKenzie, 2005). Thus, the analysis most accurately captures inequality between the poor and the middle class. This is a policy relevant threshold. A strong middle class is important for growth, and increased vulnerability of those on the threshold between poor and middle class is of increasing concern in high and middle income countries. Understanding the importance of circumstances for determining long run outcomes in this group, such as wealth, can guide policy for reducing their vulnerability.

I also report the weights from each country's PCA in Table A2. The weight depends on how correlated the ownership of each asset is with ownership of the other assets in the list. For example, if home ownership is common in rural areas, then it would not be a particularly informative indicator of wealth, so the weight would be small or negative.

Table A2: Asset index PCA weights by country

Country	Home ownership	Detached	Semi-detached	Apartment	Other	Heating	Running water	Internet access	Car	Mobil phone	Computer	Bank account
<i>2010</i>												
Albania	-0.013	-0.397	0.006	0.389		0.086	0.326	0.402	0.251	0.191	0.449	0.339
Armenia	-0.039	-0.476	0.003	0.499	-0.071	0.037	0.106	0.434	0.031	0.135	0.463	
Azerbaijan	-0.252	-0.542		0.538				0.402	0.073	0.128	0.411	
Belarus	-0.088	-0.503	-0.147	0.541		0.440	0.363	0.216	0.046		0.187	0.126
Bosnia and Herz.	-0.202	-0.441	-0.009	0.484		0.408	0.292	0.361	0.014	0.037	0.342	0.173
Bulgaria	-0.050	-0.446	0.010	0.436				0.484	0.149	0.176	0.482	0.297
Croatia	-0.054	-0.422	-0.022	0.448		0.339	0.194	0.433	0.190		0.420	0.257
Czech	0.314	0.315	0.095	-0.359		-0.070		0.461	0.354	0.193	0.474	0.246
Estonia	-0.045	-0.522	-0.042	0.525	0.004	0.403	0.450	0.180	0.007	0.081	0.185	
FYROM	-0.083	-0.384	0.074	0.378		0.273	0.133	0.441	0.298	0.192	0.459	0.272
France	0.426	0.546	-0.122	-0.517		-0.081		0.194	0.367		0.192	0.146
Georgia	-0.149	-0.475	0.032	0.463			0.419	0.388	0.033	0.158	0.384	0.194
Germany	0.452	0.432	0.150	-0.505	0.034	-0.031		0.338	0.313		0.310	0.145
Hungary	0.157	-0.057	-0.017	0.094		0.270	0.187	0.502	0.343	0.306	0.511	0.361
Italy	0.350	0.392	0.190	-0.460		0.115		0.378	0.217	0.198	0.387	0.291
Kazakhstan	-0.039	-0.425	-0.117	0.488	-0.062	0.443	0.420	0.236	0.055	0.193	0.266	
Kyrgyzstan	-0.152	-0.521	0.062	0.514	0.053		0.305	0.396	0.018	0.057	0.426	
Kosovo	0.106	-0.290	0.347	-0.074		0.138	0.210	0.481	0.367	0.242	0.470	0.265
Latvia	-0.046	-0.468		0.459		0.361	0.446	0.287	0.102	0.168	0.288	0.188
Lithuania	-0.119	-0.516	-0.048	0.530		0.406	0.392	0.239	0.099	-0.007	0.213	0.074
Moldova	-0.161	-0.440	-0.023	0.457		0.369	0.330	0.379	0.124	0.135	0.357	0.145
Mongolia	-0.110	-0.049	0.010	0.482	-0.398			0.447	0.249	0.073	0.492	0.292
Montenegro	-0.121	-0.535	0.127	0.474		0.085	0.305	0.433	0.103	0.120	0.381	0.012
Poland	-0.048	-0.179	-0.019	0.191		0.259	0.239	0.470	0.260	0.363	0.477	0.397
Romania	-0.086	-0.430	-0.045	0.438		0.359	0.353	0.370	0.146	0.190	0.353	0.206
Russia	-0.067	-0.453	-0.171	0.488		0.417	0.344	0.311	0.075	0.133	0.302	0.141
Serbia	-0.148	-0.447	-0.009	0.473		0.414	0.219	0.377	0.023	0.149	0.364	0.195
Slovakia	-0.071	-0.478	-0.069	0.492		0.170	0.131	0.425	0.178	0.133	0.446	0.212
Slovenia	0.316	0.484	-0.019	-0.485		0.287	-0.003	0.375	0.184		0.398	0.125
Sweden	0.434	0.521	0.093	-0.564		-0.302		-0.012	0.344		0.000	-0.061
Tajikistan	-0.234	-0.492	0.048	0.496		0.238	0.361	0.287	0.045	0.114	0.329	0.249
Turkey	-0.091	-0.450	-0.087	0.482		0.245		0.440	0.210	0.127	0.444	0.195
UK	0.387	0.252	0.051	-0.316		0.148		0.458	0.417		0.459	0.262
Ukraine	-0.084	-0.465	-0.062	0.479		0.341	0.353	0.362	0.099	0.163	0.329	0.164
Uzbekistan	-0.189	-0.512	0.122	0.510		0.472	0.213	0.300	0.047	0.056	0.249	0.041

Asset index PCA weights by country; *continued from previous page*

Country	Home ownership	Detached	Semi-detached	Apartment	Other	Heating	Running water	Internet access	Car	Mobil phone	Computer	Bank account
<i>2016</i>												
Albania	-0.076	-0.43	-0.051	0.45		0.17	0.125	0.373	0.278		0.421	0.409
Armenia	0.016	-0.553	-0.081	0.601	-0.082	0.032	0.206	0.36	-0.078		0.344	0.148
Azerbaijan	0.089	-0.369		0.391		0.236	0.222	0.454	0.354	0.202	0.46	0.12
Belarus	-0.153	-0.523	-0.016	0.528		0.434	0.236	0.251	0.125	0.157	0.266	0.075
Bosnia and Herz.	-0.129	-0.44	0.03	0.471		0.401	0.197	0.346	0.208	-0.062	0.356	0.271
Bulgaria	0.009	-0.337	-0.05	0.362		0.282		0.466	0.288	0.215	0.463	0.336
Croatia	-0.203	-0.449	0.136	0.389		0.24	0.211	0.441	0.084	0.143	0.468	0.208
Cyprus	0.351	0.658	-0.142	-0.617	-0.111			-0.044	0.162	-0.018	-0.031	0.02
Czech	0.365	0.411	0.036	-0.417		-0.21	-0.086	0.352	0.381		0.343	0.29
Estonia		0.534	0.137	-0.559	-0.023	-0.382	-0.156	0.185	0.299	0.053	0.192	0.013
FYROM	0.021	-0.364	-0.009	0.398	0.043		0.057	0.497	0.383	0.17	0.508	0.15
Georgia		-0.436	0.038	0.428	0.046	0.158	0.318	0.454	0.226	0.1	0.447	0.064
Germany	0.548	0.37	0.282	-0.58		-0.058		-0.027	0.364		-0.032	0.088
Greece	0.135	-0.203	0.014	0.198		0.278		0.542	0.264	0.279	0.542	0.298
Hungary	-0.095	-0.425	0.018	0.424		0.356	0.156	0.413	0.222	0.108	0.443	0.227
Italy	0.322	0.559	0.211	-0.627		-0.09		0.18	0.192		0.212	0.152
Kazakhstan	-0.038	-0.504	-0.041	0.532		0.496	0.353	0.216	0.027	-0.026	0.195	0.06
Kyrgyzstan		-0.469	0.067	0.46	0.09	0.416	0.267	0.296	0.123	0.047	0.309	0.281
Kosovo	-0.208	-0.421	0.006	0.495		0.409	0.221	0.353	0.225		0.291	0.241
Latvia		-0.411	-0.117	0.452	-0.116	0.351	0.429	0.332	0.117	0.111	0.334	0.212
Lithuania	-0.092	-0.403	-0.158	0.447	-0.028	0.409	0.359	0.363	0.153		0.35	0.175
Moldova	-0.154	-0.468	0.049	0.464		0.425	0.294	0.287	0.167	0.116	0.349	0.163
Mongolia	-0.056	-0.439		0.446		0.429	0.451	0.294	0.134	0.068	0.313	0.105
Montenegro	0.235	0.088	-0.248	0.118		0.205	0.144	0.5	0.417	0.067	0.527	0.304
Poland	0.227	0.151	-0.04	-0.094	-0.176	0.273		0.492	0.372	0.339	0.498	0.257
Romania	-0.09	-0.424		0.434		0.34	0.351	0.343	0.24	0.152	0.343	0.263
Russia		-0.457	-0.183	0.513	-0.062	0.491	0.302	0.212	0.076	0.181	0.207	0.178
Serbia	-0.203	-0.453	0.01	0.462		0.429	0.225	0.359	0.102	0.143	0.324	0.202
Slovakia	0.089	-0.126	-0.029	0.136		0.32	0.237	0.521	0.351	0.182	0.522	0.313
Slovenia	0.413	0.607	-0.154	-0.55		0.067	-0.126	0.14	0.256	0.074	0.155	
Tajikistan	-0.233	-0.566		0.509	0.22	0.397	0.29	0.153	0.012	-0.147	0.129	0.122
Turkey	-0.167	-0.535		0.535		0.077		0.406	0.197	0.224	0.278	0.25
Ukraine	0.023	-0.481	-0.018	0.479		0.405	0.333	0.322	0.01	0.186	0.325	0.143
Uzbekistan	-0.055	-0.493	0.097	0.48		0.357	0.365	0.363	0.063		0.299	0.169

Notes: The PCA is performed using all asset components. Blanks correspond to an assigned weight of 0, which are excluded for readability.

The table shows that the measure does not always treat ownership or living in a detached house as indicative of higher wealth. In most countries, living in an apartment (presumably in urban areas) is associated with higher wealth. Renting can also be a positive indicator for wealth. This is probably due to the fact that increased urbanization means that people with more assets overall live in cities, but higher property prices mean that most of these people cannot buy their homes. Countries with higher GDP per capita show a different pattern. In these places owning and living in a detached house are signs of wealth. I conclude that the housing characteristics are not distorting the wealth index in most countries.

Lastly, I conducted a number of tests to confirm the legitimacy of the wealth index across urban and rural areas. First, I use regressions with country fixed effects, as well as rank sum tests, to confirm whether urban areas have higher wealth than rural areas. This proves to be true. Second, I compare these results with similar tests for income from LiTS in 2016 (there is no income variable available for 2010). The results are the same whether I look at wealth or income. Third, I show that log income predicts wealth. The patterns that emerge are the same.

Table A3: Correlates of the asset index, non-student and non-retired sample, 2010 & 2016

	(1)	(2)	(3)	(4)
	Index	Index	Tertiles	Tertiles
Education level 0 to 3	0.597*** (0.013)		0.261*** (0.007)	
Age	0.011** (0.005)	0.002 (0.005)	0.005* (0.003)	0.002 (0.003)
Age ²	-0.000*** (0.000)	-0.000* (0.000)	-0.000*** (0.000)	-0.000** (0.000)
Employed	0.553*** (0.017)	0.558*** (0.017)	0.223*** (0.008)	0.226*** (0.008)
Married	-0.030 (0.024)	-0.012 (0.024)	-0.018 (0.012)	-0.013 (0.012)
Urban	0.633*** (0.016)	0.638*** (0.016)	0.273*** (0.008)	0.274*** (0.008)
Secondary education		0.771*** (0.030)		0.280*** (0.015)
Tertiary education		1.372*** (0.033)		0.567*** (0.016)
Household size		0.047*** (0.006)		0.013*** (0.003)
Constant	-1.848*** (0.120)	-1.397*** (0.119)	1.183*** (0.060)	1.411*** (0.059)
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs	45,270	45,271	45,270	45,271

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

B Circumstances at birth and household level analysis

While the household is the relevant unit of analysis to study assets ownership, using a household level variable for estimates of inequality of opportunity is not straightforward. This is because the method traces economic outcomes back to an individual's circumstances at birth. Meanwhile, each member of the household, with their individual circumstances, potentially contributes to overall household wealth. Other studies have resolved this conflict by using only household heads in the analysis. This works if the household head is defined as the primary income earner, in which case the researcher assumes that the primary income earner is responsible for paying for the accumulated assets.

The LiTS data do not allow for this compromise, however, and it thus makes more sense not to restrict the sample to household heads. Headship is not defined in the LiTS, and relying on the self-selection of household heads can be misleading, especially in the case of two-person households (70% of the sample consists of two-person households). Also, there is no reliable way to check the validity of the head-as-primary-income-earner assumption for both 2010 and 2016. Thus, the assumption that the head is the primary income earner leads to a large, endogenous sample reduction, which can in turn generate inaccurate estimates. Expanding the sample beyond heads eliminates this assumption and better accounts for households with multiple income earners.

Second, once non-heads are included in the analysis, it is incorrect to do the estimations for men and women separately. This is because the "female respondent" regression would actually include a number of households with male heads. While the "male respondent" regression would include some female heads. The estimates would then be impossible to interpret. Thus, once the sample includes all household members, it is more correct to do a single set of estimations that include a gender dummy.

Note however that the LiTS has random selection of the respondent (and thus respondent gender) within the household. When gender in multi-person households is essentially random, and the household has an equal number of men and women, there is no reason to expect gender of the sampled respondent to be correlated with wealth. Any non-zero coefficients on the gender dummy will be driven by households with uneven gender balance and by single-person households. Consider 2-person households, which is the majority of my sample (approx. 69% of the sample in 2010 and 70% in 2016). In a two-person household, there can be vast inequality between the household members, but both will be living in the same house with the same level of assets. Gender-bias in reporting error aside, there would be no gender impact detected. Country-level regressions using only 2-person mixed-sex households confirm that gender is almost never significant for household wealth.

Gender coefficients must be viewed with this in mind. Despite this caveat, it would be incorrect not to include the gender control. In order to avoid too much confusion regarding the gender coefficient, it is only reported in the appendix (Table B2).

Table B1 reports means for the circumstance indicators that I use in the main analysis: place of birth, parental education, political affiliation and gender. Some circumstance variables available in the data are not included in this analysis. These include ethnicity, mother tongue and religion. In this sample, the interpretation of these variables differs considerably across countries and generations. For example, in some countries in the sample, speaking only Russian is sufficient for access to good jobs, but in others, not speaking the local language may severely restrict good employment opportunities. Because of this,

including these variables reduces cross country comparability. Furthermore, due to item non-response, including religion and mother tongue reduces the sample size for the regressions considerably. Because item non-response for these variables is not random, including these variables would introduce bias and increase variance of the estimates. Nonetheless, for completeness, I performed multiple robustness checks on the inequality of opportunity estimates, where I include these variables. Including one or all of them does not change inequality of opportunity estimates or country rankings considerably. For example, being of a minority ethnicity has very little explanatory power for household wealth in most countries in the sample. See European Bank for Reconstruction and Development (2016) for estimates that include ethnicity.

I also exclude age as a circumstance. The year of one's birth is certainly something one has no control over and outcomes will vary by age. Using age as a circumstance, however, captures not only an individual's age, but also the policies and economic environments that mark their years and determine outcomes. Consequently, any significant result from including age as a circumstance in the regression cannot be clearly interpreted as the impact of age itself. Also, for the R^2 to be interpreted as a legitimate measure of inequality of opportunity and decomposed inequality of opportunity, it is necessary to exclude controlling variables. I thus exclude *age* and *age*² as controls. As a robustness check, the analyses were also run with *age* and *age*² included. While these controls tend to be significant, they do not explain much additional variation in outcomes; R^2 values are essentially unchanged. Results are available upon request.

Table B1: Summary of circumstances by country

Country	2010					2016				
	Born in urban area	Father's education	Mother's education	Member communist party	Gender	Born in urban area	Father's education	Mother's education	Member communist party	Gender
<i>Central Europe and the Baltic States</i>										
Croatia	0.674	0.408	0.339	0.074	0.574	0.862	0.689	0.615	0.092	0.547
Czech	0.793	0.421	0.417	0.197	0.617	0.869	0.912	0.856	0.193	0.533
Estonia	0.669	0.247	0.299	0.110	0.719	0.703	0.903	0.899	0.142	0.566
Hungary	0.754	0.251	0.267	0.050	0.542	0.790	0.664	0.534	0.068	0.529
Latvia	0.753	0.242	0.307	0.102	0.569	0.760	0.929	0.929	0.118	0.569
Lithuania	0.565	0.118	0.133	0.097	0.659	0.553	0.791	0.761	0.075	0.549
Poland	0.570	0.204	0.239	0.049	0.470	0.582	0.780	0.774	0.072	0.583
Slovakia	0.722	0.448	0.437	0.142	0.622	0.809	0.772	0.688	0.112	0.559
Slovenia	0.660	0.251	0.210	0.055	0.580	0.778	0.665	0.514	0.070	0.481
<i>South-eastern Europe</i>										
Albania	0.629	0.338	0.267	0.113	0.581	0.567	0.651	0.574	0.136	0.525
Bosnia and Herz.	0.539	0.271	0.205	0.111	0.604	0.570	0.607	0.449	0.094	0.485
Bulgaria	0.662	0.178	0.176	0.173	0.627	0.766	0.628	0.620	0.170	0.492
Cyprus						0.596	0.410	0.349		0.581
FYROM	0.627	0.317	0.236	0.123	0.643	0.606	0.377	0.290	0.100	0.518
Greece						0.641	0.448	0.382		0.572
Kosovo	0.461	0.378	0.165	0.051	0.708	0.414	0.386	0.216	0.046	0.528
Montenegro	0.591	0.501	0.413	0.203	0.570	0.696	0.744	0.645	0.195	0.534
Romania	0.622	0.236	0.207	0.208	0.576	0.635	0.772	0.716	0.156	0.547
Serbia	0.558	0.362	0.309	0.210	0.566	0.632	0.738	0.608	0.160	0.531
<i>Eastern Europe and the Caucasus</i>										
Armenia	0.643	0.262	0.234	0.115	0.665	0.525	0.869	0.869	0.156	0.686
Azerbaijan	0.549	0.302	0.177	0.128	0.671	0.524	0.998	0.996	0.095	0.542
Belarus	0.687	0.275	0.281	0.138	0.614	0.727	0.979	0.980	0.242	0.548
Georgia	0.522	0.368	0.356	0.156	0.701	0.536	0.931	0.922	0.191	0.614
Moldova	0.324	0.197	0.217	0.094	0.628	0.345	0.781	0.748	0.077	0.482
Ukraine	0.617	0.348	0.399	0.179	0.710	0.626	0.966	0.965	0.165	0.576

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Summary of circumstances by country; *continued from previous page*

Country	2010					2016				
	Born in urban area	Father's education	Mother's education	Member communist party	Gender	Born in urban area	Father's education	Mother's education	Member communist party	Gender
<i>Central Asia</i>										
Kazakhstan	0.503	0.253	0.276	0.136	0.685	0.444	0.924	0.911	0.223	0.645
Kyrgyzstan	0.303	0.238	0.194	0.170	0.625	0.295	0.897	0.888	0.175	0.505
Mongolia	0.308	0.145	0.154	0.166	0.542	0.202	0.634	0.608	0.354	0.531
Tajikistan	0.155	0.273	0.119	0.077	0.652	0.184	0.927	0.863	0.104	0.530
Uzbekistan	0.382	0.185	0.130	0.097	0.632	0.349	0.954	0.925	0.082	0.543
<i>Comparator countries</i>										
France	0.812	0.205	0.220	0.040	0.548					
Germany	0.617	0.127	0.094	0.039	0.588	0.493	0.901	0.826	0.013	0.432
UK	0.793	0.260	0.278	0.005	0.561					
Italy	0.575	0.267	0.211	0.020	0.700	0.856	0.771	0.713		0.509
Sweden	0.780	0.322	0.277	0.025	0.464					
<i>Without regional classification</i>										
Russia	0.699	0.420	0.473	0.188	0.680	0.717	0.963	0.957	0.200	0.606
Turkey	0.660	0.048	0.036	0.006	0.712	0.823	0.327	0.269		0.502

Notes: Figures are portions. For parental education, the figure is the portion of the sample whose mother (father) completed at least secondary education.

Table B2: OLS regression of wealth on circumstances, reporting gender (Equation 2)

Country	2010							2016						
	Born in urban area	Father's education	Mother's education	Member communist party	Gender	N	IOp	Born in urban area	Father's education	Mother's education	Member communist party	Gender	N	IOp
<i>Central Europe and the Baltic States</i>														
Croatia	0.716*** (0.167)	0.454*** (0.158)	0.547*** (0.164)	0.558** (0.269)	-0.172 (0.163)	407	0.289	0.922*** (0.209)	0.556*** (0.130)	0.351*** (0.114)	-0.131 (0.192)	-0.001 (0.089)	792	0.259
Czech	-0.617*** (0.209)	0.18 (0.169)	-0.012 (0.179)	0.288** (0.146)	-0.009 (0.142)	436	0.039	0.262 (0.302)	0.559** (0.222)	0.048 (0.173)	0.124 (0.141)	0.012 (0.120)	900	0.027
Estonia	0.047 (0.229)	0.181 (0.197)	0.420** (0.178)	0.366 (0.293)	-0.513** (0.215)	334	0.073	-0.168 (0.163)	0.129 (0.158)	-0.099 (0.144)	-0.179 (0.164)	-0.178 (0.128)	636	0.009
Hungary	0.234 (0.240)	0.528*** (0.165)	0.274 (0.180)	-0.149 (0.436)	-0.141 (0.152)	379	0.117	0.145 (0.246)	0.702*** (0.146)	0.445*** (0.138)	-0.291 (0.347)	0.047 (0.113)	713	0.183
Latvia	-0.113 (0.253)	0.445* (0.230)	0.011 (0.159)	0.053 (0.223)	0.167 (0.203)	405	0.028	0.661*** (0.192)	0.183 (0.124)	0.395*** (0.105)	0.003 (0.166)	0.131 (0.118)	617	0.089
Lithuania	0.600** (0.250)	-0.113 (0.266)	0.656*** (0.236)	-0.226 (0.399)	0.589*** (0.195)	208	0.164	0.897*** (0.157)	0.350*** (0.087)	0.363*** (0.099)	0.223 (0.165)	0.104 (0.118)	729	0.219
Poland	0.086 (0.168)	0.208 (0.231)	0.253 (0.255)	-0.427 (0.314)	-0.196 (0.120)	457	0.054	0.004 (0.158)	0.652*** (0.180)	0.178 (0.145)	-1.092** (0.428)	0.044 (0.113)	910	0.107
Slovakia	1.160*** (0.157)	0.17 (0.128)	-0.004 (0.116)	-0.017 (0.156)	-0.002 (0.139)	460	0.141	0.653** (0.273)	0.411*** (0.133)	0.760*** (0.206)	-0.052 (0.172)	0.006 (0.104)	729	0.183
Slovenia	-0.831*** (0.209)	0.353*** (0.136)	-0.263 (0.161)	0.026 (0.240)	-0.057 (0.160)	339	0.09	-0.400** (0.186)	0.025 (0.139)	0.099 (0.112)	-0.402* (0.229)	-0.086 (0.133)	596	0.019
<i>South-eastern Europe</i>														
Albania	0.512 (0.339)	0.312** (0.151)	0.527*** (0.173)	0.052 (0.219)	0.011 (0.134)	448	0.144	1.493*** (0.175)	0.388*** (0.121)	0.268** (0.121)	-0.156 (0.166)	0.032 (0.101)	809	0.311
BiH	1.209*** (0.331)	0.474*** (0.162)	0.028 (0.133)	0.293 (0.228)	-0.026 (0.137)	476	0.239	0.683*** (0.160)	0.285** (0.117)	0.448*** (0.127)	-0.218 (0.196)	-0.293*** (0.108)	834	0.208
Bulgaria	1.175*** (0.237)	0.479*** (0.169)	-0.008 (0.209)	0.226 (0.211)	-0.094 (0.154)	383	0.193	0.627*** (0.182)	0.643*** (0.127)	0.556*** (0.120)	0.037 (0.171)	0.028 (0.119)	703	0.359
Cyprus								-0.017 (0.115)	-0.438*** (0.133)	-0.11 (0.102)		0.128 (0.108)	742	0.075
FYROM	0.821*** (0.185)	0.430*** (0.143)	0.283* (0.165)	0.192 (0.273)	0.037 (0.124)	433	0.21	0.339* (0.193)	0.571*** (0.118)	0.351** (0.138)	-0.015 (0.167)	-0.194** (0.087)	716	0.258
Greece								0.494*** (0.150)	0.158 (0.107)	0.17 (0.115)		-0.296*** (0.108)	830	0.06
Kosovo	0.209 (0.259)	0.593*** (0.176)	0.361** (0.150)	-0.152 (0.373)	0.038 (0.162)	422	0.159	0.863*** (0.256)	-0.003 (0.133)	0.381*** (0.106)	-0.415 (0.286)	-0.271** (0.109)	700	0.163
Montenegro	0.682*** (0.242)	0.593*** (0.160)	0.310* (0.181)	0.088 (0.224)	0.058 (0.113)	408	0.229	0.561*** (0.149)	0.324*** (0.119)	0.349*** (0.124)	0.137 (0.134)	-0.151 (0.102)	802	0.149
Romania	1.702*** (0.263)	0.123 (0.219)	0.436* (0.240)	0.123 (0.281)	-0.166 (0.206)	408	0.282	1.014*** (0.249)	0.694*** (0.167)	0.557*** (0.175)	0.015 (0.268)	0.294** (0.125)	644	0.291
Serbia	1.109*** (0.220)	0.412*** (0.139)	0.474*** (0.156)	0.206 (0.182)	0.084 (0.145)	545	0.264	0.823*** (0.190)	0.680*** (0.138)	0.278* (0.153)	0.25 (0.264)	0.047 (0.127)	650	0.236

Continued on next page

OLS regression of wealth on circumstances, reporting gender (Equation 2); *continued from previous page*

Country	2010							2016						
	Born in urban area	Father's education	Mother's education	Member communist party	Gender	N	IOP	Born in urban area	Father's education	Mother's education	Member communist party	Gender	N	IOP
<i>Eastern Europe and the Caucasus</i>														
Armenia	0.417 (0.311)	0.364* (0.189)	0.386** (0.171)	0.069 (0.299)	-0.11 (0.193)	356	0.079	1.037*** (0.146)	0.320** (0.136)	0.06 (0.139)	0.12 (0.153)	0.266** (0.134)	578	0.18
Azerbaijan	0.930*** (0.256)	0.08 (0.159)	0.241 (0.170)	-0.012 (0.222)	0.228 (0.204)	383	0.112	0.711*** (0.201)	0.235 (0.203)	0.588*** (0.190)	0.353** (0.178)	-0.061 (0.145)	809	0.088
Belarus	1.182*** (0.341)	0.156 (0.247)	0.145 (0.179)	0.389* (0.212)	-0.204 (0.161)	352	0.169	0.845*** (0.234)	0.272* (0.146)	0.129 (0.154)	-0.047 (0.169)	-0.13 (0.104)	786	0.071
Georgia	1.592*** (0.266)	-0.117 (0.240)	0.654*** (0.186)	0.175 (0.264)	0.006 (0.147)	367	0.281	0.789*** (0.189)	0.305 (0.207)	0.631*** (0.221)	-0.093 (0.162)	-0.144 (0.171)	589	0.153
Moldova	1.832*** (0.288)	0.335*** (0.125)	0.008 (0.144)	0.168 (0.250)	-0.169 (0.190)	364	0.274	1.603*** (0.234)	0.850*** (0.154)	0.054 (0.135)	0.282* (0.155)	-0.218* (0.118)	612	0.361
Ukraine	1.511*** (0.244)	0.367*** (0.139)	0.242** (0.103)	0.373 (0.275)	0.329*** (0.127)	568	0.272	1.379*** (0.178)	0.323* (0.176)	0.498*** (0.168)	-0.18 (0.178)	0.114 (0.113)	840	0.223
<i>Central Asia</i>														
Kazakhstan	0.772** (0.351)	0.473*** (0.165)	0.2 (0.168)	0.22 (0.273)	0.027 (0.210)	413	0.108	1.095*** (0.221)	0.423*** (0.139)	-0.015 (0.138)	-0.213 (0.175)	0.053 (0.127)	948	0.132
Kyrgyzstan	1.375*** (0.336)	0.303* (0.179)	0.158 (0.162)	-0.112 (0.196)	-0.055 (0.157)	480	0.208	1.028*** (0.287)	0.289** (0.139)	0.272* (0.139)	0.517** (0.213)	0.044 (0.110)	800	0.147
Mongolia	-0.015 (0.163)	0.092 (0.140)	0.216* (0.130)	-0.183 (0.190)	-0.068 (0.184)	352	0.03	1.307*** (0.292)	0.494*** (0.125)	0.229** (0.106)	-0.038 (0.176)	0.114 (0.141)	903	0.192
Tajikistan	3.034*** (0.389)	0.098 (0.166)	-0.051 (0.136)	0.375 (0.444)	0.187 (0.143)	356	0.387	1.724*** (0.428)	0.306** (0.121)	0.181 (0.122)	-0.189 (0.154)	0.027 (0.120)	725	0.197
Uzbekistan	0.907** (0.370)	0.12 (0.118)	-0.032 (0.080)	-0.214 (0.214)	-0.041 (0.150)	526	0.084	1.583*** (0.256)	0.268 (0.193)	0.485*** (0.179)	0.254 (0.270)	0.141 (0.119)	655	0.259
<i>Comparator countries</i>														
multirow2[0]*France	-0.547*** (0.177)	-0.156 (0.156)	-0.131 (0.122)		-0.008 (0.115)	510	0.043							
Germany	-0.133 (0.167)	-0.490* (0.266)	0.249 (0.227)		0.155 (0.139)	598	0.014	-1.035*** (0.148)	-0.063 (0.090)	-0.177 (0.118)		0.002 (0.099)	1138	0.114
UK	-0.141 (0.155)	0.12 (0.109)	-0.032 (0.118)		0.229* (0.124)	594	0.009							
Italy	0.766** (0.306)	0.205* (0.118)	0.323** (0.134)	0.224 (0.140)	-0.116 (0.146)	571	0.107	1.272*** (0.291)	0.284** (0.143)	0.331** (0.133)	-0.001 (0.204)	0.105 (0.120)	827	0.159
Sweden	-0.192 (0.182)	-0.072 (0.112)	0.145 (0.100)		0.015 (0.168)	576	0.005							
<i>Without regional classification</i>														
Russia	0.766** (0.306)	0.205* (0.118)	0.323** (0.134)	0.224 (0.140)	-0.116 (0.146)	571	0.107	1.272*** (0.291)	0.284** (0.143)	0.331** (0.133)	-0.001 (0.204)	0.105 (0.120)	827	0.159
Turkey	0.699** (0.281)	0.249 (0.182)	0.485*** (0.138)		-0.434** (0.179)	548	0.145	0.673* (0.362)	0.591*** (0.132)	0.347** (0.147)		0.303** (0.135)	1139	0.21

Notes: Standard errors in parentheses. *** (**, *) indicates significance at 1% (5%, 10%) level.

C Causes of changes in unfair inequality

In addition to access to product markets and access to jobs, changes in unfair inequality in household wealth may be due to changes in access to finance (including bank accounts and mortgages), inequality of opportunity for income and rule of law.

First, changes in access to finance impact households' ability to buy durables, in particular housing and automobiles. An example of where this may have impacted unfair inequality is Montenegro, which experienced a sharp increase in competition in the banking sector in 2013 (International Monetary Fund, IMF). Reduced concentration in the banking sector would increase access to finance (e.g., see Beck et al., 2004). Montenegro also displays one of the largest falls in unfair inequality over the study period. Coupled with access to finance, tightening housing markets in urban areas can reduce the ability of urban-born people to become home owners (in urban areas), and thus strengthen the link between circumstances and household wealth. This scenario could be the case for Germany, which displays an increase in my measure of unfair inequality as well as increasing urbanization, and higher demand for urban housing, during the study period.

Second, if inequality of opportunity for income (IO) goes down, such that high incomes are less linked to circumstances, then more people from more backgrounds can acquire the items in the wealth index. My measure of unfair inequality would go down in turn. Drops in IO (for income) would most likely come from increased access to education and jobs, which can delink incomes and circumstances. Estimates of changes in IO are unavailable for this sample.

Lastly, improvements in rule of law can also lead to changes in unfair inequality. Reducing corruption improves the business climate, increases efficiency of government spending, and weakens the link between privilege and outcomes. For example, large improvements in unfair inequality in Georgia coincide with massive reductions in corruption since 2003. Reforms began in 2003 and continued to be implemented throughout the study period (Organisation for Economic Co-operation and Development (OECD), 2016). Transparency international data suggests that such reforms continued to have positive impacts through out the study period: the corruption perceptions index goes up between 2008 and 2015.

D Robustness checks

It also includes robustness checks for the main estimation of Equation 3 and Equation 4, with each of $fair_{merit}$ and $fair_{control}$ as dependent variables. I show results using the following sub-samples: transition countries, men, women. I also show the analysis at the level of the primary sampling unit (PSU). For the LiTS, the PSUs are typically voting districts. Lastly, I show a variation of Table 6 that includes results for $fair_{merit}$ only, but with two additional estimations, where I alternately include interactions of governance with either unfair inequality (level and change) or income inequality (level and change). Results are robust to the checks.

Table D1: Correlates of beliefs about determinants of inequality, only transition countries
Equation 3 and Equation 4 probit coefficients

	Dep var: $fair_{merit}$		Dep var: $fair_{control}$	
	(1)	(2)	(3)	(4)
Δ Unfair Ineq. (2016-2010)	-2.230*** (0.765)	-2.933*** (0.862)	-1.408* (0.738)	-1.440 (0.954)
Unfair Inequality (2010)	-1.995*** (0.668)	-3.011*** (0.991)	-0.363 (0.586)	0.284 (1.048)
Δ Gini (2016-2010)	-1.416 (3.354)	2.404 (1.909)	-2.516 (2.169)	-2.125 (2.807)
Gini (2010)	0.478 (1.466)	2.644** (1.295)	0.829 (1.216)	1.479 (1.033)
Governance (2016)	-0.028 (0.195)	3.441*** (0.924)	0.200 (0.222)	3.696*** (1.104)
Δ Unfair Ineq. (2016-2010)*Governance (2016)		4.177* (2.305)		0.447 (2.033)
Unfair Inequality (2010)*Governance (2016)		2.302* (1.357)		1.255 (1.365)
Δ Gini (2016-2010)*Governance (2016)		-14.292** (5.878)		-3.658 (7.187)
Gini (2010)*Governance (2016)		-11.042*** (2.824)		-9.948*** (3.298)
Own economic success variables	Yes	Yes	Yes	Yes
Circumstance variables	Yes	Yes	Yes	Yes
Country controls for 2010 and 2016	Yes	Yes	Yes	Yes
Pseudo R-squared	0.068	0.075	0.033	0.036
N	17,729	17,729	17,458	17,458

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Table D2: Correlates of beliefs about determinants of inequality, men only
Equation 3 and Equation 4 probit coefficients

	Dep var: <i>fair_{merit}</i>		Dep var: <i>fair_{control}</i>	
	(1)	(2)	(3)	(4)
Δ Unfair Ineq. (2016-2010)	-1.371 (0.970)	-3.213*** (1.149)	-0.597 (0.613)	-1.151 (1.313)
Unfair Inequality (2010)	-1.014 (0.895)	-2.952*** (1.049)	0.049 (0.463)	-0.489 (1.221)
Δ Gini (2016-2010)	-2.465 (4.167)	2.255 (2.307)	-1.690 (2.334)	-0.753 (2.859)
Gini (2010)	-0.808 (1.477)	1.595 (1.393)	0.585 (1.357)	1.244 (1.555)
Governance (2016)	-0.025 (0.153)	3.351*** (0.457)	-0.021 (0.154)	1.292 (0.832)
Δ Unfair Ineq. (2016-2010)*Governance (2016)		2.929 (1.968)		0.874 (2.422)
Unfair Inequality (2010)*Governance (2016)		1.826 (1.512)		0.648 (2.099)
Δ Gini (2016-2010)*Governance (2016)		-14.725** (6.686)		0.690 (12.140)
Gini (2010)*Governance (2016)		-10.323*** (1.588)		-3.932 (2.797)
Own economic success variables	Yes	Yes	Yes	Yes
Circumstance variables	Yes	Yes	Yes	Yes
Country controls for 2010 and 2016	Yes	Yes	Yes	Yes
Pseudo R-squared	0.075	0.090	0.033	0.035
N	9,416	9,416	9,271	9,271

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Table D3: Correlates of beliefs about determinants of inequality, women only
Equation 3 and Equation 4 probit coefficients

	Dep var: <i>fair_{merit}</i>		Dep var: <i>fair_{control}</i>	
	(1)	(2)	(3)	(4)
Δ Unfair Ineq. (2016-2010)	-0.594 (0.940)	-2.515*** (0.670)	-0.756 (0.563)	-1.358 (1.105)
Unfair Inequality (2010)	-0.935 (0.783)	-2.873*** (0.785)	-0.277 (0.409)	-0.989 (0.948)
Δ Gini (2016-2010)	-0.718 (3.561)	2.501 (1.602)	-2.366 (2.006)	-2.175 (2.587)
Gini (2010)	0.332 (1.448)	2.797** (1.218)	-0.441 (1.271)	0.438 (1.426)
Governance (2016)	-0.136 (0.138)	2.014*** (0.419)	-0.138 (0.127)	0.627 (0.562)
Δ Unfair Ineq. (2016-2010)*Governance (2016)		3.443** (1.443)		1.553 (1.819)
Unfair Inequality (2010)*Governance (2016)		1.718 (1.119)		0.635 (1.541)
Δ Gini (2016-2010)*Governance (2016)		-15.471*** (4.959)		4.762 (9.099)
Gini (2010)*Governance (2016)		-6.900*** (1.159)		-2.275 (1.918)
Own economic success variables	Yes	Yes	Yes	Yes
Circumstance variables	Yes	Yes	Yes	Yes
Country controls for 2010 and 2016	Yes	Yes	Yes	Yes
Pseudo R-squared	0.073	0.084	0.027	0.028
N	11,408	11,408	11,193	11,193

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Table D4: Correlates of beliefs about determinants of inequality, PSU level
OLS regression - clustered SE

	Dep var: <i>fair_{merit}</i> PSU average		Dep var: <i>fair_{control}</i> PSU average	
	(1)	(2)	(3)	(4)
Δ Unfair Ineq. (2016-2010)	-0.288*** (0.097)	-0.773*** (0.180)	-0.152 (0.094)	-0.401** (0.194)
Unfair Inequality (2010)	-0.399*** (0.086)	-0.891*** (0.167)	-0.016 (0.090)	-0.315* (0.179)
Δ Gini (2016-2010)	-0.857* (0.498)	0.546 (0.550)	-1.127*** (0.436)	-0.813* (0.488)
Gini (2010)	0.107 (0.214)	0.778*** (0.263)	0.004 (0.192)	0.389 (0.239)
Governance (2016)	-0.034* (0.021)	0.402*** (0.110)	-0.042* (0.022)	0.189 (0.123)
Δ Unfair Ineq. (2016-2010)*Governance (2016)		0.538 (0.328)		0.547 (0.337)
Unfair Inequality (2010)*Governance (2016)		0.255 (0.247)		0.150 (0.278)
Δ Gini (2016-2010)*Governance (2016)		-7.285*** (1.607)		0.129 (1.602)
Gini (2010)*Governance (2016)		-1.384*** (0.349)		-0.650 (0.408)
Own economic success variables	Yes	Yes	Yes	Yes
Circumstance variables	Yes	Yes	Yes	Yes
Country controls for 2010 and 2016	Yes	Yes	Yes	Yes
N	2,090	2,090	2,089	2,089

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Table D5: Correlates of beliefs about determinants of inequality, robustness checks
probit coefficients

	Dep var: $fair_{merit}$			
	(1)	(2)	(3)	(4)
Δ Unfair Ineq. (2016-2010)	-0.967 (0.946)	-2.284*** (0.463)	-1.503*** (0.295)	-2.858*** (0.566)
Unfair Inequality (2010)	-0.988 (0.811)	-2.660*** (0.456)	-1.510*** (0.271)	-2.925*** (0.533)
Δ Gini (2016-2010)	-1.568 (3.777)	-0.453 (1.372)	2.936** (1.364)	2.291 (1.479)
Gini (2010)	-0.161 (1.432)	1.645** (0.693)	1.015 (0.619)	2.290*** (0.730)
Governance (2016)	-0.102 (0.140)	-0.149 (0.112)	2.351*** (0.327)	2.624*** (0.357)
Δ Unfair Ineq. (2016-2010)*Governance (2016)		3.341*** (0.683)		3.230*** (1.016)
Unfair Inequality (2010)*Governance (2016)		0.867* (0.507)		1.773** (0.793)
Δ Gini (2016-2010)*Governance (2016)			-23.907*** (3.075)	-15.064*** (4.519)
Gini (2010)*Governance (2016)			-7.137*** (0.894)	-8.519*** (1.160)
Own economic success variables	Yes	Yes	Yes	Yes
Circumstance variables	Yes	Yes	Yes	Yes
Country controls for 2010 and 2016	Yes	Yes	Yes	Yes
Pseudo R-squared	0.072	0.076	0.083	0.085
N	20,824	20,824	20,824	20,824

Notes: For comparison with the main results in the paper, column (1) shows results from Equation 3 and column (4) shows results from Equation 4. Standard errors are in parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

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