

## An Equity Theory of Predistribution

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**ABSTRACT:** Research on attitudes towards inequality suggests the possibility of a causal relationship whereby attitudes to inequality affect inequality levels and where levels of inequality affect attitudes to inequality. This paper extends research on epistemic beliefs and macro-level inequality with an empirical analysis of micro-level “Equity Beliefs” defined as value judgements as to the fairness of market outcomes, within the context of “predistribution” that Jacob Hacker defined as “the way in which the market distributes its rewards in the first place” (2011, p. 35).

An *Equity Theory of Predistribution* is posited and its predictions are investigated that, i. Equity Beliefs emerge from experiences of income inequality, ii. Equity Beliefs exert a redistributive effect on inequality, and iii) Equity Beliefs moderate disposable income inequality. Separate models are specified to test these propositions empirically at the country level, using data from the European Union spanning the period 1984 to 2018. The results support each of the propositions. Additionally, this study finds that Equity Beliefs exacerbate disposable income inequality via its interaction with corporate employment policy.

This research highlights the role of micro-level beliefs as an antecedent of resource allocations that shape macro-level inequality, and it informs government and corporate-level actors seeking to reduce inequality within and among countries, that progress on UN SDG no. 10 is contingent upon addressing societal notions of equity. In line with this conclusion, the study advocates for development of “equity targets” for employment income that could potentially be operationalized through their integration into a future ISO Equality Certification framework.

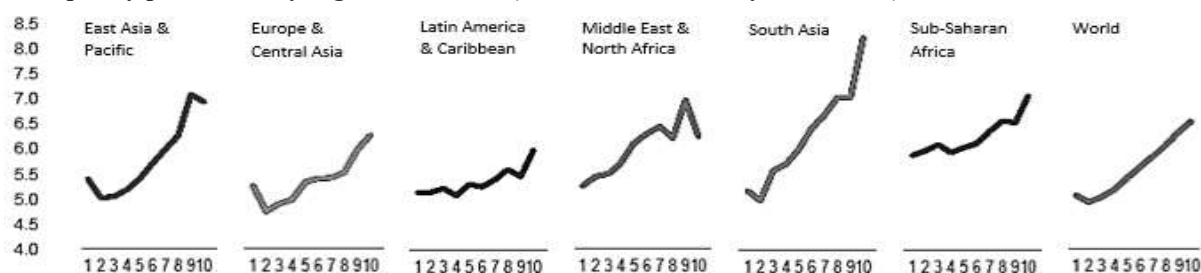
**KEYWORDS:** Income distribution, Epistemic beliefs, Behavioural Macroeconomics, Inequality, Welfare State

### 1 INTRODUCTION

Since 1980, income inequality has been rising globally and is expected to continue increasing (Atkinson, 2015; Morelli, Smeeding, & Thompson, 2015). Research links high inequality to slower economic growth, market inefficiencies, and weakened social cohesion (Cingano, 2014; de Chaumont, 2012; World Bank, 2005). The deleterious social effects of income inequality are well documented (Pickett, Gauhar, Wilkinson, & Sahni-Nicholas, 2024). Consequently, the United Nations Sustainable Development Goal 10 aims to reduce inequality within and among countries by 2030 (UN, 2021).

Aversion to inequality might therefore be expected to encourage mitigating policies. However, a World Bank report (Cruz, Foster, Quillin, & Schellekens, 2015) reveals that aversion to income inequality decreases with rising income level as shown in Figure 1.1.1, where on the left scale, preferences for more equality are indicated by 1 and preferences for larger income differences as incentives by 10 and income deciles are shown on the bottom scale. Where inequality aversion decreases moving up the scale on the left, the regional trends show that aversion to inequality consistently falls with rising income level<sup>1</sup>.

#### 1.1.1 Inequality preference by region and decile (World Values Survey, 2010-2014)



Source: Cruz et al. (2015)

<sup>1</sup> These results are collated from survey responses for wave 6 of the WVS and represent sixty countries over the period 2010 to 2014.

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The World Values Survey data aligns with theoretical and empirical evidence suggesting that individuals assess their well-being through interpersonal comparisons of their relative position in the income hierarchy (Basu, 1994; Brighouse & Swift, 2006, p. 490; Clark & D'Ambrosio, 2015; Mankiw & Taylor, 2017; Milanovic, 2004; Sen, 2000, p. 66). When people judge their personal well-being relative to peers rather than in absolute terms, the true impact of income inequality can be obscured, and since problems related to inequality have steep social gradients and are more common in the lower income deciles (Wilkinson & Pickett, 2009) the effects of inequality are unlikely to be fully appreciated by the better-off members of society.

The preferences of individuals for inequality and for redistribution may vary for a variety of reasons. Low-income individuals may endorse lower inequality due to an anticipated benefit to themselves from redistribution whereas high income individuals, in their own self-interest, may be more accepting of higher levels of inequality (Alesina & Giuliano, 2011) and oppose redistribution (Andreß & Heien, 2001; Blekesaune, 2007; Rehm, 2009). Attitudes towards inequality may also stem from an aversion to inequality or be based on beliefs about fairness that may vary according to the individual's relative position (Senik, 2009). Self-interest theories therefore predict that rising inequality may either be viewed as acceptable or lead to discontent subject to the relative position of individuals (Medgyesi, 2013). Socioeconomic differences, therefore, may differentially affect policies that affect economic inequality and may weaken the political will to address it. Furthermore, if rising inequality is considered a just outcome of free market processes, beliefs about the equitability of market outcomes may support rising inequality.

This is suggested by a strong, near-perfect correlation between rising levels of inequality and meritocratic beliefs<sup>2</sup>, as observed in the United Kingdom since the late 1970s by (Mijs & Savage, 2020). This phenomenon is not unique to the United Kingdom. Mijs (2021) reports that as income inequality rose between 1987 and 2012, at least two-thirds of citizens in twenty-three Western countries have become more convinced that the rising inequality is merited. This finding is supported by the research others (Bucca, 2016; Duru-Bellat & Tenret, 2012; McCall, 2013; Paskov & Dewilde, 2012)<sup>3</sup>, which suggests this may be a universal response to rising inequality. Alternatively, it could suggest that because market outcomes are considered equitable, rising income inequality is partly due to micro-level beliefs supporting policies that facilitate it.

The existing literature on inequality and beliefs has largely neglected the possibility of beliefs as a factor contributing to the rise in inequality. Indeed, a review by Janmaat (2013) concludes research would benefit by demonstrating that “views on inequality have an effect on social outcomes complementary to that of objective inequalities” (Janmaat, 2013, p. 357). The current paper answers this call with an empirical study of the relationship between beliefs and inequality, in the context of “predistribution”, that Jacob Hacker defined as “the way in which the market distributes its rewards in the first place” (2011, p. 35). The results indicate a significant relationship between levels of macroeconomic inequality among EU countries over the past four decades and beliefs about the fairness of market outcomes. This study finds that such beliefs influence policy decisions and contribute to greater disposable income inequality through corporate policies that affect employment.

In Section 2 of this paper, previous studies that have analysed the relationship between beliefs and inequality are reviewed. These studies have found either find no relationship (Hadler, 2005), a positive relationship where aversion to inequality rises as inequality rises (Kerr, 2014; Lübker, 2004, 2007; Medgyesi, 2013; Suhrcke, 2001) or an acceptance of rising levels of inequality (Kenworthy & McCall, 2008). Others have found preferences for inequality to coincide with inequality levels (Andersen & Yaish, 2012; Murthi & Tiongson, 2009) or that rising inequality is accepted on the basis of differences between worker skillsets (Kerr, 2014). This section also reviews Equity Theory (Adams, 1963, 1965; Adams & Freedman, 1976; Leventhal, 1976) in relation to differential beliefs among firm stakeholders in relation to resource allocations.

Section 3 outlines the data and methodology, introduces an analytical framework for predistribution, and proposes an *Equity Theory of Predistribution* to guide the investigation of the research hypotheses. Section 4 presents the analysis results, while Section 5 discusses the main findings. Section 6 concludes that Equity Beliefs significantly contribute to rising disposable income inequality by legitimizing employment practices that exacerbate it. The main implication of this finding is that, in rules-based economies, efforts to curb inequality would require policy frameworks grounded in principles of equitability that challenge prevailing societal beliefs. The section also offers the author's suggestions for future research directions.

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<sup>2</sup> Meritocratic beliefs is defined as the view that “success is determined by hard work”.

<sup>3</sup> Bucca (2016) found in seven Latin-American countries that people are more likely to believe that wealth and poverty are due to individual merits or faults rather than structural constraints. In a study of twenty-six countries, Duru-Bellat and Tenret (2012) found that perceptions of a prevailing meritocracy (the view that effort and skills are what determines rewards) and convictions that meritocratic beliefs (the view that one's income ought to be determined by education and training) are most prevalent in societies with high levels of inequality. McCall (2013) found that concern over rising inequality in recent decades increased in the United States but support for social insurance policies remained low. McCall (2013) ascribes this result to meritocratic beliefs centered on expanding equal opportunities and earnings redistribution in the workplace. Paskov and Dewilde (2012) studied twenty-six European countries and found that welfare-sentiment in both low- and high-income households is lower in more unequal countries.

### 2 PREVIOUS LITERATURE

The theoretical interaction between self-interest and rising inequality has been studied empirically by several methods using survey data of either inequality aversion or of personal preferences for income inequality.

#### 2.1 Related empirical studies

Kenworthy and McCall (2008) analysed time trends of market income inequality and inequality aversion using ISSP data for eight countries (USA, UK, Australia, Canada, Italy, Germany, Sweden and Norway). They found that in the mid-1980 to mid-1990 period, Americans perceived income differences in the United States as “too large” but that later, even whilst inequality continued to rise, public perceptions of income differences being “too large” decreased.<sup>4</sup>

Several cross-sectional country-level studies have found higher income inequalities to be associated with beliefs that inequalities are too large. Lübker (2004) analysed inequality trends and perceptions of inequality in twenty-four countries for 1987, 1992 and 1999<sup>5</sup> and separately, Lübker (2007) analysed ‘evaluations of inequality’ in 1999 via OLS regression using dummy variables for social justice norms of groups of twenty-six countries. Suhreke (2001) analysed attitudes to inequality and redistribution using 1999 ISSP data for twenty-three countries to investigate the effect of the transition from socialism to capitalism<sup>6</sup>.

By contrast, Hadler (2005) found no significant effect of inequality levels on opinions over the level of inequality using a multi-level logistic regression model that included controls for country differences of Gross National Product at purchasing power parity, dominant religion and ideology for thirty countries using 1999 ISSP data.

Murthi and Tiongsong (2009), using WVS data, analysed changes to inequality preferences over 1990-2001 and found lower inequality levels in Central and Eastern European countries to be associated with greater preferences for *equality*. The authors conclude that greater aversion to inequality in Central and Eastern European countries led to stronger support for redistribution and consequently to lower inequality vis-à-vis post-Soviet countries. Their study employed a Probit model specified to explain equality preference as a function of individual and country-level characteristics, using dummy variables for each country and for country groups. Similarly, Andersen and Yaish (2012) found a close association between a high desired level of inequality and higher levels of inequality in twenty capitalist countries over 1992-1999 using ISSP data. Their analysis controlled for individual-level characteristics such as occupational class, and country-level characteristics including GDP.

Using a combination of ISSP and WVS data, Kerr (2014) found a higher concern over inequality in societies in which income inequality was rising but simultaneously, a higher acceptance of rising income differentials between workers of different skillsets. Medgyesi (2013), measured intertemporal variation of attitudes to inequality using WVS data over the period 1990-2010 via multi-level analysis and country fixed effects models, and found that discontent with inequality rises along with rising inequality at household level.

#### 2.2 Equity and resource allocations

Equity Theory as proposed by Stacy Adams (1963, 1965) suggests that the allocation of rewards and resources in social exchanges will be in proportion to the perceived usefulness of individuals’ actions (Leventhal, 1976). Social systems typically favour allocation norms other than equity (or merit) alone. Such norms may be equality, reciprocity, the fulfilment of needs where they arise, or the fulfilment of commitments. Leventhal (1976) discusses the importance of norms in value allocation decisions and concludes that an allocator will follow an equity norm where he/she believes that the distribution of rewards and resources will maximise individual productivity and group performance over the long term. An allocator who wishes to preserve harmony may otherwise adopt an equality norm and distribute rewards more evenly. The choice of which norm to follow stems from an attempt to be fair and just, and also to gain the benefits of any particular norm for the allocator themselves and other members of the system.

Whilst equity theory has the capacity to explain a broad spectrum of social behaviour (Adams & Freedman, 1976) and predicts that equitable allocations will foster high productivity over the long run, there are important differences in allocation decisions between individuals and those of groups (Burnstein & Katz, 1972). Group-level allocation norms that are implemented for instrumental reasons and are deemed equitable at group level may then not constitute an equitable allocation at individual level. Hence, an allocator may over-reward a specific stakeholder (i.e. CEOs) at the expense of other recipients to elicit better group performance (Leventhal, 1976).

Thus, where Sjöberg (2008) argues the Anglo-American model of corporate governance induces managers to prioritise shareholder interests over employee interests, an alternative view is that a group level allocation norm is maintained in order to retain ownership control over corporate interests such as long-term productivity. By contrast, where the European model of governance is described

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<sup>4</sup> The focus of Kenworthy and McCall’s study is the median voter theorem. Their findings in regards to levels of income inequality and perceptions of whether income inequality is too high are nevertheless relevant here.

<sup>5</sup> see Table 3 in Lübker (2004, p. 107)

<sup>6</sup> Suhreke’s logistic regression methodology employed dummy variables for groups of countries representing those that underwent a transition from socialist command economies to capitalism and western countries, and included controls such as socio-economic position, personal mobility experience, individual and household characteristics and proxies for individual ideology.

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as fostering a greater awareness of labour interests (Sjöberg, 2008, p. 524), this may instead be characterised as a group level equity norm proceeding from “country-specific economic interests and socialisation experiences” (Andreß & Heien, 2001, p. 337).

### 2.3 Predistribution and Equity Beliefs

Predistribution is optimistically viewed as a remedy to the contested politics of the redistributive state (Pierson, 2016) and predistributive policy as “market reforms that encourage a more equal distribution of economic power and rewards even before government collects taxes or pays out benefits” (Hacker, 2011, p. 35). Achieving this entails “rewriting the rules to make markets competitive, fix finance, incentivize growth, rebalance tax and transfers, boost employment, empower workers, and expand economic security and access to labour markets.” (Eynon, 2016, p. 12). As such, predistribution is conceptualised as an economic process that is relevant to macro-level inequality. In the present paper, predistribution is depicted as a process in which an individual’s disposable income is an outcome of their market income and redistribution. Market income refers to pre-taxes and transfers income from all sources (i.e. income from investments, property rental, earnings on interest, employment income, self-employment income and pension payments). Disposable income refers to post-taxes and transfers income excluding consumption taxes and public benefits and redistribution is the difference between market income and disposable income. Aggregating the individuals in a population allows predistribution to be presented as a process that gives rise to disposable income inequality as shown in Figure 2.3.1.

#### 2.3.1 The Macro-level Process of Predistribution



Source: Author

The reviewed literature suggests the possibility of a causal relationship between Equity Beliefs — defined in this study as *value judgments about the fairness of market outcomes* — and inequality. Equity Beliefs may differ according to personal preferences for income inequality, by socioeconomic status and by organisational role. Policymakers who balance the interests of multiple stakeholders will have values that are sensitive to the public interest, whilst those of firm managers are balanced by shareholders’ and employees’ power resources (Korpi, 2006). Experimental research shows that belief in a just economic system reduces sensitivity to inequality, thereby undermining collective motivation for redistributive action (Goudarzi, Pliskin, Jost, & Knowles, 2020). As a result, beliefs that normalize or justify inequality may contribute to its persistence, regardless of individuals’ stated preferences. Hence, even if individuals express aversion to income inequality, a belief in the pre-eminence of productivity as the objective of policy can lead to rising macro-level inequality. Equity Beliefs are thus expected to affect income inequality through their influence on the policies of government and organisations.

The influence of beliefs on policy is evident in studies of the United States: Fong (2001) found that beliefs about equity significantly affected support for redistribution, while Kerr (2014) observed that public support for welfare spending in four U.S. regions increased alongside rising inequality between 1970 and 2000.

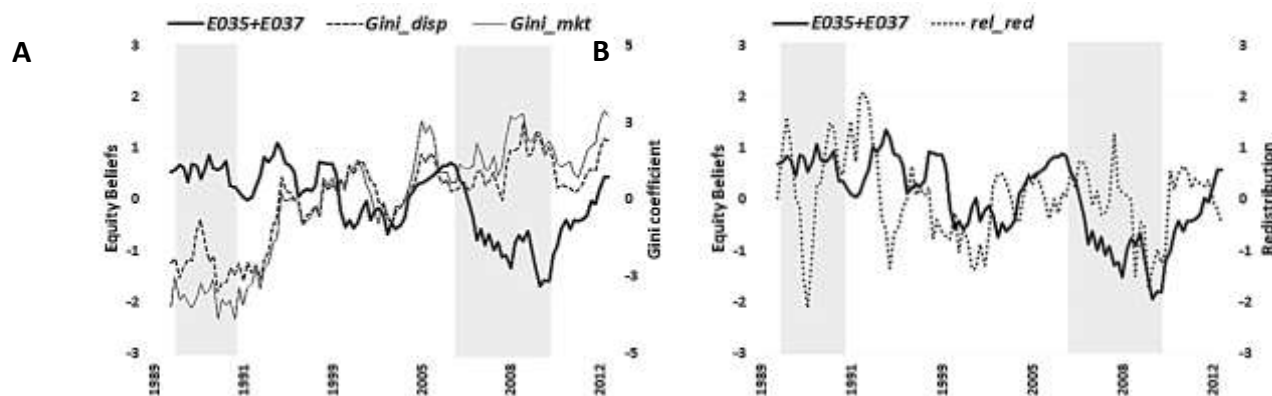
A similar dynamic is visible in the trends for inequality in the European Union over 1989 to 2013. EU membership requires democratic governance, that members have functioning market economies and that EU rules and regulations are adopted as national law. All member states are party to an Economic and Monetary Union that forms the world’s largest free trade bloc and twenty members use a common currency<sup>7</sup>. EU welfare states are therefore broadly similar both economically and socially, in terms of employment regulation and social protections.

Figure 2.3.2 shows household level trends for the Gini coefficient of pre-taxes and transfers, or market income inequality (*Gini\_mkt*), post taxes and transfers, or disposable income inequality (*Gini\_disp*) and government redistribution (*rel\_red*). The variable (*E035 + E037*) is taken to represent micro-level views on the equitability of market outcomes, or “Equity Beliefs” in the EU. The trend data is demeaned so that zero on the vertical axes indicates country-level averages.

<sup>7</sup> Source: [https://european-union.europa.eu/index\\_en](https://european-union.europa.eu/index_en)

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### 2.3.2 Social policy and inequality in the European Union



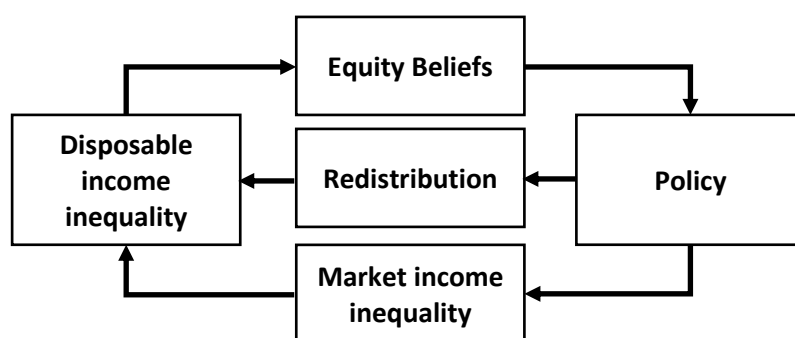
Source: Author-generated using data described in Section 3.

Low values of Equity Beliefs indicate preferences for more *equality* and for more government intervention to reduce inequality and high values indicate preferences for more *inequality* and less government intervention to reduce inequality. Thus, low values of Equity Beliefs are interpreted as perceived inequity of market outcomes and high values are interpreted as perceived equity of market outcomes. Accordingly, upward movements of Equity Beliefs are in response to current market outcomes being perceived as equitable and downward movements are in response to perceived inequity.

Between 1989 and 2013, both market income inequality and disposable income inequality increased but there is little evidence of a correlation between these trends and Equity Beliefs. The figure highlights two major recessions: the global recession of 1991, which between 1990 to 1995 coincided with financial and exchange rate crises in Europe (Kose, Sugawara, & Terrones, 2020), and the 2008 financial crisis. During the 2008 recession, European governments undertook large-scale interventions to prevent the collapse of banking institutions and financial systems, resulting in sharp increases in public debt (Montani, 2011). A notable pattern emerges during this period: as inequality rises, Equity Beliefs fall alongside a reduction in redistribution. This suggests that the recession was perceived as a period of inequity, with perceptions of fairness gradually recovering in the post-recession period.

These trends point to a possible relationship between Equity Beliefs and the process of predistribution, in which disposable income inequality is the result of changes to market income inequality and redistribution that are associated with Equity Beliefs. This proposition is illustrated in Figure 2.3.3 and forms the basis for empirically testable hypotheses about the relationship between micro-level beliefs and macro-level income inequality, as outlined below.

### 2.3.3 Equity Beliefs and the Process of Predistribution



Source: Author

**Hypothesis 1:** *Equity Beliefs emerge from experiences of income inequality.*

The effect of past inequality on beliefs is implicit in country-level studies that found inequality aversion rose in response to rising inequality (Kerr, 2014; Lübker, 2004, 2007; McCall, 2013; Medgyesi, 2013; Suhrcke, 2001). Additionally, Andersen and Yaish (2012) found that experiences of economic inequality had an enduring effect on attitudes to income inequality in 20 advanced capitalist democracies between 1992 and 1999.

**Hypothesis 2:** *Equity Beliefs exert a predistributive effect on inequality.*

The predistributive effect of beliefs on inequality is suggested where Kenworthy and McCall (2008) observed that concern over inequality in the United States initially rose with increasing inequality, but that a subsequent decline in aversion to inequality occurred alongside continued rises in inequality. Similarly, (Kerr, 2014) found rising inequality was accepted on the basis of differences between worker skillsets.



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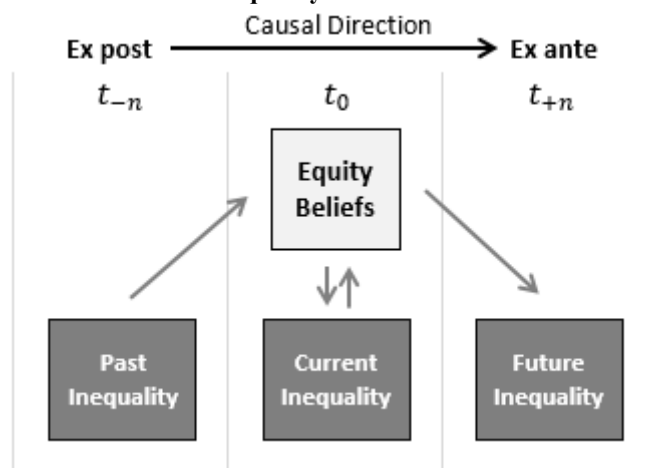
### Hypothesis 3: *Equity Beliefs moderate disposable income inequality.*

The moderating effect of beliefs on disposable income inequality is suggested where preferences for more *equality* were associated with lower measured inequality (Murthi & Tiongson, 2009), and where preferences for inequality align with country levels of inequality (Andersen & Yaish, 2012). Separately, Schmidt (2012) noted a “saturation effect” in European countries, where increasing social spending led to less demand for redistribution after a certain level was reached.

## 3 METHOD AND DATA

In the analysis and interpretation of time series data, “the past can affect the future, but not vice versa” Wooldridge (2016, p. 32). Accordingly, if Equity Beliefs and inequality are in a causal relationship, Figure 3.1.1 illustrates the direction of causality, where  $t_n$  represents the year of a given observation.

### 3.1.1 The causal relationship between beliefs and inequality



Source: Author

The effect size of a regression parameter constitutes a *ceteris paribus* index of the magnitude and direction of a relationship between multiple predictor variables controlling for the influence of other variables in the model (Aloe & Thompson, 2013). Because the partial effect size of one variable influences the size of another effect, changing the time period of one of the variables allows the relationship between two variables over time to be analysed in a bivariate correlation analysis of their effect sizes.

The theoretical relationship between Equity Beliefs and inequality is thus modelled by regressing  $t_0$  (i.e., “time zero”) observations of Equity Beliefs, along with observations of inequality and policy that in separate regressions are systematically varied through periods  $t_{-5}$  to  $t_{+5}$  in relation to the Equity Beliefs variables at  $t_0$ . By holding the Equity Beliefs variables constant in each regression, these function as a “ $t_0$  equity benchmark” that facilitates causal interpretation of the relationship between Equity Beliefs and inequality over time. Subsequently, the relative magnitudes of the regression parameters are correlated using Spearman’s rank correlation coefficient.<sup>8</sup> The correlations are performed separately for the ex post and ex ante estimates and compared. A statistically significant correlation would suggest a relationship between the variables as their relative effects converge on, or diverge away from  $t_0$ . A statistically significant convergence on  $t_0$  would indicate an influence of past inequality on Equity Beliefs and a divergence, that Equity Beliefs influences future inequality. This method of analysis avoids the difficulty in determining the timing of the effect of explanatory variables in time series regression that Förster and Tóth (2015) has found could obscure long-running relationships in inequality analyses.

## 3.2 Data

The data comprise a longitudinal time series constructed from independently pooled cross-sections that covers twenty-eight European Union (EU) countries from 1984 to 2018. Table 5.1.1 in the appendix lists the variables discussed here, along with their descriptive statistics and the bivariate correlations for  $t_0$ .

### 3.2.1 Income inequality variables

For this study, a summary index of inequality for the whole population is used at both household level and individual level to investigate the relationship between Equity Beliefs and inequality. The Gini coefficient is one such measure that scales from zero to one, where zero represents complete equality and one, complete inequality. Household level Gini coefficient data is sourced from

<sup>8</sup> Pearson’s product-moment correlation coefficient (Pearson’s  $r$ ) assumes that the data are normally distributed, but this assumption may not hold for the paired observations. Therefore, Spearman’s rank correlation coefficient, a non-parametric alternative to Pearson’s  $r$  (Myers et al., 2010) is used for all correlation analyses.

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the Standardised World Income Inequality Database (SWIID), which uses the Luxembourg Income Study as the standard for equivalized (square root scale) household income that is obtained from harmonised microdata on labour income, capital income and a variety of other variables (Solt, 2016, 2019). Individual level Gini coefficient data is sourced from the World Inequality Database (WID.world, 2024). The WID collates income data from multiple sources including national accounts, survey data, fiscal data, and wealth rankings that is split equally among household members over twenty years of age. Inequality measures are obtained using generalized Pareto interpolation that provides more accurate estimates for the top half of the distribution than other commonly used techniques (Blanchet, Fournier, & Piketty, 2022).

### 3.2.2 Equity Beliefs variables

The beliefs data used in this study are social survey microdata aggregates for countries of the European Union<sup>9</sup>. The Equity Beliefs variables are sourced from the World Values Survey (WVS) and European Values Survey (EVS). The variable coded *E035* represents micro-level preferences for equality versus incentives (or rewards), and *E037* represents views on whether government should intervene to reduce levels of inequality or if individuals' socioeconomic position is their personal responsibility. Both variables scale from one to ten and their sum is deemed a close approximation of micro-level views on the equitability of market outcomes. Country-level Equity Beliefs data are calculated using robust measures of central tendency—Huber's M-estimator and Tukey's biweight—and treated as continuous variables. Survey respondents who report on their socioeconomic position in the distribution of income allows observations to be separated by income terciles. This furnishes robust estimators for the top, middle and bottom of the distribution. Further details of the survey micro-data response rates, and descriptive statistics are provided in the appendix.

### 3.2.3 Control variables

Control variables for country level capital and labour market conditions are used in all regressions to remove their effect from the error term. In the moderation analysis, these serve as proxies for national policy dimensions: economic policy (*EFI*), property rights (*EFI\_b*), monetary control (*EFI\_c*) and international trade (*EFI\_d*). The variables *irr*, *labsh* and *emp* are treated as indicators of corporate policy.

## 3.3 Estimation method

Feasible Generalised Least Squares (FGLS) is typically used to correct for serial autocorrelation in the error terms. However, since the data consist of independently pooled cross-sections, serial correlation across observations is not a concern. Consequently, given that FGLS is biased, Ordinary Least Squares (OLS) is employed as it remains the best linear unbiased estimator. To address residual heteroskedasticity and autocorrelation, Newey-West HAC standard errors are used. This may reduce the statistical significance of some estimates (Wooldridge, 2016). Zero-order (bivariate) correlations are shown in the Appendix and confirm the absence of perfect collinearity among the regressors.

Controlling for country-specific, time-invariant fixed effects (FE) helps mitigate omitted variable bias. However, FE estimators may be overly conservative by ignoring cross-country variation in unobserved, time-constant factors (Förster & Tóth, 2015). As an alternative, random effects (RE) estimators assume such unobserved heterogeneity is uncorrelated with the explanatory variables (Alderson & Nielsen, 2002; Nielsen & Alderson, 1995). To assess the efficiency of a RE estimator for the data of this study, a Hausman (1978) specification test was conducted. The test results indicated that the FE estimator is more suitable. Consequently, all regressions are estimated using FE by applying OLS to time-demeaned data. An Augmented Dickey-Fuller test of the core variables and policy variables confirms that the data follows a stationary, weakly dependent time series process. This negates the requirement of first differencing, and a detrending variable is included in all regressions to circumvent a spurious regression problem (Wooldridge, 2016). All models include control variables, country and time dummy variables. Statistical outliers are identified via studentised residuals that exceed 2.5 standard deviations, and their influence is controlled for via an outlier dummy variable. To reduce the standard error of regression and increase the precision of the estimates, the regression data is transformed with a natural logarithm, which is done prior to demeaning. In models that contain interaction terms, the original variables are first interacted before they are transformed and demeaned.

## 3.4 Models

Each hypothesis test is evaluated using a separate model. For hypotheses 1 and 2, the models include observations from two time periods,  $t = 0$  and  $t = n$ . Hence, the regression estimates capture cumulative effects that reflect the average impact over the two periods. This modelling strategy increases the number of observations per regression, enhances the degrees of freedom, and improves the precision of the estimates, and in the correlation analyses it facilitates a convergence or divergence of the paired observations from  $t_0$ .

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<sup>9</sup> The United Kingdom exited the European Union on 31 January 2020 and is included in this analysis.

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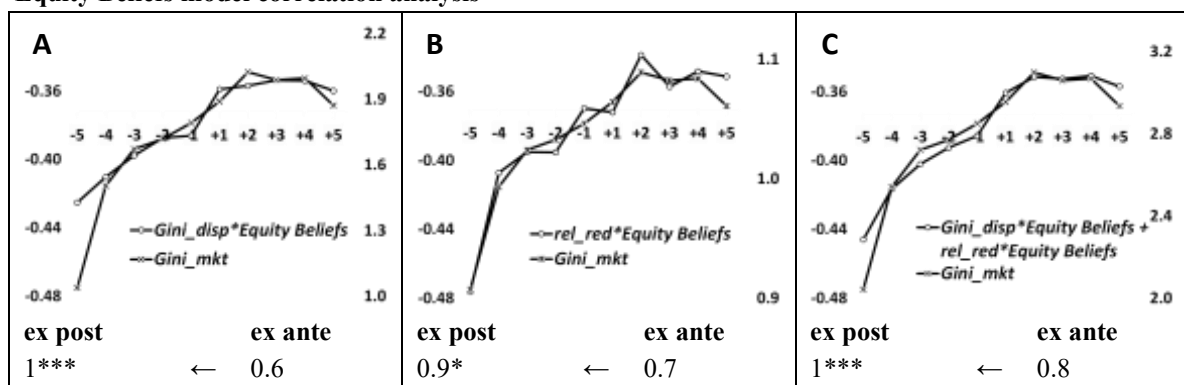
### Hypothesis 1: Equity Beliefs emerge from experiences of income inequality.

A model is specified using Equity Beliefs as the dependent variable to assess how disposable income inequality and redistribution interact with Equity Beliefs over time. Its specification is provided in the appendix. The model pools observations from two time periods: a baseline observation at  $t = 0$ , and a second observation  $t = n$ , where,  $n \in \{-5, \dots, -1, 1, \dots, 5\}$  and  $n \neq 0$ . In both cases, the period of Equity Beliefs remains fixed at  $t = 0$ , while the independent variables vary over time. A single coefficient is estimated for each interaction term, which captures the average marginal effect of inequality or redistribution when interacted with Equity Beliefs at  $t = 0$ . The parameter estimates are thus in relation to a theoretical  $t_0$  equity benchmark. The model is specified as:

$$\text{EquityBeliefs}_{it0} = \hat{\beta}_1 \text{Gini\_disp}_{itn} \times \text{EquityBeliefs}_{it0} + \hat{\beta}_2 \text{rel\_red}_{itn} \times \text{EquityBeliefs}_{it0} + \hat{\beta}_3 \text{Gini\_mkt}_{itn} + \hat{\beta}_k X_{ikt0n}$$

Ten separate regressions are estimated and a correlation analysis is performed of the regression coefficients to compare the paired observations' relationship in the ex post and ex ante periods<sup>10</sup>. The intertemporal correlation analysis is shown for the  $t_0$  equity benchmark, *Huber\_a*, in Figure 3.4.1 to illustrate the movements of the paired observations. Panel A shows the correlation of  $\hat{\beta}_3$  with the relative effect of  $\hat{\beta}_1$ , Panel B the correlation of  $\hat{\beta}_3$  with the relative effect of  $\hat{\beta}_2$ , and Panel C the correlation of  $\hat{\beta}_3$  with the sum of the relative effects of  $\hat{\beta}_1$  and  $\hat{\beta}_2$ . The regression data is provided in Table 5.4.2 of the appendix.

#### 3.4.1 Equity Beliefs model correlation analysis



\*\*\*p<0.001 | \*\*p<0.01 | \*p<0.05 | †p<0.10

The correlations show a stronger correlation in the ex post period for all paired observations, which is interpreted as a convergence on the  $t_0$  equity benchmark and a confirmation that Equity Beliefs emerge from previous levels of inequality, or are shaped by experiences of income inequality.

### Hypothesis 2: Equity Beliefs exert a predistributive effect on inequality.

A model representing the process of predistribution is specified with disposable income inequality as the dependent variable to estimate the effects of market inequality, redistribution, and Equity Beliefs over time. The full specification is provided in the appendix.

As before, the model pools observations from two time periods: a baseline observation at  $t = 0$ , and a second observation  $t = n$ , where,  $n \in \{-5, \dots, -1, 1, \dots, 5\}$  and  $n \neq 0$ . In both cases, the period of Equity Beliefs remains fixed at  $t = 0$ , while the independent variables vary over time. A single coefficient is estimated for each regressor that captures the average marginal effect of market income inequality, redistribution and Equity Beliefs at  $t = 0$ . The parameter estimates are thus in relation to a theoretical  $t_0$  equity benchmark. The model is specified as:

$$\text{Gini\_disp}_{itn} = \hat{\beta}_1 \text{Gini\_mkt}_{itn} + \hat{\beta}_2 \text{rel\_red}_{itn} + \hat{\beta}_3 \text{EquityBeliefs}_{it0} + \hat{\beta}_k X_{ikt0n}$$

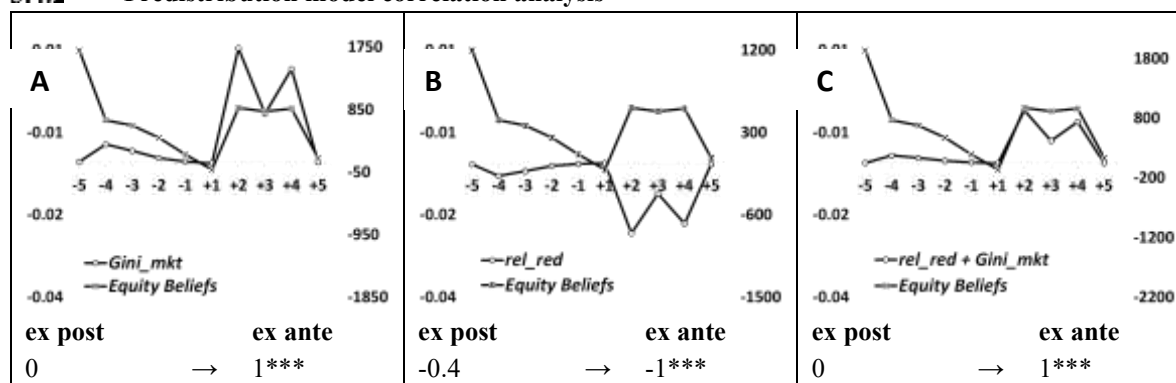
Ten separate regressions are estimated and the magnitudes of  $\hat{\beta}_1$  and  $\hat{\beta}_2$  relative to  $\hat{\beta}_3$  are correlated to compare the relationship of paired observations in the ex post and ex ante periods. This analysis is shown for the  $t_0$  equity benchmark, *Huber\_a* in Figure 3.4.2 to illustrate the movements of the paired observations. Panel A shows the correlation of  $\hat{\beta}_3$  with the relative effect of  $\hat{\beta}_1$ , Panel B the correlation of  $\hat{\beta}_3$  with the relative effect of  $\hat{\beta}_2$ , and Panel C the correlation of  $\hat{\beta}_3$  with the sum of the relative effects of  $\hat{\beta}_1$  and  $\hat{\beta}_2$ . The regression data are provided in Table 5.4.3 of the appendix.

<sup>10</sup> This correlates measurements of the interaction term parameters against a unity, or constant value of the parameter for market income inequality. The Oxford English Dictionary defines unity as: "A quantity, magnitude, or substance regarded as equivalent to the number one in calculation, measurement, or comparison".



## An Equity Theory of Predistribution

### 3.4.2 Predistribution model correlation analysis



\*\*\*p<0.001 | \*\*p<0.01 | \*p<0.05 | †p<0.10

These correlations show a stronger correlation in the ex ante period for all paired observations, which is interpreted as a divergence from the  $t_0$  equity benchmark and a confirmation that Equity Beliefs exert a redistributive effect on inequality.

#### Hypothesis 3: *Equity Beliefs moderate disposable income inequality.*

Two separate models are specified using disposable income inequality as the dependent variable. The observations of  $t = +1$  to  $t = +5$  are pooled whilst the period of Equity Beliefs is fixed at  $t = 0$ . Hence, the regression estimates capture cumulative effects that reflect the average estimate over four periods in relation to a theoretical  $t_0$  equity benchmark. The models are specified as:

Model A:  $Gini\_disp_{itn} = Gini\_mkt_{itn} + rel\_red_{itn} + \beta_1 policy_{itn} + \beta_k X_{ikt n}$

Model B:  $Gini\_disp_{itn} = policy_{itn} + Equity\_Beliefs_{it0} + \beta_2 (policy_{itn} \times Equity\_Beliefs_{it0}) + \beta_k X_{ikt n}$

In Model A, the policy variable is analysed alongside market income inequality and redistribution. In Model B, market income inequality and redistribution are excluded because these variables contain the influence of Equity Beliefs on resource allocation in future periods ( $t_n$ ), which makes Equity Beliefs' interaction with policy irrelevant in a regression that includes market income inequality and redistribution as regressors.

Model A estimates a *policy effect*, and Model B an *interaction effect* that measures the impact of Equity Beliefs on policy. The product of these parameters represents the proportion of the dependent variable's variance explained by a change of one standard deviation of their joint effect<sup>11</sup>, which is referred to here as the *equity effect*. The sum of the *policy effect* and the *equity effect* is the *residual policy effect* that measures policy effectiveness whilst accounting for the influence of Equity Beliefs. Policy effect + Equity effect = Residual policy effect

Policy effects and equity effects are interpreted on the basis that  $t_0$  equity benchmarks precede contemporaneous policy and inequality variables in periods  $t_n$ . Policy effects may either increase or decrease disposable income inequality and equity effects may strengthen, weaken or negate policy effects (Andersson, Cuervo-Cazurra, & Nielsen, 2014). To illustrate how these effects are calculated, Table 3.4.3 shows that Equity Beliefs produces a residual policy effect (denoted  $\beta'$  Policy) that is significantly weaker than the policy alone ( $\Delta\% = 86.96$ ).

### 3.4.3 Computing Equity effects, $\beta'$ policy effects and $\Delta\beta$ Policy effects

Point estimates	$\beta$	SE	T-stat	p-value	Notes:
Policy effect	.025	.006	4.173	.00004	Model A coefficient for <i>EFI_c</i>
Interaction effect	-.13	.041	-3.211	.00142	Model B coefficient for <i>Huber_a*EFI_c</i>
Equity effect	-.003	.001	-2.592	.00985	Policy effect*Interaction effect
$\beta'$ Policy =	.022				$\beta$ Policy effect + $\beta$ Equity effect
$\Delta \beta$ Policy (%) =	86.96				$ \beta' \text{Policy}  /  \beta \text{Policy effect}  * 100$

The interaction effect indicates that Equity Beliefs moderates disposable income inequality significantly ( $p < 0.01$ ). The sign of the interaction effect is negative and opposed to the policy effect so that Equity Beliefs attenuates the policy effect by  $100\% - 86.96\% = 13.04\%$ .

<sup>11</sup> Goodman's (1960) calculation of unbiased standard errors of product terms is used to obtain Wald statistics and p-values of the joint effect. The standard error of the joint effect is obtained via a parametric test that requires the policy effect, interaction effect and equity effect to be normally distributed. For this reason, a Shapiro-Wilk test for non-normality of these parameters is performed. Where evidence of non-normality is found, this is indicated in the results.

## An Equity Theory of Predistribution

Statistically significant interaction effects confirm the proposition that Equity Beliefs moderate disposable income inequality. Where a statistically significant interaction effect is negative/positive in sign, a  $t_0$  equity benchmark decreases/increases disposable income inequality. A policy effect and interaction effect that are both statistically significant and are opposite in sign implies that a  $t_0$  equity benchmark is in opposition to the policy effect. Where the magnitude of a policy effect is smaller than that of a significant interaction effect, this would suggest that Equity Beliefs dominates the policy effect to bring resource allocations into alignment with a  $t_0$  equity benchmark.

### 4 RESULTS

For the analysis of hypothesis 1 and 2, the household level datasets contain 200 observations representing twenty-six countries. The individual level datasets contain 188 observations representing twenty-three countries. Both levels span the period 1984 to 2018. Huber's M-estimator is used in the analysis of hypotheses 1 and 2 and the results are compared across the top, middle, and bottom segments of the distribution. The robustness of the findings is checked by repeating the analysis using Tukey's biweight estimator, and it is conducted at both household and individual levels of inequality. Due to space constraints, regression outputs are not included but are available from the corresponding author upon request. The regressions and correlation analyses were performed with Microsoft Excel 2016 using the Real Statistics Resource Pack (Release 8.7) Copyright (2013 – 2023) Charles Zaiontz. [www.real-statistics.com](http://www.real-statistics.com).

#### 4.1 Hypothesis 1 – Equity Beliefs emerge from experiences of income inequality

Together with country and time dummy variables, the control variables used in these regressions are *irr*, *emp*, *labsh*, *EFI\_a*, *rgdnpnc* and *t*. Table 4.1.1 presents the correlation between  $\hat{\beta}_3 Gini\_mkt_{itn}$  and the relative effect of  $\hat{\beta}_1 (Gini\_disp_{itn} \times Equity\_Beliefs_{it0})$ , as well as the correlation between  $\hat{\beta}_3 Gini\_mkt_{itn}$  and the relative effect of  $\hat{\beta}_2 (rel\_red_{itn} \times Equity\_Beliefs_{it0})$ . The combined relative effects of  $\hat{\beta}_1$  and  $\hat{\beta}_2$  are also correlated with  $\hat{\beta}_3$  and reported in a separate column labelled "Market Outcomes".

The  $t_0$  equity benchmarks are shown on the left. The arrows indicate whether the strength of a correlation is stronger in the ex post period ( $\leftarrow$ ), the ex ante period ( $\rightarrow$ ), or of equal strength in each period ( $\equiv$ ).

##### 4.1.1 Equity Beliefs model intertemporal correlation analysis results

Equity benchmark	Household Level						Individual Level					
	Disposable income		Redistribution		Market Outcomes		Disposable income		Redistribution		Market Outcomes	
	ex post	ex ante	ex post	ex ante	ex post	ex ante	ex post	ex ante	ex post	ex ante	ex post	ex ante
Huber_a	1***	$\leftarrow$ 0.6	0.9*	$\leftarrow$ 0.7	1***	$\leftarrow$ 0.8	0.9*	$\leftarrow$ 0.8	0.7	$\leftarrow$ 0.1	0.9*	$\leftarrow$ 0.6
Tukey_a	1***	$\leftarrow$ 0.6	0.9*	$\leftarrow$ 0.7	1***	$\leftarrow$ 0.8	0.9*	$\leftarrow$ 0.8	0.7	$\leftarrow$ 0.1	0.9*	$\leftarrow$ 0.8
Huber_top	1***	$\leftarrow$ 0.7	0.9*	$\equiv$ 0.9*	1***	$\leftarrow$ 0.8	0.9*	$\leftarrow$ 0.6	0.9*	$\leftarrow$ 0.1	0.9*	$\leftarrow$ 0.6
Tukey_top	1***	$\leftarrow$ 0.6	0.9*	$\leftarrow$ 0.7	1***	$\leftarrow$ 0.9*	0.9*	$\leftarrow$ 0.7	0.8	$\leftarrow$ 0.1	0.8	$\leftarrow$ 0.6
Huber_mid	1***	$\leftarrow$ 0.6	0.9*	$\leftarrow$ 0.7	1***	$\leftarrow$ 0.8	0.9*	$\leftarrow$ 0.6	0.9*	$\leftarrow$ 0.2	1***	$\leftarrow$ 0.6
Tukey_mid	1***	$\leftarrow$ 0.6	0.9*	$\leftarrow$ 0.7	1***	$\leftarrow$ 0.8	0.9*	$\rightarrow$ 1***	0.9*	$\leftarrow$ 0.1	0.9*	$\leftarrow$ 0.8
Huber_bot	1***	$\leftarrow$ 0.6	1***	$\leftarrow$ 0.7	1***	$\equiv$ 1***	0.9*	$\equiv$ 0.9*	0.7	$\rightarrow$ 0.9*	0.9*	$\leftarrow$ 0.8
Tukey_bot	1***	$\leftarrow$ 0.6	1***	$\leftarrow$ 0.9*	1***	$\leftarrow$ 0.9*	1***	$\leftarrow$ 0.6	0.7	$\leftarrow$ 0.2	0.9*	$\leftarrow$ 0.5

\*\*\* $p < 0.001$  | \*\* $p < 0.01$  | \* $p < 0.05$  | † $p < 0.10$

In summary, correlations of the paired observations are normally stronger in the ex post period than in the ex ante period and are all statistically significant at an alpha level of 0.05. This constitutes strong evidence of a convergence on  $t_0$  in the ex post period and supports hypothesis 1 at both household and individual levels of inequality.

#### 4.2 Hypothesis 2 – Equity Beliefs exert a predistributive effect on inequality.

Together with country and time dummy variables, the control variables used in these regressions are *irr*, *emp*, *EFI\_a*, *EFI1B(2)*, *rgdnpnc* and *t*. Table 4.2.1 presents the correlations between  $\hat{\beta}_3 Equity\_Beliefs_{it0}$  and the relative effect of  $\hat{\beta}_1 Gini\_mkt_{itn}$ , as well as between  $\hat{\beta}_3 Equity\_Beliefs_{it0}$  and the relative effect of  $\hat{\beta}_2 rel\_red_{itn}$ . The combined relative effects of  $\hat{\beta}_1$  and  $\hat{\beta}_2$  are also correlated with  $\hat{\beta}_3$  and reported in the column labelled "Predistribution". The  $t_0$  equity benchmarks are shown on the left and the arrows indicate whether the strength of a correlation is stronger in the ex post period ( $\leftarrow$ ), the ex ante period ( $\rightarrow$ ), or of equal strength in each period ( $\equiv$ ).

## An Equity Theory of Predistribution

### 4.2.1 Predistribution model intertemporal correlation analysis results

Equity benchmark	Household level						Individual level					
	Market income		Redistribution		Predistribution		Market income		Redistribution		Predistribution	
	ex post	ex ante	ex post	ex ante	ex post	ex ante	ex post	ex ante	ex post	ex ante	ex post	ex ante
Huber_a	0	→ 1***	-0.4	→ -1***	0	→ 1***	-0.9*	→ -1***	0.8	→ 1***	-0.9*	→ -1***
Tukey_a	0.4	→ 1***	-0.7	→ -1***	0.4	→ 1***	-0.9*	→ -1***	0.8	→ 1***	-0.9*	→ -1***
Huber_top	0	→ 0.3	0	→ -0.3	0	→ 0.3	0	→ -1***	0	→ 1***	-0.1	→ -1***
Tukey_top	0	→ 0.7	0	→ -0.6	0	→ 0.7	0	→ -1***	0	→ 1***	0	→ -1***
Huber_mid	0.7	→ 1***	-0.7	→ -1***	0.4	→ 1***	-0.4	→ -1***	0.4	→ 0.9*	-0.4	→ -1***
Tukey_mid	0.9*	→ 1***	-0.9*	→ -1***	0.9*	→ 1***	0.6	→ -0.9*	-0.6	→ 1***	0.6	→ -0.9*
Huber_bot	0	→ 1***	0	→ -0.9*	0	→ 1***	-0.7	→ -1***	0.4	→ 1***	-0.7	→ -1***
Tukey_bot	0	→ 1***	0	→ -1***	0	→ 1***	0	→ -0.9*	0	→ 1***	0	→ -0.9*

\*\*\* $p < 0.001$  | \*\* $p < 0.01$  | \* $p < 0.05$  | † $p < 0.10$

As indicated by the arrows, the correlations are consistently stronger in the ex ante period and generally significant at an alpha level of 0.05 at both household and individual levels of analysis. These results indicate a divergence from  $t_0$  in the ex ante period, which supports hypothesis 2 and confirms that Equity Beliefs exert a predistributive effect on inequality via policy.

### 4.3 Hypothesis 3 – *Equity Beliefs moderate disposable income inequality*

Standardized policy effects, interaction effects and equity effects are provided with  $t_0$  equity benchmarks listed beneath the policies shown on the left in the tables below. Unstandardised regression results are provided in Tables 5.5.1-4 of the appendix that include statistical tests for the effect sizes of the interaction effects. Owing to space constraints, and given the similarity of results obtained using Huber's M-estimator and Tukey's biweight in the analyses of Hypotheses 1 and 2, only results from Huber's M-estimator are reported. For the analysis of hypothesis 3, the moderation analysis datasets comprise 500 household-level observations across twenty-six countries, and 470 individual-level observations across twenty-three countries. Both household and individual levels of analysis span the period 1990 to 2018.

The standard economic model (SEM) assumes that rational economic agents seek to maximize their utility whilst disregarding that of others (Mankiw & Taylor, 2017). This implies that in capitalist economies, relaxation of constraints on corporate and personal freedoms to transact are more in the interest of those with greater economic resources. It would therefore benefit those at the top of the distribution more than the other socioeconomic groups that economic policy provides for freer movement of capital and labour, and lesser taxation on income and wealth. The household level moderation analysis results in Table 4.3.1 are consistent with the SEM assumptions.

#### 4.3.1 Moderation analysis results<sup>12</sup>

	Household level					Individual level				
	βPolicy effect	βInteraction effect	βEquity effect	βPolicy	Δ βPolicy (%)	βPolicy effect	βInteraction effect	βEquity effect	βPolicy	Δ βPolicy (%)
<i>EFI</i>	.0336*** (.007)					.02 (.02)				
Aggregate		-.1371** (.044)	-.0046** (.002)	.029	86.29		-.077 (.065)	-.002 (.002)	.0184	92.28
Top		-.1122** (.041)	-.0038* (.002)	.0299	88.78		-.086 (.063)	-.002 (.002)	.0182	91.35
Middle		-.1283** (.043)	-.0043** (.002)	.0293	87.17		-.066 (.065)	-.001 (.001)	.0187	93.39
Bottom		-.1231* (.051)	-.0041* (.002)	.0295	87.69		-.057 (.069)	-.001 (.001)	.0188	94.31
<i>EFI_b</i>	.0033 (.004)					.014 (.012)				
Aggregate		-.1054* (.043)	-.0003 (.0004)	.00292	89.46		-.054 (.06)	-.0007 (.0008)	.01312	94.59
Top		-.1014* (.046)	-.0003 (.0004)	.00294	89.86		-.068 (.061)	-.0009 (.0009)	.01292	93.19
Middle		-.1118** (.042)	-.0004 (.0005)	.0029	88.82		-.072 (.061)	-.001 (.001)	.01287	92.84
Bottom		-.1014* (.046)	-.0003 (.0004)	.00294	89.86		-.022 (.059)	-.0003 (.0005)	.01357	97.84
<i>EFI_c</i>	.025*** (.006)					.017 (.018)				
Aggregate		-.1304** (.041)	-.0033** (.001)	.0217	86.96		-.107† (.063)	-.002 (.002)	.0149	89.31
Top		-.1247** (.038)	-.0031** (.001)	.0218	87.53		-.134* (.06)	-.002 (.002)	.0144	86.56
Middle		-.137** (.044)	-.0034* (.001)	.0215	86.30		-.097 (.063)	-.002 (.002)	.015	90.29
Bottom		-.121** (.046)	-.003* (.001)	.0219	87.90		-.078 (.066)	-.001 (.001)	.0154	92.24
<i>EFI_d</i>	.0165* (.007)					.004 (.012)				
Aggregate		-.179*** (.043)	-.003* (.001)	.0136	82.10		-.165** (.055)	-.001 (.002)	.0029	83.46
Top		-.1251** (.039)	-.0021* (.001)	.0145	87.49		-.164** (.055)	-.001 (.002)	.0029	83.57
Middle		-.1735*** (.044)	-.0029* (.001)	.0137	82.65		-.149*** (.054)	-.001 (.002)	.003	85.14
Bottom		-.1572*** (.046)	-.0026* (.001)	.0139	84.28		-.149** (.053)	-.001 (.002)	.003	85.15

\*\*\* $p < 0.001$  | \*\* $p < 0.01$  | \* $p < 0.05$  | † $p < 0.10$

<sup>12</sup> For *EFI\_d*, the individual level estimates are not normally distributed at an alpha level of 0.05. *P*-values for the aggregate, top, middle and bottom  $t_0$  equity benchmarks are 0.041, 0.041, 0.045 and 0.044, respectively.

## An Equity Theory of Predistribution

Equity effects on economic freedom (*EFI*), are lowest at the top of the distribution and greatest at the middle of the distribution. By contrast, the equity effect at the bottom of the distribution is smaller than that of the middle. Where the bottom of the distribution is likely to gain the most from higher taxation and/or more redistribution, this may reflect a conditioning of Equity Beliefs, whereby the lower socioeconomic groups discount the influence of structural forces on their individual position. Mijs and Savage (2020) describe this as an “internalised meritocratic logic” that is “embedded in peoples’ own thinking about their lives” (p. 402). There is further evidence of this in the case of monetary policy (*EFI\_c*), where the equity effect is weakest for the bottom of the distribution followed by the top, then the middle.

In regards to international trade policy (*EFI\_d*), the SEM predicts that international trade opportunities are more relevant to corporate decision makers or to individuals who may benefit from increasing trade openness. The results for the top of the distribution concur with the SEM where the equity effect is smallest for this group. Furthermore, within the European Union, international trade as a percentage of GDP increased from 53 percent to 92 percent over this period World Bank (2023).

The results for employment policy (*emp*) are presented in Table 4.3.2. Numbers employed is an outcome of business management decisions to retain workers, or divest of labour, or to substitute capital for labour and is therefore relevant to corporate policy. The shareholder value maximization objective (Jensen, 2002) supported by principal-agent theory (Lewis & Mizen, 2000, p. 245) justifies alignment of executive interests with those of shareholders, as opposed to the managers themselves or other stakeholders. Under these conditions, Equity Beliefs at the top of the distribution should have the least impact on employment’s mitigating effect on disposable income inequality relative to other socioeconomic groups. On the assumption that managers of profit maximizing firms are more likely to fall within the top socioeconomic group, the household level results agree with the anticipated effect of Equity Beliefs at the top of the distribution as the equity effect is smallest for this group. However, the equity effect is non-significant for all socioeconomic groups, which implies that market outcomes accord with Equity Beliefs in respect of employment.

### 4.3.2 Employment policy (*emp*) moderation analysis results

	Household level				Individual level				
	$\beta$ Policy effect	$\beta$ Interaction effect	$\beta$ Equity effect	$\beta'$ Policy	$\Delta \beta$ Policy (%)	$\beta$ Policy effect	$\beta$ Interaction effect	$\beta$ Equity effect	$\beta'$ Policy $\Delta \beta$ Policy (%)
<b><i>emp</i></b>	-.0093* (.004)					-.02† (.011)			
<b>Aggregate</b>		.0901 (.057)	-.0008 (.001)	-.0085	90.99		.218*** (.06)	-.004† (.003)	-.01594 78.17
<b>Top</b>		.1156* (.057)	-.0011 (.001)	-.0083	88.44		.27*** (.062)	-.006† (.003)	-.01487 72.96
<b>Middle</b>		.099† (.057)	-.0009 (.001)	-.0084	90.10		.221*** (.06)	-.005† (.003)	-.01588 77.87
<b>Bottom</b>		.0933† (.056)	-.0009 (.001)	-.0085	90.67		.215*** (.055)	-.004† (.003)	-.016 78.48

\*\*\* $p < 0.001$  | \*\* $p < 0.01$  | \* $p < 0.05$  | † $p < 0.10$

The equity effects at individual level mirror those at household level in that they are weakest at the top of the distribution and strongest at the bottom. They differ from household level in that the equity effects are significant at an alpha level of 0.1 (top  $p = 0.079$ , mid  $p = 0.086$ , bot  $p = 0.083$ ). This implies that, in contrast to the household level case, Equity Beliefs exacerbate disposable income inequality at individual level via their effect on employment. Cohen’s effect sizes in the appendix indicate a weak effect ( $f^2 < 0.02$ ) across the distribution that peaks at the top ( $f^2 = 0.04$ ).

The labour share of income (*labsh*) is relevant to company remuneration policy and cost management. The moderation analysis results are presented in Table 4.3.3.

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### 4.3.3 The labour share of income (*labsh*) moderation analysis results <sup>13</sup>

	Household level					Individual level				
	$\beta$ Policy effect	$\beta$ Interaction effect	$\beta$ Equity effect	$\beta$ 'Policy	$\Delta$ $\beta$ Policy (%)	$\beta$ Policy effect	$\beta$ Interaction effect	$\beta$ Equity effect	$\beta$ 'Policy	$\Delta$ $\beta$ Policy (%)
<b><i>labsh</i></b>	.0031 (.005)					-.033* (.013)				
<b>Aggregate</b>		.0849† (.046)	.0003 (.0004)	.00337	108.49		.042 (.053)	-.0014 (.0017)	-.03144	95.77
<b>Top</b>		.0976* (.043)	.0003 (.0004)	.00341	109.76		.04 (.056)	-.0013 (.0018)	-.0315	95.96
<b>Middle</b>		.0757 (.047)	.0002 (.0003)	.00334	107.57		.031 (.053)	-.001 (.0016)	-.0318	96.89
<b>Bottom</b>		.0063 (.053)	.00002 (.0002)	.00313	100.63		-.024 (.058)	.00079 (.0018)	-.03203	97.59

\*\*\* $p < 0.001$  | \*\* $p < 0.01$  | \* $p < 0.05$  | † $p < 0.10$

At household level, the equity effect of the top  $t_0$  equity benchmark is significant and the residual policy effect is approximately 10% greater than the policy effect. The equity effects for the middle and bottom of the distribution, though non-significant, have similar, lesser effects with the bottom equity effect being the weakest. The significant effect at the top of the distribution accords with the reality that corporate decisions to allocate a greater share of income to capital than labour are taken by high-income executives, and these decisions increase household levels of disposable income inequality.

At individual level, the policy effect is significant but the sign negative, so that an increasing labour share of income is interpreted as reducing individual level disposable income inequality. In this instance however, the equity effects are reversed so that the same residual policy effect obtains for each socioeconomic group. That is, the equity effect at the top of the distribution reduces the equalizing effect most, the middle less and notably for the bottom of the distribution the Interaction effect reverses so that the equity effect enhances the equalizing effect of a rising labour income share. Hence, the household level and individual level results are consistent.

Internal rates of return are determined largely by central bank interest rates and market conditions but corporate decisions to hire or divest of labour may also affect internal rates of return via their effect on production cost and productivity. The results for Equity Beliefs and internal rates of return (*irr*) are presented in Table 4.3.4.

### 4.3.4 Internal rates of return (*irr*) moderation analysis results

	Household level					Individual level				
	$\beta$ Policy effect	$\beta$ Interaction effect	$\beta$ Equity effect	$\beta$ 'Policy	$\Delta$ $\beta$ Policy (%)	$\beta$ Policy effect	$\beta$ Interaction effect	$\beta$ Equity effect	$\beta$ 'Policy	$\Delta$ $\beta$ Policy (%)
<b><i>irr</i></b>	-.00085 (.004)					.008 (.012)				
<b>Aggregate</b>		-.1121* (.051)	.000095 (.0004)	-.00095	111.21		-.071 (.058)	-.0006 (.0007)	-.00762	92.88
<b>Top</b>		-.0955† (.049)	.00008 (.0003)	-.00093	109.55		-.085 (.054)	-.0007 (.0009)	-.00751	91.53
<b>Middle</b>		-.0813 (.053)	.00007 (.0002)	-.00092	108.13		-.072 (.057)	-.0006 (.0007)	-.00761	92.78
<b>Bottom</b>		-.0627 (.051)	.00005 (.0001)	-.00091	106.27		-.017 (.059)	-.0001 (.0005)	-.00806	98.33

\*\*\* $p < 0.001$  | \*\* $p < 0.01$  | \* $p < 0.05$  | † $p < 0.10$

At household level, the interaction effects are significant and negative for the aggregate and top  $t_0$  equity benchmarks. This implies that the interaction of Equity Beliefs with investment returns decreases disposable income inequality by both benchmarks but the policy effects and equity effects are non-significant. Investments are highest in aggregate and are likely to decrease from the top to the bottom of the distribution. This interpretation is consistent with the residual policy effect that is highest for the aggregate equity benchmark and that falls from the top to the bottom of the distribution. Hence, the equalizing effect is lower for the top than the

<sup>13</sup> For *labsh*, at household level, for the top equity benchmark estimates there is evidence of non-normality at an alpha level of 0.05 ( $p$ -value = 0.048).



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aggregate  $t_0$  equity benchmark. At individual level, the parameter effects are all non-significant so that there is no statistical confidence in the estimates.

### 5 DISCUSSION

The results support the propositions that inequality affects Equity Beliefs, which in turn affect future levels of inequality. The moderation analysis gives insight into the mechanism by which Equity Beliefs affects future income inequality, via its influence on policy.

The analysis makes three principal findings. Firstly, the Equity Beliefs of income groups at the bottom, middle or top of the distribution have similar effects on policy but of differing intensity. Secondly, while Equity Beliefs generally serve to reduce inequality in the ex ante period, they intensify it through their impact on employment. Thirdly, the results suggest the presence of an equilibrium between Equity Beliefs and predistribution. This requires some elaboration.

Recalling that policy effects are a metric of policy's impact on disposable income inequality as explained in Section 3.4, whether Equity Beliefs increase or decrease disposable income inequality is deduced from a comparison of policy effects and residual policy effects, the latter of which are adjusted by the equity effect. All of these effects must be significant in order for there to be a confirmed moderating effect of Equity Beliefs on disposable income inequality, which is seen in the following cases: At household level, economic policy (*EFI*), monetary policy (*EFI\_c*) and international trade policy (*EFI\_d*) all increase levels of disposable income inequality. The interaction effect of Equity Beliefs with each of these policies counters their disequalising effect such that Equity Beliefs decreases disposable income inequality. At household level, the middle of the distribution generally mitigates rising disposable income inequality the most, followed by the bottom, then the top. Exceptions occur in the analysis of economic policy (*EFI*) and international trade policy (*EFI\_d*) where the aggregate  $t_0$  equity benchmark mitigates rising inequality the most. This result accords with the view that government interventions are viewed as inimical to the operation of markets (Rodrik, 1998) and may therefore be resisted.

As mentioned, and in contrast to the other policy effects, where rising employment (*emp*) decreases disposable income inequality, Equity Beliefs counters this policy effect and exacerbates disposable income inequality. The results show that the top  $t_0$  equity benchmark exacerbates rising disposable income inequality the most followed by the middle, the aggregate and then the bottom  $t_0$  equity benchmarks. This implies that micro-level assessments of worker productivity contribute to job losses and layoffs. To understand this finding, we can turn to Edgar H. Schein's influential contribution to organizational culture and leadership theory (Yergler, 2012), and Stacy Adams' seminal work in experimental social psychology, known as Equity Theory.

Schein (1990); (2010) identifies three levels of organisational level culture that are useful for hypothesising the causal relationship between beliefs and inequality.

- **Beliefs:** Schein's *basic underlying assumptions* that are defined as "perceptions, thought processes, feelings and behaviour" Schein (2010, p. 24).
- **Values:** Schein's *espoused Beliefs and values* are the cultural norms, ideologies, charters and philosophies that represent "how people feel and think" (Schein, 1990, p. 112).
- **Outcomes:** This level corresponds to Schein's *artefacts*, which are palpable phenomena that the members of organisations react to, but that are difficult to decipher because they are connected to underlying assumptions, or beliefs.

Schein's model predicts that corporate values disseminate throughout organisations and become evident as artefacts of values and beliefs as formulated below.

$$\text{Beliefs} + \text{Values} \rightarrow \text{Outcomes}$$

Management literature furnishes considerable evidence of personal values of top managers influencing the corporate decisions (Keeney, 1992; Norburn, 1989 in Agle, Mitchell, & Sonnenfeld, 1999) that define the salience of stakeholders and corporate social performance (Carroll, 1979; Waddock and Graves, 1997a; Wood, 1991 in Agle et al., 1999). Upper-echelons theory (Hambrick and Mason, 1984 in Arthur, Herdman, & Yang, 2016) posits that top management decisions are shaped by their personal values and beliefs within an ambiguous and uncertain organizational context. This theory was applied in a study of a large company operating approximately 3,600 hotels worldwide and found that top management values and beliefs moderated the intensity of human resource programs relative to alternative investments that could generate positive financial returns (Arthur et al., 2016). Whilst top managers strive to maximise the difference between total organizational inputs and outputs (Beal, Astakhova, & Conaway, 2017), they also balance the flow of firm resources among stakeholders (Greenley & Foxall, 1997). The balance of resource flows depends on the power that each stakeholder group can exert over the company (Mintzberg, 1983 in Greenley & Foxall, 1997). If organisation culture is formulated around the normative principle that social welfare is maximised when firm profits are maximised, and resource allocation decisions are guided by "enlightened value maximisation" as promulgated by Jensen (2002)<sup>14</sup>, the prevailing allocation

<sup>14</sup> Enlightened value maximisation theory propounds that increasing shareholder value should be the sole purpose of a firm seeking long-term value.

## An Equity Theory of Predistribution

norm would be to preferentially channel value to the firm's shareholders. However, where the attitudes of firm managers are not aligned with firm values, the stated values of firms do not necessarily manifest in their actions (Cassells and Lewis, 2011; Revell et al. 2010 in Jansson, Nilsson, Modig, & Hed Vall, 2017). The principal-agent problem may thus manifest with managers (the agent) placing their own interests or those of other stakeholders above the interests of a firm's shareholders (the principal) and strategic planning may be hampered by values and beliefs within the context of corporate culture (McDonald and Leppard cited in Greenley & Foxall, 1997). The solution to this problem in industrial economic philosophy is to restructure managerial incentives via stock option grants (Jensen & Murphy, 1990; Neal & Rosen, 2000), and reduce monitoring costs via efficiency wages (Akerlof, 1984; Shapiro & Stiglitz, 1984). Shareholders may thus tilt managers' behaviour towards their own interests via incentives sufficient to ensure the firm manager's first imperative is to maximise shareholder value (Core & Guay, 2010).

The seminal framework of Equity Theory developed by Adams (1963, 1965) and Adams and Freedman (1976) is particularly insightful in this regard. Equity Theory links perceived fairness in resource allocation to motivation and behaviour and has shaped theories in organisational behaviour, psychology, and behavioural economics. It posits that perceptions of fairness in resource allocations prompt economic agents to take actions that minimise inequity. Fehr and Schmidt (1999) find support for Equity Theory by empirically demonstrating inequity aversion: individuals prefer outcomes that are fair and even at a cost to themselves reject those perceived as unfair. Fong (2001) also finds support for Equity Theory in peoples support and/or opposition to redistribution in the United States.<sup>15</sup> Where equitable allocations are widely believed to foster high productivity over the long run (Leventhal, 1976), the criterion against which resource allocations are assessed at corporate level is expected to be that of equity. Hence, if economic agents do not perceive resource allocations that proceed from corporate decisions to be inequitable, they would refrain from taking corrective action. Accordingly, top managers whose values are aligned with those of shareholders are likely to perceive the resulting resource allocations as equitable. Following Arthur et al. (2016), the Equity Beliefs held by these top managers are expected to diffuse throughout the organization. Equity Beliefs in this study are defined as *value judgments about the fairness of market outcomes*, and employees continuously assess equitability based on equity benchmarks. The finding that equity benchmarks throughout the distribution exacerbate inequality through its impact on employment suggests that employees throughout the distribution hold similar values. According to Schein's model of organizational culture, this suggests that employees' values and beliefs are closely aligned with those of shareholders, and that they perceive labour market outcomes as fair. This interpretation is consistent with the literature on meritocratic beliefs discussed in the introduction of this paper.

The third key finding of this study is the indication of a dynamic equilibrium between Equity Beliefs and predistribution. The results suggest that Equity Beliefs are shaped by individuals' experiences of inequality and, in turn, influence future levels of inequality. Equity Theory (Adams, 1963, 1965; Adams & Freedman, 1976; Leventhal, 1976), predicts that economic agents are motivated to minimize perceived inequity. Hence, when market outcomes are perceived as fair, resource allocations will proceed without disruption but perceptions of inequity would prompt corrective action, whereby Equity Beliefs influence market incomes or redistribution policies to realign outcomes with perceptions of equitability. This dynamic suggests that market outcomes and Equity Beliefs are mutually reinforcing, with perceptions of fairness or unfairness playing a central role in the process of predistribution.

### 5.1 Limitations

Only Gini coefficients have been used as aggregate measures of inequality as this metric reduces inequality for the distribution as a whole to a single number (Atkinson, Rainwater, & Smeeding, 1995, p. 23) and alternative statistics (for example, Palma ratios or decile ratios) exclude portions of the distribution (Trapeznikova, 2019). The Gini coefficient is potentially insensitive to transfers from the top to the bottom of the distribution (Atkinson, 1970). This is particularly relevant to this study since both pre-taxes and transfers income inequality and post-taxes and transfers income inequality statistics are used in the same model along with relative redistribution that is derived from these two measures. Alternatives to the Gini coefficient are either more sensitive at the top (i.e. the Coefficient of Variation) or at the bottom of the distribution (i.e. the Variance of the Natural Logarithm of Income) so it is not clear that either of these alternatives are preferable.

Given that the household level inequality data source uses the Luxembourg Income Study (LIS) as standard and LIS is of high-quality, this data is not anticipated to contain persistent measurement error (Solt, 2016). However, the survey data from which these measures of inequality are derived may suffer from measurement bias due to non-responses, under- or incomplete reporting of top and bottom incomes, and from under sampling at the extremes of the distribution (Anand & Segal, 2015; Atkinson et al., 1995; ONS, 2023). The individual level inequality data is collated from a variety of sources, including national income and wealth accounts, household surveys and administrative data such that the potential for systematic error is reduced.

For the analysis of hypothesis 1 and 2, five paired observations are used in each of the ex post and ex ante period correlation analyses. The number of paired observations needed to detect a Pearson  $r$  effect size of  $r = 0.9$  at a conventional statistical power of 0.80 is  $n = 6$ . For  $n = 5$  paired observations, the statistical power achieved in a correlation analysis is only 0.70 Cohen (1988).

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<sup>15</sup> Fong defines equity as "consistent with the basic concept of insuring industrious people against bad luck, but not providing unconditional assistance to the poor if their condition is due to idleness." (2001, p. 242).

### 6 CONCLUSION

This paper reviews empirical research on the relationship between beliefs and inequality and finds that current studies suggest the possibility of a bidirectional causal relationship, in which market outcomes influence beliefs about inequality, and these beliefs, in turn, shape subsequent market outcomes. Building on these studies, this paper analyses the relationship between value *judgments about the fairness of market outcomes*, denoted “Equity Beliefs” and market outcomes in the context of “predistribution”, that Jacob Hacker loosely defined as “the way in which the market distributes its rewards in the first place” (2011, p. 35). An *Equity Theory of Predistribution* is proposed that leads to the following propositions: 1) Equity Beliefs emerge from experiences of income inequality; 2) Equity Beliefs exert a redistributive effect on inequality; 3) Equity Beliefs moderate disposable income inequality. These propositions are examined empirically and are supported through statistical analysis.

The findings of this study carry significant theoretical implications for our understanding of income distribution. The neoliberal free-market ideology views ethical and political considerations, and discussions of income distribution beyond the remit of the scientific discipline of economics, and has become more influential since the 1970s with economists’ increasing influence on government policy, business praxis and academia (Appelbaum, 2019; Dardot & Laval, 2013). Consequently, questions of income distribution have often been overlooked in economic research (Atkinson, 1997, 2001), and although economic policy plays a central role in shaping resource allocation (Cruz et al., 2015, p. 50), it prioritises economic growth over income distribution. The impact of this ideology is reflected in a recent global workforce survey commissioned by the technology corporation, Microsoft<sup>16</sup>, where in a sample of 31,000 full-time workers in 31 countries, “increasing employee productivity” was ranked highest among the anticipated benefits of adopting artificial intelligence technologies at work (Microsoft, 2023). Economic theory, therefore, has profound implications on beliefs about the equitability of market outcomes and this study suggests that rising inequality at country level is at least partially due to the absence of feelings of inequity being triggered at the micro-level among economic agents.

These findings have several policy implications. Firstly, socioeconomic status can influence policy outcomes in ways that may exacerbate disposable income inequality, particularly when lower socioeconomic groups are underrepresented. Secondly, the prioritization of equality over equity—as understood in political philosophy, where equity emphasizes equal opportunity—may inadvertently intensify disposable income inequality, even when such policies are perceived as just. Third, although UN Sustainable Development Goal 10 has created a favourable climate for policy action to reduce inequality, the chief difficulty in establishing whether or not executive pay is “too high”, is that no obvious benchmark exists for this metric (Hall, 2003). This argument is also applicable to benchmarks of low pay. Accordingly, efforts towards achievement of UN SDG 10 may benefit from the development of “equity targets” for employment income targets that may serve as benchmarks for high versus low pay. Such metrics may shape perceptions of the fairness of labour market outcomes, thereby contributing to the advancement of UN Sustainable Development Goal 10.

The scope of this study was intentionally limited to countries of the European Union. Consequently, this paper is most relevant to EU policymakers who are committed to the goal of reducing income inequality by 2030. Future research on macro-level equity benchmarks can extend the geographical coverage of this analysis to include countries outside of the European Union. The design of firm-level equity targets that are conducive to equality are an avenue for further research that entail the explication of justifying principles for their implementation. Future studies may further contribute to this stream of research by analysing the theoretical impact of a more equal distribution of employment income on economic growth, and its implications for public spending.

Finally, this paper has laid the foundation for an emerging *Equity Theory of Predistribution*, conceptualised as a dynamic equilibrium between Equity Beliefs and market outcomes in which Equity Beliefs are antecedent, and causally connected to societal income inequality. Following Weick (1995), these writings are presented as theory under construction with an invitation to other researchers to further develop what may later become strong theory.

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<sup>16</sup> The survey was conducted in 2023 by an independent research firm, Edelman Data x Intelligence.

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