INEQUALITY AND THE EQUITY PREMIUM: EMPIRICAL CROSS-COUNTRY EVIDENCE

SAIRA TATIANA CALDERÓN CASTILLO

MAGISTER THESIS

Supervisor

Thomas Goda

UNIVERSIDAD EAFIT

ESCUELA DE ECONOMÍA Y FINANZAS

MAESTRÍA EN ECONOMÍA

MEDELLÍN

2023

ABSTRACT

This paper empirically examines the relationship between income and wealth inequality and the subsequent period equity premium for 49 countries in the period 2002 - 2019. As an approximation of inequality are used relative inequality measurements, absolute inequality measurements and capital share income. Through a two-step Generalized Method of Moments with country fixed effects, it is found that, while relative inequality and capital share income do not significantly impact the equity premium, absolute inequality has a positive and significant correlation with it. The study used two distinct definitions of the stock returns rate, based on Christou et al. (2021) and Toda & Walsh (2020), which enhances the robustness of the findings by accounting for potential variations in the measurement of this critical equity premium component. These findings contribute to the ongoing debate on the impact of inequality on the equity premium and highlight the complexity of the relationship and the need for further research.

Keywords: Inequality; Determinants of equity premium; Economic factors; Financial markets.

JEL classification: D31, G11, G12

RESUMEN

En este trabajo se examina empíricamente la relación entre la desigualdad de ingresos, riqueza y la prima de riesgo de acciones para 49 países en el periodo 2002 - 2019. Como aproximación de la desigualdad se utilizan medidas de desigualdad relativa, medidas de desigualdad absoluta y participación de los ingresos del capital en el ingreso total. A través de un Método Generalizado de Momentos de dos pasos con efectos fijos de país, se encuentra que, mientras que la desigualdad relativa y participación de los ingresos del capital no impactan significativamente en la prima de riesgo de acciones, la desigualdad absoluta tiene una correlación positiva y significativa con la misma. El estudio utilizó dos definiciones distintas de la tasa de rentabilidad de las acciones, basadas en Christou et al. (2021) y Toda & Walsh (2020), lo que mejora la robustez de los resultados al tener en cuenta las posibles variaciones en la medición de este componente crítico dentro de la prima de riesgo de la renta variable. Estos hallazgos contribuyen al debate en curso sobre el impacto de la desigualdad en la prima de riesgo de las acciones, y destacan la complejidad de esta relación y la necesidad de seguir investigando sobre ello.

Palabras clave: Desigualdad; Determinantes de la prima de las acciones; Factores económicos; Mercados financieros.

Clasificación JEL: D31, G11, G12

1. INTRODUCTION

The equity premium is a rate that indicates the excess return an investor is expected to earn by investing in risky stocks compared to safe fixed-income investments, such as government bonds. This information is of considerable importance in financial economics, given that the equity premium allows defining asset allocation decisions such as how much of one's portfolio should be invested in stocks relative to safer assets. Moreover, it is an important variable in the Capital Asset Pricing Model (CAPM), which is used to calculate an appropriate hurdle rate to accept investment projects (Welch, 2000). Hence, equity premium estimates greatly influence the asset allocation decisions of investors, such as individual and institutional investors (Siegel, 2018).

For this reason, Mehra and Prescott (1985) conducted an application of the Lucas (1978) asset pricing formula, using U.S. data from 1889 to 1978. When they compare their results with what is theoretical expected, they were “puzzled” because the realized equity premium was too high to be explained by Luca’s standard general equilibrium asset-pricing model. Based on this finding, an exhaustive literature has developed, which is interested in verifying if this equity premium puzzle also exists in other countries[1] and to identify the determinants of the equity premium[2].

Typically, literature does not consider the role of wealth inequality as a possible determinant of the equity premium, given that they use a specification of the Lucas model with Constant Relative Risk Aversion (CRRA) and complete insurance

[1] See e.g., Annaert et al. (2012); Bellelah et al. (2017); Dimson et al. (2012); Łukowski et al. (2020); Marquis (2011); Virk (2012); Dimson et al. (2012); Donadelli & Prosperi (2012); Duangchaiyoosook & Ousawat (2021); Hassan & Van Biljon (2010); Imran et al. (2019); Marquis (2011).

[2] See e.g., Barberis et al. (2001); Barberis & Huang (2007); Benartzi & Richard H. (1995); Bernstein (1997); Brown et al. (1995); G. M. Constantinides et al. (2002); Dimson et al. (2008); Fama & Kenneth R. (2002); McGrattan & Edward C. (2001)

markets, which makes the introduction of economic inequality in the modelling irrelevant (Cochrane, 2005; Gollier, 2001). However, various authors disagree with some simplifying assumptions of the model and find that when removing them inequality can influence the equity premium (Constantinides & Duffie, 1996; Danthine & Donaldson, 2002; Dumas, 1989; Gârleanu & Panageas, 2015; Giannikos & Koimisis, 2021; Gollier, 2001; Guvenen, 2009; Hatchondo, 2008; Krusell & Smith, 1997; Lansing, 2015; Lettau et al., 2019; Peress, 2004; Toda & Walsh, 2020). The growing interest in understanding the implications of the inequality on asset returns in part can be explained by an upward trend in both wealth and income inequality that has been reported by authors such as Atkinson et al. (2011), Milanovic (2012), Alvaredo et al. (2013) and Piketty and Saez (2014). In 2008 the richest 1% of the global population held about 42.7% of all wealth and 15% of income, figures which increased to 45.8% and 20.6% by 2020 (Credit Suisse, 2021; World Inequality Lab, 2022).

From a theoretical point of view the mechanisms of how changes in inequality affect the equity premium are not clear cut. According to some theoretical models (Dumas, 1989; Gârleanu & Panageas, 2015; Peress, 2004; Toda & Walsh, 2020) income inequality and the equity premium are related in the sense that an increase in inequality rises the demand for stocks, which increments their price and lowers the equity risk premium. However, other models show that the effect can be ambiguous depending on the assumptions made about the relationship between risk aversion and the propensity to demand stocks in the face of increases in wealth (Giannikos & Koimisis, 2021; Gollier, 2001; Hatchondo, 2008). A third type of models argues that an increase in the labor share impacts stock prices and the equity premium due to the additional risk that capital owners face, which leads them to demand a higher equity premium (Danthine & Donaldson, 2002; Guvenen, 2009; Lansing, 2015; Lettau et al., 2019).

Despite these inconclusive theoretical outcomes, few empirical studies verify the impact of inequality on the equity premium, and the existing ones mainly focus on the USA. Typically, these studies find that there is a negative effect of inequality on the equity premium (Christou et al., 2021; Favilukis, 2013; Walentin, 2010), which is explained by an increase in stock prices and the resulting fall in returns (Campbell et al., 2016; Gomez, 2019; Johnson, 2012; Lettau et al., 2019; Toda & Walsh, 2020). To our knowledge, there are only two studies that consider the effect of inequality on the equity premium across countries (Christou et al., 2021; Toda & Walsh, 2020). Their results suggest that, although for most of the countries in their sample the relationship is negative, in some cases there exist an opposite or non-significant correlation between the two variables. To put it differently, from the existing literature it does not become clear in how far inequality affects the equity premium. Additionally, another aspect that so far has not been emphasized in the literature is the appropriate measure of inequality that should be used. All studies use relative inequality measures, but absolute inequality measures might be more suitable as a measure of asset demand (see Goda et al., 2020).

The main objective of this paper is to verify empirically if changes in inequality affect the equity premium across countries using distinct inequality measures and the equity premium measures suggested by Christou et al. (2021) and Toda & Walsh (2019). The exercise is done with a Generalized Method of Moments (GMM) estimation for dynamic panels with fixed effects, considering a panel of 49 countries during the period 2002 to 2019.

The obtained results indicate that relative inequality and capital share income do not significantly impact the equity premium. However, absolute inequality has a positive and significant effect on the equity premium, supporting the idea that increased inequality can lead to a higher equity premium, especially when investors have absolute risk aversion. Further research is needed to fully understand this relationship and its implications, given the ongoing rising of wealth and income disparity on a global scale. As a result, understanding these dynamics becomes increasingly critical for investors and policymakers alike.

The rest of the paper is organized as follows. Section 2 discusses the theoretical framework, together with the empirical evidence that has been presented in the literature, which seeks to contrast the hypotheses raised. The methodology and variables used in the empirical exercise of this document are described in Section 3. Estimates and results are analysed in Section 4. Finally, Section 5 concludes the main findings.

2. THEORETICAL FRAMEWORK

Lucas (1978) presents an asset pricing formula in a one-good, pure exchange economy with identical consumers. In 1985, Mehra and Prescott conducted an application of this formula to determine the asset prices in equilibrium of an economy with a similar U.S. pattern of consumption during the 20th century. The authors found that, relative to what is theoretically expected, the average equity return was excessively higher than expected when considering the average riskless security return. This phenomenon is called the equity premium puzzle[3]. There is a whole branch of the asset pricing literature that is dedicated to showing that the equity premium puzzle is not only a phenomenon of the United States. Multiple studies have shown that this happens in countries with both advanced (Annaert et al., 2012; Bellelah et al., 2017; Dimson et al., 2012; Łukowski et al., 2020; Marquis, 2011; Virk, 2012) and emerging economies (Dimson et al., 2012; Donadelli & Prosperi, 2012; Duangchaiyoosook & Ousawat, 2021; Hassan & Van Biljon, 2010; Imran et al., 2019; Marquis, 2011).

[3] Following Mehra and Prescott (1985, 2003, 2008), the capital premium or risk premium originally corresponds to the return granted by a risky asset more than the average return on a risk-free security and cannot be explained by equilibrium models based on in the consumption of conventional representative agents (CCAPM).

Typically, the literature that studies the determinants of the equity premium[4] ignores potential effects of inequality, given that the standard asset pricing formula assumes complete markets, no background risks[5] and the case of Hyperbolic Absolute Risk Aversion (HARA) preferences, that is, Constant Relative Risk Aversion (CRRA). Together, these assumptions eliminate aspects of the analysis that are related to market imperfections, heterogeneity among agents, and changes in their attitude towards risk when they have different levels of income or wealth.

Hence, some authors disagree with these simplifying assumptions, claiming that there are insufficient arguments or evidence to assume CRRA preferences, complete markets, or the inexistence of background risks (Giannikos & Koimisis, 2021; Gollier, 2001; Peress, 2004). Some asset pricing models therefore propose changes to the standard model. In the first place, there are authors who, to give relevance to wealth inequality, maintain the CRRA assumption and discarded the complete markets assumption, such as Constantinidies and Duffie (1996)[6] and Krusell and Smith (1997)[7]. However, even though their results show a positive effect of wealth inequality on equity premium, it is so small that the authors conclude that wealth inequality does not matter for equity premium.

Some other authors also remove the assumption of CRRA preferences, as Dumas (1989). In his article, he analyses two agents' behaviour in a complete financial market, where both agents have equal initial wealth and patience levels, but different relative risk aversion levels. The more risk averse agent is modelled with a CRRA function and the less risk averse with a Decreasing Relative Risk

[4] According to Mehra and Prescott (1985), historically observed large average equity return and the small average risk-free return.

[5] Background risks cannot be insured against and cannot be easily avoided, such as a risk on labor income.

[6] These authors show that in an economy with uncertain uninsurable income, wealth inequality can generate a higher equity premium.

[7] These authors reached the same conclusion as Constantinidies and Duffie including an infinite horizon, borrowing constraints, and persistence in shocks on labor incomes.

Aversion (DRRA) function. The author shows that a more unequal economy generates a lower equity premium, by increases in risk-free interest rates. This is because in Dumas' model, in an initial period, agents have the option of consuming or investing in a risky asset of a representative firm. The "less risk averse" individual invests in stocks more than her initial wealth level and leverages his inversion by borrowing at a risk-free interest rate from the "more risk averse" agent. Faced with an exogenous increase in capital stock, the wealth of the “less risk averse” agent increases more with respect to that other agent's, which leads to her demand for stocks increasing, she asks for more loans, and this increases risk-free interest (while the stock prices remain the same, given that the stock supply increases)[8].

Gollier (2001), on the other hand, finds that a higher wealth inequality increases (decreases) the equity premium if agents' Absolute Risk Aversion (ARA) on wealth holdings is concave (convex)[9]. However, according to Gollier, savings and portfolio behaviour data gives no conclusive evidence about the most likely curvature of ARA, i.e., it is not clear if a concave or convex ARA is the best representation of agents' preferences. Wealth inequality therefore might reduce or increase the equity premium, depending on the features of the agents of a specific economy. In contrast to this conclusion, Peress (2004) argues that decreasing and convex ARA on wealth must be taken into account in the analysis, given that this assumption is supported by most empirical studies. He indicates that, without assigning an assumption to relative risk aversion[10], his results are the same as Dumas (1989); that is, higher

[8] Please note that Peress (2004), criticizes the DRRA assumption, since several studies reject the DRRA hypothesis using data that contain information on attitudes towards risk, such as agricultural data, survey data or experimental data.

[9] Concave ARA means that with more wealth, agents invest less in risky assets; convex ARA means that with more wealth, agents invest more in risky assets.

[10] Absolute risk aversion measures the rate at which marginal utility decreases when wealth is increased by one monetary unit. Whereas, relative risk aversion is unit free that is, it measures the rate at which marginal utility decreases when wealth increase in one percent (Pratt, 1964; Arrow, 1965).

wealth inequality leads to a lower equity premium. Unlike Dumas, the mechanism in Peress' model does not occur due to increases in the risk-free interest rate, but rather due to increases in stock prices[11]. The explanation offered relies on the possibility to acquire, at a cost, a private signal or additional information about stock returns in the next period: In the initial period, there are two agents with equal patience levels and decreasing ARA, who face an exogenous shock that redistributes their wealth levels in such a way that there is one agent richer than the other one. In this scenario, individuals can demand stocks or bonds, however, in the model is assumed that stocks prices do not show all the relevant information for an optimal investment decision, so there is the option of acquiring private information about the payoff of a stock, which only the richest one can afford, and they use to trade competitively in the market. This leads the rich to invest more efficiently, it means that their expected stocks payoff will be higher than the other agent, and achieve higher returns than the poor, thus increasing the gap between the two. Consequently, if the riskless interest rate is constant and the stock supply is fixed, the increasing stock demand leads rising stock prices, so that the expected stock yield decreases, leading to a fall in the equity premium.

Gârleanu and Panageas (2015), on the other hand, decide to separate Intertemporal Elasticity Substitution (IES) heterogeneity from risk aversion heterogeneity, modelling individual preferences with Epstein-Zein utility functions. They assume agent heterogeneity in an overlapping generations model with different IES and risk aversion. They find that concentrations of wealth to the more patient, less risk averse agent type ("the rich") tends to lower equity premium. The explanation for these results is that, with initial wealth equal and having the option of consuming and investing between stocks and risk-free bonds, the most patient and less risk averse agent will demand more stocks than bonds (vice versa). When both agents face an exogenous positive output shock, the wealth of the patient and more risk-loving agent will increase more than that of the risk averse one, that redistributes

[11] The model assumes given stock supply, risk-less interest rate, and information cost.

wealth toward the less risk averse agent, this causes both the market price of risk to fall and the interest rate to rise, because of the falling of precautionary savings. Since it is assumed in the model that the IES of the less risk-averse increase, the interest rate becomes insensitive to output shocks. Following the above, and assuming that the stock supply is fixed, an increasing demand on stocks of the rich leads to a higher stock aggregate demand, raising stock prices, lowering expected returns and a decreasing equity premium.

Toda and Walsh (2020) show similar results although, unlike the previously mentioned authors, argue that is important to identify the types of portfolios in which agents mainly invest, given that establishing empirically the degree of risk aversion is difficult. In their theoretical model and its empirical application, they show that the equity premium will be reduced by stock prices increases if the less risk averse agent becomes richer by an exogenous change in the distribution of wealth. Similar to the previous work, there are both an impatient and risk averse agent and a more patient and less risk averse one. Everything else fixed, an initial wealth redistributive shift makes the patient and less risk averse richer in comparison, leading her to invests relatively more in stocks, while the other agent invests relatively more in bonds. Thereby, the aggregate stock demand grows, stock prices go up and stock returns fall in the next period (and therefore also the equity premium).

Since an alternative perspective, Lettau et al. (2019) argue that, in a scenario where wealth is concentrated in the hands of a few top income households –whose consumption is financed mainly from capital income and who are denominated as shareholders–, while most households are workers who finance their consumption with wages and salaries, a redistributive shock that shifts the share of national income between labour and capital is a source of systematic risk for shareholders. The reason is that only shareholders hold equity assets, while workers do not participate in the asset market. Accordingly, shareholders demand a higher equity premium assuming an additional risk.

In a similar vein, Danthine and Donaldson (2002) proposes an economy where non-stockholders (workers) consume all their income and do not participate at all in the financial market, so their only way of smooth fluctuations in labor income, and therefore consumption growth, is through a wage contract. This contract consists of secure payments to which the shareholders (capital owners) agree to pay the non-shareholders. In each period, this contract is negotiated between the parties, and what the “workers” seek is that this be more beneficial for them, that is, that the labor income share in the national income is greater with respect to the capital income share. This negotiation process is uncertain because in each period there is a persistent shock on the relative bargaining power. In this way, a source of risk is created and that must be assumed by the shareholder so that they demand compensation in the form of a high equity premium.

Guvenen (2009) shows a model where workers have the opportunity to participate in the risk-free asset market. They have low Elasticity Intertemporal Substitution and desire to smooth their consumption more than shareholders. In other words, they have a higher desire to smooth fluctuations in labor income over time. Following the above, the workers are willing to obtain bonds from the capital owners. This trade interests both parts because the workers receive interest payments from a risk-free bond and the capital owners can leverage their stock demand. However, this mechanism does not reduce the risk faced by workers but transfers it to the shareholders. Since interest payments and dividends are volatile, capital income is more volatile and fluctuates widely. As a result, this additional risk assumed by shareholders, which means that they require a high equity premium.

The model proposed by Lansing (2015), unlike the previous ones, does not propose a mechanism where an additional risk is transferred to shareholders (and leads them to demand a high equity premium), but it is shown that the mere fact that the shareholders being owners of the companies makes them vulnerable with respect to workers. Shareholders thus demand a high equity premium because their consumption is strongly linked to volatile dividends from equity[12], so their consumption is more volatile than the aggregate consumption. Additionally, shareholders must invest with their income in capital adjustment costs given the existence of capital depreciation rate. Thus, the high volatility of the shareholders consumption growth magnifies the equity risk premium.

2.1 PREVIOUS EMPIRICAL EVIDENCE

Most of the above-mentioned studies calibrate their models with real data from the US to simulate an economy and show the effect of a change in inequality on the equity premium according to their model; but, so far, only few empirical papers study the relationship between inequality and the equity premium. However, in line with the theoretical literature, their number is growing recently. An overview of the previous empirical results related to the impact of inequality on equity premium is presented in Table 1.

Table 1: The effect of inequality on equity premium with Christou et al. returns definition (ep_c).

Authors	Estimation methods	Results	Data periods	N° of counries
Aggarwal & Goodell (2008)	Panel-data regressions	**Negative**	1996-2003	16
Gupta et al. (2018)	Quantile Random Forest	Unclear	1977-2016	1

[12] Ait-Sahalia et al.'s (2001) model of the utility of luxury goods suggests a similar notion regarding wealthy consumption and equity volatility. Wealthier households, who engage in luxury goods consumption, display significant responses in their consumption patterns due to wealth shocks caused by stock returns. As wealth increases, these households allocate a larger proportion of their wealth to equity.

Lettau et al. (2019)	Generalized Moments Method (GMM)	**Positive**	1963-2013	1
Toda & Walsh (2020)	Generalized Moments Method (GMM)	**Negative**	1913-2015	29
Christou et al. (2021)	Common Correlated Effects Augmented by Generalized Moments Method (GMM)	**Negative**	1990-2011	7

Source: Elaborated by the authors.

One of the first empirical papers is Aggarwal & Goodell (2008), which use a panel of 16 countries to estimate the effect of various variables on the equity premium between 1996 and 2003. Their focus lies on variables such as civil liberties and market synchronicity, but they also use income inequality as control variable (measured by the Gini index). Using an Abnormal Earnings Growth (AEG) model, developed by Ohlson and Juettner-Nauroth (2005), they find that income inequality is a significative negative effect on the equity premium (i.e. higher inequality leads to a lower equity premium).

Ten years later, Gupta et al. (2018) focus on the ability of inequality to explain the future behaviour of the equity premium, more specifically in the stock returns component. They use quarterly information from the UK between 1977 and 2016 and a non-parametric estimation method called Quantile Random Forests[13]. Applying this method, they calculate in-sample and out-of-sample forecasts[14] for stock returns. The results of the empirical analysis show that if Gini coefficient

[13] Which is an algorithm proposed by Meinshausen (2006) that, in general terms, does not estimate an average value of the predictions, but rather their distribution, which once obtained allows to calculate quantiles or any other statistic

[14] As explained in Eurostat Glossary (2022), the in-sample forecast is conducted dividing in two the dataset and calculating with one of the subsamples the initial parameter estimation and model selection and then forecasts the other subsample. On the other hand, in the out-of-sample forecast is used all available data in the sample to predict data outside of the dataset period.

indexes based on income, wage, total consumption, and non-durable consumption are included as explanatory variables, the predictive capacity of in-sample forecasts of stock returns is improved. It is worth mentioning that the authors do not clarify the sign of the relationship between the variables of interest, but instead show the p-values for the forecasts calculated by the models that include the inequality measure among the predictors[15].

Lettau et al. (2019), on the other hand, use the capital share as a proxy for inequality to study the effect of a positive exposure of capital share of income on expected returns across a range of equity characteristic portfolios and nonequity asset classes. They use quarterly US data that spans from 1963:3 to 2013:4. Their estimation strategy is a GMM estimator. They find that a positive exposure to capital share risk increases the risk premium, and that the exposure to fluctuations in the growth of the capital share has substantial explanatory power for expected returns across a range of equity characteristic portfolios and other asset classes.

In line with Lettau et al., Toda and Walsh (2020) also use a GMM estimator to test their theory that wealth inequality should predict excess stock market returns empirically. Using US data during 1913-2015 and cross-country data for 29 countries from 1969-2015, they find that when the US top income share rises, the subsequent one-year stock market excess returns decline significantly. For the case of the 29 countries, they show that in large economies, an increase in domestic inequality (measured as the top 1% income share) led to a decrease in future stock market returns. For its part, in small open economies, global inequality (proxied with US inequality), rather than domestic inequality, is correlated to lower future stock returns.

Finally, Christou et al. (2021) investigate whether the growth of the market or net income Gini index can help to forecast the equity premium in the G7 countries[16]. For

[15] Gupta et al. (2018) incorporates in the estimations “auxiliary predictors”, that correspond to equity premium predictors from the literature.

[16] Canada, France, Germany, Italy, Japan, United Kingdom (UK), and United States (US)

this exercise, they adopt the Common Correlated Effects (CCE) estimation method of Pesaran (2006), augmented by 2SLS and GMM estimation methods developed by Neal (2015) to control for possible issues of endogeneity, which controls for heterogeneity, cross-sectional dependence and persistence. When analysing the annual out-of-sample period of 1990-2011, their results suggest that inequality tends to reduce the equity premium.

3. METHODOLOGY

3.1. VARIABLES AND DATA USED

To analyse the effect of inequality on the equity premium, we consider a wide set of developed and developing countries (the latter including large emerging economies such as Brazil, Russia, China, India, South Africa, and Mexico). Given the limitations of availability of the dependent variable, the sample period chosen is 2002 to 2019[17], resulting in a panel with 49 countries (Table 1).

Table 2. Countries included in the data panel.

Developed countries				**Developing countries**		
America	Asia	Europe	Oceania	Africa	America	Asia
Canada	Israel	Austria	Australia	Egypt	Brazil	China
United States	Japan	Belgium	New Zeland	Kenya	Chile	Hong Kong
	South Korea	Czech Republic		Mauritius	Colombia	India
		Denmark		South Africa	Mexico	Indonesia
		Estonia				Lebanon

[17] The last year is 2019 to leave out the Covid-19 pandemic since this crisis could distort the results.

Finland	Malaysia
France	Pakistan
Germany	Philippines
Greece	Singapore
Hungary	Sri Lanka
Ireland	Thailand
Italy	Turkey
Netherlands	
Norway	
Poland	
Portugal	
Russia	
Slovenia	
Spain	
Sweden	
Switzerland	
United Kingdom	

Source: Elaborated by the authors. Classification of the level of development of the economy from United Nations Conference on Trade and Development (2022)

In line with the literature, we define the Equity Premium (EP), our dependent variable, as the difference between stock returns and risk-free rate. Following authors such as Aggarwal & Goodell (2008), Aro-Gordon (2015), Morawakage et al. (2019) and Othieno & Biekpe (2019), the risk-free rate is proxied by the local treasury bill rate of each country. Treasury bills have maturity periods from a couple of days up to 52 weeks. Depending on the data availability, we consider different maturities within this range that are taken from the International Monetary Fund (IMF), Organization for Economic Co-operation and Development (OECD), Bloomberg, Federal Reserve Economic Data (FRED) and Refinitiv EIKON database.

The stock returns, on the other hand, are proxied with the MSCI gross total returns index annual change in local currency (in line with Ameur et al., 2013; Graham et al., 2016; Othieno & Biekpe, 2019; Toda & Walsh, 2020). The MSCI gross total returns index is used since it measures stock market prices performance including income from dividends[18] (MSCI Data Operations & Technology, 2012). The nominal MSCI data is available in Bloomberg and is adjusted into real terms with consumer price inflation (CPI).

We will employ two distinct definitions of the stock returns rate. One approach is the one proposed by Christou et al. (2021), and involves taking the natural logarithm of the MSCI gross total return index and subsequently computing the difference with the corresponding value from the prior year. The second approach originates from Toda & Walsh (2020), which define the gross return on stocks from year t to $t+1$ in $R_{t+1} = \frac{P_{t+1} + D_{t+1}}{P_t}$, where R is the stock returns rate, P is the price of the equity and D denotes the dividends. Empirically, this is defined as the annual change of the MSCI gross total return index.

Regarding our variable of interest, inequality, various measures are considered. The relative personal inequality measures are the Top 1% pre-tax income share, the Top 1% pre-tax wealth share and the market Gini index. The top income/wealth measures are available in the Word Inequality Database (WID), whereas the Gini index is retrieved from the Standardized World Income Inequality Database (SWIID). With respect to absolute measures, we calculate the logarithm of the absolute Gini (Chakravarty (2001)[19] and the logarithm of the absolute income difference between

---

[18] The definition of a MSCI total return index in local currency for a country in t+1 is: $MSCITotalReturnindex(local)_t * \frac{IndexAdjusted\ Market\ Cap_{t+1} + Index\ Dividend\ Impact_{\ t+1}}{IndexInitialMarketCap_{\ t+1}}$

[19] The absolute Gini index, according to Chakravarty (2001), can be calculated by multiplying the mean income by the relative Gini index. The mean income is extracted from WID and refers to the

top and bottom earners (Goda et al. 2020)[20]. Finally, we will also consider the growth in the capital share of national income as inequality measure (Lettau et al. (2019) which is also obtained from WID.

Based on the reviewed empirical literature, the following variables will be taken as controls: (i) real GDP growth, to control for income effects that may be correlated to changes in equity premium and inequality (Brückner et al., 2010); (ii) real GDP per capita[21], to control for distinct economic contexts across countries (Goda et al., 2020); (iii) the MSCI gross total returns index variance, to account for the impact of borrowing constraints on shareholders' uninsurable income risk (Guo, 2004, 2006); (iv) inflation rate[22], since literature has shown that inflation can boost or lower equity premium. On the one hand, inflation could contribute to higher the equity premium due to monetary policy uncertainty (Beirne & De Bondt, 2008; Kyriacou et al., 2006; Tristani, 2016). On the contrary, inflation can also lead to an increase in a company's dependence on external financing, resulting in an outstanding equity value decrease and, consequently, reducing the stock return rate and equity premium (J. Campbell et al., 2004; Fama, 1981; Fama & Schwert, 1977; Lintner, 1975).

We also consider (v) the economic freedom[23], considering that various academic investigations have examined the impact of economic freedom on stock returns and equity premium. It is argued that a high degree of economic freedom has the potential to mitigate uncertainty, leading to a reduction in the equity premium due to

average national income of adult individuals in each country. This income is measured in constant 2011 Purchasing Power Parity (PPP) US dollars.

[20] They proposed an approach for calculating absolute top income measures, denoted as Y/N (π/μ-(1-π)/(1-μ)), Where Y/N is the mean income, π is the income share of top earners, μ is the population share of top earners, while 1-π and 1-μ refer to bottom earners.

[21] We will use the logarithm of this variable and measured in constant 2015 US dollars.

[22] Annual inflation measured by the Consumer Price Index (CPI).

[23] Economic freedom is measured as the annual index of Economic Freedom calculated by The Heritage Foundation and The Wall Street Journal.

a decrease in risk perception; (vi) interaction between local/global inequality measures and financial openness, to assess the relative significance of investment due to domestic inequality and to global inequality (Toda & Walsh, 2020). Regarding data sources, (i), (ii) and (iv) are retrieved from the World Bank, (iii) is self-calculated with the MSCI data, (v) extracted from official webpage of The Heritage Foundation, (vi) self-calculated with inequality data from SWIID and financial openness index from the Chinn-Ito website[24].

3.2. ESTIMATION STRATEGY

To study the effect of inequality on equity premium we consider the following dynamic regression model:

$$ER_{jt} = \alpha_j + \beta_j X_{jt-1} + ER_{jt-1} + e_{jt} \tag{1}$$

$$e_{jt} = \lambda'_j F_t + u_{jt} \tag{2}$$

Where the observation on the j_{th} is a cross-section unit (country) at time t, for t = 1, 2…, T and j = 1, 2…, N. The dependent variable, ER, is a measure of Equity Premium. The vector X denotes the $kx1$ regressors, which in our case includes different inequality measures and control variables (see the next section for a detailed description of the variables). e_{jt} denotes the $mx1$ vector of unobserved common factors. F_t is an unobserved common factor, λ_j a heterogeneous factor loading, and α_j a unit-specific fixed effect. Finally, u_{jt} is a cross-section unit-specific independent and identically distributed (IID) error term (Ditzen, 2018).

[24] Financial openness is the Chinn-Ito index, available in the website.

Since we aim to study a panel of 49 countries, we test stationarity using the Levin-Lin-Chu test (Levin et al., 2002)[25], as well as we consider the methodologies used in the empirical literature with this type of data structure for analysis of various countries. In this section, we outline the methodology employed in our study to estimate the impact of inequality on risk premiums. Our choice of using a system Generalized Method of Moments (GMM) estimation strategy is motivated by its relevance and extensive application in similar research efforts (Christou et al., 2021; Lettau et al., 2019; Toda & Walsh, 2020).

Furthermore, fixed effect or random effect models may not be appropriate in situations when the temporal dimension (T) is constrained, as is the case in our study with a time window of up to 17 periods. It is also necessary to address any endogeneity issues, since there exists the possibility that other explanatory variables may be influenced by the dependent variable. To mitigate the endogeneity and improve the consistency of the estimator, we adopt the methodology proposed by Neal (2015) and exemplified by Ditzen (2018) which involves using lagged regressors in the GMM estimation. To ensure the validity of our instruments, we implement the Hansen test, as excessive usage of instruments could result in overfitting of endogenous variables and being unable to remove their endogenous component. For this reason, in this study the reduction of instruments is made through using only three lags of the variables in the model and the adoption of collapsed instruments, as suggested by Roodman (2009).

It is important to acknowledge that while our methodology shares similarities with prior studies in terms of the estimate methods. The key variations are a larger sample size in terms of countries, and the addition of absolute inequality measures.

[25] As is mentioned by Singla and Samanta (2019) and exposed by Maddala and Wu (1999), the work of Levin and Lin (1992, 1993) allows to find that unit root tests such as the Dickey-Fuller, augmented Dickey-Fuller and Phillips-Perron are not convenient to test stationarity for panel data, so eventually they propose the Levin-Lin-Chu test for that purpose (Levin et al., 2002).

4. RESULTS

In this section we will show the findings obtained from the GMM estimations. Our research primarily focuses on analyzing the impact of various inequality measures, both relative and absolute, on the equity premium and its components. As outlined in the previous section, we examine the validity of these effects controlling for key variables of the literature and using two different stock return rate definitions for the equity premium.

Table 3: The effect of inequality on equity premium, using Christou et al.'s (2021) definition

	(i)	*(ii)*	*(iii)*	*(iv)*	*(v)*	*(vi)*	*(vii)*
Top 1% income$_{t-1}$	2.432						
	[1.596]						
Top 1% wealth$_{t-1}$		2.509					
		[1.670]					
Gini market$_{t-1}$			6.497				
			[7.132]				
Log(Absolute Top 1% income)$_{t-1}$				**0.398***			
				[0.209]			
Log(Absolute Top 1% wealth)$_{t-1}$					**0.710*****		
					[0.254]		
Log(Absolute gini market)$_{t-1}$						**0.710*****	
						[0.254]	
Capital share$_{t-1}$							0.529
							[0.893]
ep_c$_{t-1}$	-0.044	0.015	-0.057	-0.023	0.008	-0.039	0.030
	[0.054]	[0.070]	[0.063]	[0.060]	[0.072]	[0.061]	[0.070]
Growth $_t$	-0.162	-0.894	-0.785	-0.023	-0.840	-0.154	-0.548
	[0.607]	[1.162]	[0.681]	[0.521]	[0.623]	[0.450]	[0.436]
Log(GDPpc)$_t$	**-0.392****	-0.236	**-0.444****	**-0.503****	**-0.882*****	**-0.977*****	**-0.314*****
	[0.153]	[0.206]	[0.203]	[0.189]	[0.329]	[0.335]	[0.095]
Inflation$_t$	**-1.691****	**-1.857***	**-1.319***	**-1.960****	**-2.182****	**-1.539***	-0.846
	[0.841]	[1.087]	[0.704]	[0.890]	[1.014]	[0.825]	[0.677]

Stock Variance$_t$	-0.134	0.006	-0.243	-0.260	-0.291	-0.253	0.326
	[0.422]	[0.687]	[0.462]	[0.452]	[0.617]	[0.498]	[0.521]
Economic freedom$_t$	0.041	0.128	-0.073	-0.001	-0.015	0.019	0.152
	[0.110]	[0.188]	[0.113]	[0.091]	[0.138]	[0.092]	[0.138]
Financial openess x local inequality$_t$	0.032	0.022	0.016	0.027	0.029	-0.054	
	[0.276]	[0.582]	[0.592]	[0.516]	[0.499]	(0.3238)	
Financial openess x global inequality$_t$	2.553	-1.099	5.147	0.276	-0.090	0.061	
	[1.875]	[1.185]	[3.468]	[0.249]	[0.365]	[0.314]	
F test	0.00***	0.02**	0.09*	0.00***	0.01**	0.00***	0.01**
Hansen J	0.250	0.577	0.642	0.395	0.485	0.627	0.362
AR(1) z	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
AR(2) z	0.898	0.861	0.914	0.521	0.607	0.608	0.525
Laglimit	3	3	3	3	3	3	3
Instruments	42	42	42	42	42	42	35
Observations	777	777	777	777	777	777	681
Countries	49	49	49	49	49	49	49

*Notes: This table summarizes the effect of backward-looking relative and absolute inequality on equity premium (ep_c) during 2002-2019, using a system GMM estimator with a collapsed instrument matrix, heteroskedasticity robust standard errors, and small-sample adjustments. t-1 is a one-period lag, Each column refers to (i) Top 1% income (ii) Top 1% wealth (iii) Gini market index (iv) log(Absolute top 1% income) (v) log(Absolute top 1% wealth), (vi) log(Absolute gini market), (vii) capital share income. Growth is GDP growth, log(GDPpc) is the logarithm of income per capita, inflation is the GDP deflator, Stock variance is the variance of stock returns ,Economic Freedom is the Chinn-Ito index Financial openess x local inequality is the interaction variable between the Chinn-Ito index and the respective local inequality measure used in the estimation, Financial 22penness x global inequality is the interaction variable between the Chinn-Ito index and the respective glocal inequality measure used in the estimation. All regressions include unreported time and country fixed effects. In each column, coefficients and robust p-values (in parenthesis) are reported. The significance of a coefficient at the 1%, 5% and 10% level is indicated by ***, ** and *, respectively. See Section 3 for more details.*

Considering the equity premium using the definition proposed by Christou et al. (2021), as presented in Table 3, the findings indicate that increases in relative inequality and capital share income do not have a statistically significant effect on the equity premium (see columns 1, 2, 3 and 7). This evidence presents a contrasting viewpoint to the arguments brought up by Dumas (1989), Peress (2004) and Gârleanu & Panageas (2015). They suggest that increased inequality may lead to a fall in the equity premium because of lower stock returns or higher interest rates.

Moreover, our results challenge the conclusions of Danthine & Donaldson (2002), Guvenen (2009), Lansing (2015) and Lettau et al. (2019), who claimed that an increased proportion of capital share income yields a positive impact on the equity premium.

On the contrary, the results indicate that absolute inequality has a statistically significant positive effect on the equity premium (see columns 4, 5 and 6). This result holds true across all inequality measures, including top 1% income (0.398), top 1% wealth (0.710), and the Gini market index (0.710). Thus, the outcome of this study aligns with the argument made by Gollier (2001) that an increase in inequality might lead to a higher equity premium when agents exhibit a concave absolute risk aversion. However, it is crucial to acknowledge that Gollier also emphasizes the absence of definitive evidence regarding the curvature of absolute risk aversion, making it unclear whether a concave or convex representation best captures agent's preferences. The results furthermore indicate that it is important to consider the interaction between mean income and relative income distribution when studying the effects of inequality on asset prices. The reason is that asset demand is mainly driven by the total available income from rich households (Goda et al., 2020).

Table 4: The effect of inequality on stock returns, using Christou et al.'s (2021) definition

	(i)	*(ii)*	*(iii)*	*(iv)*	*(v)*	*(vi)*	*(vii)*
Top 1% income$_{t-1}$	2.774*						
	[1.434]						
Top 1% wealth$_{t-1}$		2.652					
		[1.674]					
Gini market$_{t-1}$			7.780				
			[6.351]				
Log(Absolute Top 1% income)$_{t-1}$				**0.318***			
				[0.186]			
Log(Absolute Top 1% wealth)$_{t-1}$					**0.632*****		

					[0.213]		
Log(Absolute gini market)$_{t-1}$						**0.839****	
						[0.372]	
Capital share$_{t-1}$							0.613
							[0.758]
return_c$_{t-1}$	-0.081	-0.021	-0.096	-0.077	-0.052	-0.081	0.012
	[0.054]	[0.065]	[0.063]	[0.056]	[0.062]	[0.058]	[0.047]
Growth $_t$	-0.156	-0.927	-0.761	0.201	-0.633	-0.041	-0.444
	[0.574]	[1.158]	[0.646]	[0.508]	[0.505]	[0.403]	[0.369]
Log(GDPpc)$_t$	**-0.332****	-0.145	-0.284	**-0.292***	**-0.653****	**-0.794*****	**-0.213****
	[0.141]	[0.207]	[0.185]	[0.162]	[0.271]	[0.264]	[0.089]
Inflation$_t$	-1.381	-1.549	-0.990	**-1.561***	**-1.738***	-1.309	-0.527
	[0.835]	[1.040]	[0.687]	[0.846]	[0.922]	[0.796]	[0.660]
Stock Variance$_t$	-0.218	-0.079	-0.229	-0.272	-0.377	-0.273	0.326
	[0.405]	[0.690]	[0.452]	[0.416]	[0.528]	[0.460]	[0.517]
Economic freedom$_t$	0.022	0.097	-0.100	-0.056	-0.082	-0.037	0.158
	[0.106]	[0.180]	[0.104]	[0.076]	[0.108]	[0.070]	[0.104]
Financial openess x local inequality$_t$	-2.535	1.274	**-7.718***	-0.332	0.002	-0.216	
	[1.893]	[1.1495]	[4.4440]	[0.2614]	[0.3134]	[0.2959]	
Financial openess x global inequality$_t$	**2.933***	-1.183	**5.236***	0.340	0.004	0.215	
	[1.741]	[1.187]	[2.9345]	[0.2587]	[0.3132]	[0.2865]	
F test	0.00***	0.01**	0.10	0.03**	0.03**	0.04**	0.2
Hansen J	0.164	0.564	0.656	0.340	0.400	0.418	0.0934
AR(1) z	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
AR(2) z	0.549	0.530	0.537	0.265	0.257	0.20	0.754
Laglimit	3	3	3	3	3	3	3
Instruments	42	42	42	42	42	42	35
Observations	777	777	777	777	777	777	681
Countries	49	49	49	49	49	49	49

Notes: This table summarizes the effect of backward-looking relative and absolute inequality on equity premium (ep_c) during 2002-2019, using a system GMM estimator with a collapsed instrument matrix, heteroskedasticity robust standard errors, and small-sample adjustments. t-1 is a one-period lag, Each column refers to (i) Top 1% income (ii) Top 1% wealth (iii) Gini market index (iv) log(Absolute top 1% income) (v) log(Absolute top 1% wealth), (vi) log(Absolute gini market), (vii) capital share income. Growth is GDP growth, log(GDPpc) is the logarithm of income per capita, inflation is the GDP deflator, Stock variance is the variance of stock returns ,Economic Freedom is the Chinn-Ito index Financial openess x local inequality is the interaction variable between the Chinn-Ito index and the respective local inequality measure used in the estimation, Financial openess x global inequality is the interaction variable between the Chinn-Ito index and the respective glocal inequality measure used in *the estimation. All regressions include unreported time and country fixed effects. In each column, coefficients, and robust p-values (in parenthesis) are reported. The significance of a coefficient at the 1%, 5% and 10% level is indicated by ***, ** and *, respectively. See Section 3 for more details. Note 2: The '(vii)' column, that refers to Capital share income, is marked as 'Invalid' and has been excluded from the analysis due to not meeting the specified test criteria.*

Table 5: The effect of inequality on the risk free interest rate (treasury bill rate)

	(i)	*(ii)*	*(iii)*	*(iv)*	*(v)*	*(vi)*	*(vii)*
Top 1% income$_{t-1}$	-0.276						
	[0.274]						
Top 1% wealth$_{t-1}$		-0.374					
		[0.288]					
Gini market$_{t-1}$			0.709				
			[1.072]				
Log(Absolute Top 1% income)$_{t-1}$				**-0.097***			
				[0.055]			
Log(Absolute Top 1% wealth)$_{t-1}$					**-0.099***		
					[0.053]		
Log(Absolute gini market)$_{t-1}$						0.013	
						[0.106]	
Capital share$_{t-1}$							0.176
							[0.242]
Treasury_bill_rate$_{t-1}$	**0.597*****	**0.638*****	**0.595*****	**0.620*****	**0.651*****	**0.587*****	**0.669****
	[0.178]	[0.180]	[0.181]	[0.184]	[0.194]	[0.195]	[0.251]
Growth $_t$	**0.323****	0.313	0.204	**0.357***	**0.330***	**0.283***	**0.232***
	[0.161]	[0.199]	[0.166]	[0.181]	[0.180]	[0.148]	[0.132]
Log(GDPpc)$_t$	0.055	0.046	**0.093****	**0.154****	**0.158****	0.082	**0.084***
	[0.035]	[0.034]	[0.036]	[0.068]	[0.060]	[0.074]	[0.042]
Inflation$_t$	**0.305*****	**0.324****	0.205	**0.308****	**0.306****	0.159	**0.374*****
	[0.093]	[0.158]	[0.127]	[0.121]	[0.140]	[0.138]	[0.131]
Stock Variance$_t$	0.043	0.025	0.040	0.111	0.080	0.054	0.148
	[0.093]	[0.118]	[0.080]	[0.116]	[0.119]	[0.077]	[0.127]
Economic freedom$_t$	0.001	-0.013	-0.004	-0.010	-0.014	-0.005	0.015
	[0.027]	[0.039]	[0.029]	[0.031]	[0.033]	[0.026]	[0.027]

Financial openess x local inequality$_t$	-0.287	-0.191	-0.211	0.012	0.013	-0.056	
	[0.507]	[0.258]	[0.864]	[0.057]	[0.079]	[0.093]	
Financial openess x global inequality$_t$	0.128	0.158	0.120	-0.013	-0.013	0.053	
	[0.423]	[0.248]	[0.579]	[0.056]	[0.077]	[0.089]	
F test p-value	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Hansen J	0.561	0.756	0.398	0.846	0.903	0.470	0.414
AR(1) z	0.01**	0.00***	0.01**	0.01**	0.00***	0.01**	0.00***
AR(2) z	0.700	0.817	0.659	0.548	0.763	0.758	0.143
Laglimit	3	3	3	3	3	3	3
Instruments	42	42	42	42	42	42	35
Observations	777	777	777	777	777	777	681
Countries	49	49	49	49	49	49	49

*Notes: This table summarizes the effect of backward-looking relative and absolute inequality on risk free rate (Treasury_bill_rate) during 2002-2019, using a system GMM estimator with a collapsed instrument matrix, heteroskedasticity robust standard errors, and small-sample adjustments. t-1 is a one-period lag. Each column refers to (i) Top 1% income (ii) Top 1% wealth (iii) Gini market index (iv) log(Absolute top 1% income) (v) log(Absolute top 1% wealth), (vi) log(Absolute gini market), (vii) capital share income. Growth is GDP growth, log(GDPpc) is the logarithm of income per capita, inflation is the GDP deflator, Stock variance is the variance of stock returns ,Economic Freedom is the Chinn-Ito index Financial openess x local inequality is the interaction variable between the Chinn-Ito index and the respective local inequality measure used in the estimation, Financial openess x global inequality is the interaction variable between the Chinn-Ito index and the respective glocal inequality measure used in the estimation. All regressions include unreported time and country fixed effects. In each column, coefficients and robust p-values (in parenthesis) are reported. The significance of a coefficient at the 1%, 5% and 10% level is indicated by ***, ** and *, respectively. See Section 3 for more details.*

Building upon the insights presented in Table 3, the subsequent analysis in Table 4 and Table 5 delves deeper into the impact of inequality measures on the components of the equity premium. Specifically, Table 4 examines the relationship between inequality and stock returns rate, while Table 5 focuses on the correlation between inequality and the risk-free interest rate, represented by the treasury bill rate. The collective findings in these tables, reinforce the earlier conclusions regarding the influence of inequality on the equity premium. Table 4 underscores a positive and statistically significant association between inequality and the equity premium, primarily through its effect on higher stock returns rates. Table 5 exhibits a negative and statistically significant relationship between inequality and the risk-free rate.

Among the control variables in all estimations, GDP per capita and inflation stand out with a complex influence. Inflation negatively affects returns while simultaneously exerts a positive impact on risk-free interest rates. This leads to a negative effect on equity premium, which coincides with Fama & Schwert (1977), Fama (1981) and Campbell & Vuoltenahoo (2004). GDP per capita affects positively treasury bill rate but shows an inverse correlation with stock returns rate and equity premium. On the other hand, GDP growth, though displaying effects similar to GDP per capita, is less robust and fail to exhibit consistent significance. The other control variables do not show statistical significance in relation to the equity premium and its components.

Exploring a possible dynamic aspect of the equity premium, the estimations show that a previous period treasury bill rate has a significant effect on the one of a subsequent period. This suggests that the risk-free interest rate follows a dynamic process. In contrast, it can be observed that the stock returns rate and equity premium do not exhibit such characteristic.

When considering the stock returns rate definition from Toda & Walsh (2020), the main findings stay robust (see Table 6-7). The relative inequality measures are not significant, whereas absolute inequality displays a direct and significant impact on equity premium and on stock returns. Estimations of absolute inequality measures also continue to reveal a negative correlation between GDP per capita and inflation with equity premium and stock returns.

Table 6: The effect of inequality on equity premium, using with Toda & Walsh stock's (2021) definition

	(i)	*(ii)*	*(iii)*	*(iv)*	*(v)*	*(vi)*	*(vii)*
Top 1% income$_{t-1}$	7.963 [5.0030]						
Top 1% wealth$_{t-1}$		7.572 [4.8900]					
Gini market$_{t-1}$			32.295 [25.0050]				

Log(Absolute Top 1% income)$_{t-1}$				**0.936***			
				[0.4894]			
Log(Absolute Top 1% wealth)$_{t-1}$					**1.851*****		
					[0.6289]		
Log(Absolute gini market)$_{t-1}$						**2.422****	
						[1.1924]	
Capital share$_{t-1}$							0.768
							[1.803]
ep_tw$_{t-1}$	-0.072	0.008	-0.095	-0.068	-0.029	-0.069	0.051
	[0.060]	[0.067]	[0.075]	[0.065]	[0.068]	[0.067]	[0.061]
Growth $_t$	-0.638	-2.878	-2.954	-0.204	-2.417	-0.473	-1.087
	[1.673]	[3.061]	[2.463]	[1.616]	[1.484]	[1.100]	[0.968]
Log(GDPpc)$_t$	**-0.935****	-0.537	-0.856	**-0.943****	**-2.042****	**-2.400*****	**-0.573****
	[0.422]	[0.567]	[0.680]	[0.465]	[0.851]	[0.844]	[0.262]
Inflation$_t$	-4.118	-4.658	-2.948	**-5.100***	**-5.769***	-4.226	-0.986
	[2.667]	[3.268]	[2.253]	[2.855]	[3.180]	[2.646]	[1.703]
Stock Variance$_t$	-0.338	-0.088	-0.493	-0.614	-0.875	-0.626	0.533
	[1.089]	[2.046]	[1.428]	[1.234]	[1.620]	[1.327]	[1.286]
Economic freedom$_t$	-0.028	0.239	-0.423	-0.295	-0.314	-0.203	0.272
	[0.304]	[0.537]	[0.3600]	[0.303]	[0.375]	[0.269]	[0.288]
Financial openess x local inequality$_t$	-6.974	3.030	**-31.029***	-0.683	0.222	-0.390	
	[5.224]	[3.465]	[16.359]	[0.750]	[0.987]	[0.822]	
Financial openess x global inequality$_t$	**9.028***	-2.586	**21.172***	0.726	-0.191	0.415	
	[4.924]	[3.441]	[11.110]	[0.743]	[0.985]	[0.797]	
F test	0.01**	0.03**	0.2	0.02**	0.02**	0.04**	0.03**
Hansen J	0.347	0.608	0.494	0.341	0.430	0.333	0.177
AR(1) z	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
AR(2) z	0.727	0.786	0.857	0.308	0.320	0.317	0.207
Laglimit	3	3	3	3	3	3	3
Instruments	42	42	42	42	42	42	35
Observations	777	777	777	777	777	777	681
Countries	49	49	49	49	49	49	49

Notes: This table summarizes the effect of backward-looking relative and absolute inequality on equity premium (ep_tw) during 2002-2019, using a system GMM estimator with a collapsed instrument matrix, heteroskedasticity robust standard errors, and small-sample adjustments. t-1 is a one-period lag. Each column refers to (i) Top 1% income (ii) Top 1% wealth (iii) Gini market index (iv) log(Absolute top 1% income) (v) log(Absolute top 1% wealth), (vi) log(Absolute gini market), (vii) capital share income. Growth is GDP growth, log(GDPpc) is the logarithm of income per capita, inflation is the GDP deflator, Stock variance is the *variance of stock returns ,Economic Freedom is the Chinn-Ito index Financial openess x local inequality is the interaction variable between the Chinn-Ito index and the respective local inequality measure used in the estimation, Financial openess x global inequality is the interaction variable between the Chinn-Ito index and the respective glocal inequality measure used in the estimation. All regressions include unreported time and country fixed effects. In each column, coefficients, and robust p-values (in parenthesis) are reported. The significance of a coefficient at the 1%, 5% and 10% level is indicated by ***, ** and *, respectively. See Section 3 for more details. Note 2: The '(iii)' column, that refers to Gini market index, is marked as 'Invalid' and has been excluded from the analysis due to not meeting the specified test criteria.*

Table 7: The effect of inequality on stock returns, using with Toda & Walsh stock's (2021) definition

	(i)	*(ii)*	*(iii)*	*(iv)*	*(v)*	*(vi)*	*(vii)*
Top 1% income$_{t-1}$	**8.301***						
	[4.881]						
Top 1% wealth$_{t-1}$		7.941					
		[4.993]					
Gini market$_{t-1}$			34.418				
			[25.014]				
Log(Absolute Top 1% income)$_{t-1}$				**0.866***			
				[0.477]			
Log(Absolute Top 1% wealth)$_{t-1}$					**1.839*****		
					[0.598]		
Log(Absolute gini market)$_{t-1}$						**2.470****	
						[1.095]	
Capital share$_{t-1}$							0.883
							[1.682]
return_tw$_{t-1}$	-0.075	0.007	-0.100	-0.078	-0.039	-0.075	0.059
	[0.061]	[0.067]	[0.078]	[0.066]	[0.067]	[0.068]	[0.054]
Growth $_t$	-0.698	-3.060	-3.041	-0.046	-2.357	-0.432	-0.990
	[1.646]	[3.159]	[2.488]	[1.614]	[1.431]	[1.0788]	[0.9555]
Log(GDPpc)$_t$	**-0.883****	-0.460	-0.722	-0.742	**-1.881****	**-2.250*****	**-0.466***
	[0.412]	[0.587]	[0.687]	[0.448]	[0.818]	[0.785]	[0.261]
Inflation$_t$	-3.831	-4.415	-2.669	-4.731	**-5.392***	-4.042	-0.704
	[2.700]	[3.285]	[2.277]	[2.850]	[3.136]	[2.656]	[1.737]
Stock Variance$_t$	-0.355	-0.106	-0.420	-0.542	-0.902	-0.581	0.590
	[1.087]	[2.099]	[1.473]	[1.215]	[1.5670]	[1.310]	[1.302]

Economic freedom$_t$	-0.038	0.235	-0.458	-0.343	-0.367	-0.245	0.280
	[0.304]	[0.549]	[0.367]	[0.295]	[0.360]	[0.258]	[0.268]
Financial openess x local inequality$_t$	-7.625	3.141	**-32.323***	-0.763	0.119	-0.588	
	[5.153]	[3.547]	[16.212]	[0.760]	[0.960]	[0.804]	
Financial openess x global inequality$_t$	9.327*	-2.867	21.948*	0.802	-0.092	0.602	
	[4.844]	[3.516]	[10.974]	[0.753]	[0.958]	[0.779]	
F test	0.02**	0.04**	0.2	0.05**	0.02**	0.08**	0.06**
Hansen J	0.292	0.647	0.574	0.307	0.392	0.260	0.0886
AR(1) z	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
AR(2) z	0.649	0.681	0.787	0.269	0.244	0.234	0.225
Laglimit	3	3	3	3	3	3	3
Instruments	42	42	42	42	42	42	35
Observations	777	777	777	777	777	777	681
Countries	49	49	49	49	49	49	49

*Notes: This table summarizes the effect of backward-looking relative and absolute inequality on equity premium (ep_c) during 2002-2019, using a system GMM estimator with a collapsed instrument matrix, heteroskedasticity robust standard errors, and small-sample adjustments. t-1 is a one-period lag. Each column refers to (i) Top 1% income (ii) Top 1% wealth (iii) Gini market index (iv) log(Absolute top 1% income) (v) log(Absolute top 1% wealth), (vi) log(Absolute gini market), (vii) capital share income. Growth is GDP growth, log(GDPpc) is the logarithm of income per capita, inflation is the GDP deflator, Stock variance is the variance of stock returns ,Economic Freedom is the Chinn-Ito index Financial openess x local inequality is the interaction variable between the Chinn-Ito index and the respective local inequality measure in the estimation, Financial openess x global inequality is the interaction variable between the Chinn-Ito index and the respective glocal inequality measure in the estimation. All regressions include unreported time and country fixed effects. In each column, coefficients, and robust p-values (in parenthesis) are reported. The significance of a coefficient at the 1%, 5% and 10% level is indicated by ***, ** and *, respectively. See Section 3 for more details. The '(iii)' column, that refers to Gini market index, is marked as 'Invalid' and has been excluded from the analysis due to not meeting the specified test criteria.*

5. CONCLUSIONS

The equity premium, a pivotal metric in financial economics, has been the subject of extensive study and debate. Understanding its determinants is crucial for asset allocation decisions and investment strategies. This study aimed to investigate the impact of inequality on the equity premium across 49 countries from 2002 to 2019, shedding light on an aspect that has not been extensively explored in the existing literature. To address endogeneity and ensure the robustness of the results, we employed GMM estimations and used distinct inequality and stock returns rate measures.

The empirical results of this research yield several noteworthy conclusions. First and foremost, the study's results indicate that neither relative inequality (represented by measures such as the top 1% income share, top 1% wealth share, Gini market index) nor the capital income share of national income, have a significant effect on the equity premium. Intriguingly, the analysis reveals that absolute inequality, as opposed to relative inequality, does have a notable impact on the equity premium. This distinction suggests that the important to consider the interaction of rising mean income and its relative distribution when studying potential correlates of asset prices, and is in line with Goda et al.'s (2020) findings about the effect of inequality on OECD house prices. More generally, finding confirms the prevailing belief that income inequality influences equity premium dynamics. Furthermore, when dissecting the components of the equity premium, it becomes evident that both risk-free rates, represented here by the treasury bill rate, and stock returns rate are affected by changes in absolute inequality.

It is important to mention that the precise theoretical mechanisms driving these findings are unclear, given that theoretical models offer conflicting explanations for the relationship between inequality and the equity premium. Some models suggest that increasing inequality boosts demand for stocks, reducing their risk premium, while others posit ambiguous effects dependent on risk aversion and wealth accumulation dynamics. These distinct theories and our empirical findings highlight the complex nature of the relationship between inequality and the equity premium, emphasizing the need for further research to unravel the underlying mechanisms. As wealth and income inequality continue to rise globally, understanding these dynamics becomes increasingly critical for investors and policymakers alike.

REFERENCES

Aggarwal, R., & Goodell, J. W. (2008a). Equity premia in emerging markets : National characteristics as determinants. *Journal of Multinational Financial Management*, *18*, 389–404. https://doi.org/10.1016/j.mulfin.2008.02.002

Aggarwal, R., & Goodell, J. W. (2008b). Equity premia in emerging markets: National characteristics as determinants. *Journal of Multinational Financial Management*, *18*(4), 389–404. https://doi.org/10.1016/j.mulfin.2008.02.002

Aït-Sahalia, Y., Parker, J., & Yogo, M. (2001). *Luxury Goods and The Equity Premium* (Vol. 3).

Alvaredo, F., Atkinson, A., Piketty, T., & Saez, E. (2013). The Top 1 Percent in International and Historical Perspective. *Journal of Economic Perspectives*, *27*(3).

Ameur, H. Ben, Gnégné, Y., & Jawadi, F. (2013). Measuring time-varying equity risk premium in the context of financial crisis: do developed and emerging markets differ? *Applied Economics Letters*, *20*(18), 1673–1677. https://doi.org/10.1080/13504851.2013.829174

Annaert, J., Buelens, F., & Deloof, M. (2012). Long Run Stock Returns: Evidence from Belgium 1838-2010. *SSRN Electronic Journal*, *2010*. https://doi.org/10.2139/ssrn.2156803

Aro-Gordon, S. (2015). Equity Risk Premium in an Emerging Market Economy. *IOSR Journal of Economics and Finance Ver. II*, *6*(6), 2321–5933. https://doi.org/10.9790/5933-06620110

Arrow, K. (1965). *Aspects of the Theory of Risk Bearing*.

Atkinson, A., Piketty, T., & Saez, E. (2011). Top Incomes in the Long Run of History. *Journal of Economic Literature*, *49*(1).

Barberis, N., & Huang, M. (2007). The Loss Aversion/Narrow Framing Approach to the Equity Premium Puzzle. In *Handbook of the Equity Risk Premium*.

Barberis, N., Ming, H., & Tano, S. (2001). Prospect Theory and Asset Prices. *Quarterly Journal of Economics*, *116*(1 (February)), 1–53.

Beirne, J., & De Bondt, G. (2008). The equity premium and inflation. *Applied Financial Economics Letters*, *4*(6), 439–442. https://doi.org/10.1080/17446540801935389

Bellelah, M. A., Bellelah, M. O., Ben Ameur, H., & Ben Hafsia, R. (2017). Does the equity premium puzzle persist during financial crisis? The case of the French equity market. *Research in International Business and Finance*, *39*, 851–866. https://doi.org/10.1016/j.ribaf.2015.02.018

Benartzi, S., & Richard H, T. (1995). Myopic Loss Aversion and the Equity Premium Puzzle. *Quarterly Journal of Economics*, *110*(1 (February)), 73–92.

Bernstein, P. L. (1997). What Rate of Return Can You Reasonably Expect . . . or What Can the Long Run Tell Us about the Short Run? *Financial Analysts Journal*, *53*(2 (March/April)), 20–28.

Brown, S. J., William N, G., & Stephen A, R. (1995). Survival. *Journal of Finance*, *50*(3 (July)), 853–873.

Brückner, M., Gerling, K., & Grüner, H. P. (2010). Wealth inequality and credit markets: Evidence from three industrialized countries. *Journal of Economic Growth*, *15*(2), 155–176. https://doi.org/10.1007/s10887-010-9053-y

Campbell, J., Vuolteenaho, T., Brennan, M., Cohen, R., Hodrick, R., Keloharju, M., Lamont, O., Mankiw, G., Pastor, L., Petajisto, A., Polk, C., Shanken, J., Shleifer, A., Stein, J., Thompson, S., & Viceira, L. (2004). Bad Beta, Good Beta. *American Economic Association*, *94*(5), 1249–1275. http://www.nber.org/papers/w9509

Campbell, S. D., Delikouras, S., Jiang, D., & Korniotis, G. (2016). The Human Capital That Matters : Expected Returns and High-Income Households. *The Review of Financial Studies*, *29*(9), 2523–2563.

Chakravarty, S. R. (2001). The variance as a subgroup decomposable measure of inequality. *Social Indicators Research*, *53*(1), 79–95. https://doi.org/10.1023/A:1007100330501

Christou, C., Gupta, R., & Jawadi, F. (2021). Does inequality help in forecasting equity premium in a panel of G7 countries? *North American Journal of Economics and Finance*, *57*(May), 101456. https://doi.org/10.1016/j.najef.2021.101456

Cochrane, J. H. (2005). *Asset Pricing: Revised Edition*.

Constantinides, G., & Duffie, D. (1996). Asset pricing with Heterogeneous Consumers. *The Journal of Political Economy*, *104*(2), 219–240.

Constantinides, G. M., Donaldson, J. B., & Rajnish, M. (2002). Junior Can't Borrow: A New Perspective on the Equity Premium Puzzle. *Quarterly Journal of Economics*, *117*(1 (February)), 269–296.

Credit Suisse. (2021). Global welth report 2021. *Global Wealth Report 2021*, *June*.

Danthine, J. P., & Donaldson, J. B. (2002). Labour relations and asset returns. *Review of Economic Studies*, *69*(1), 41–64. https://doi.org/10.1111/1467-937X.00197

Dimson, E., Marsh, P., & Staunton, M. (2012). Equity Premia Around the World. *SSRN Electronic Journal*, *2011*(October), 1–19. https://doi.org/10.2139/ssrn.1940165

Dimson, E., Paul, M., & Staunton, M. (2008). The Worldwide Equity Premium: A Smaller Puzzle. In *Handbook of the Equity Risk Premium*.

Ditzen, J. (2018). Estimating dynamic common-correlated effects in stata. *Stata*

Journal, *18*(3), 585–617. https://doi.org/10.1177/1536867x1801800306

Donadelli, M., & Prosperi, L. (2012). The Equity Risk Premium: Empirical Evidence from Emerging Markets. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1893378

Duangchaiyoosook, S., & Ousawat, T. (2021). *EQUITY PREMIUM PUZZLE IN THAILAND : REVISITED Theoretical background*. *13*(1), 101–134.

Dumas, B. (1989). The Society for Financial Studies Two-Person Dynamic Equilibrium in the Capital Market. *The Review of Financial Studies*, *2*(2), 157–188.

Eurostat. (2022). *Glossary:In-sample vs. out-of-sample forecasts*. Statistics Explained. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:In-sample_vs._out-of-sample_forecasts

Fama, E. F. (1981). Stock Returns, Real Activity, Inflation, and Money. *American Economic Association Stock Returns The American Economic Review*, *71*(4), 545–565. http://www.jstor.org/stable/1806180%5Cnhttp://www.jstor.org/stable/1806180

Fama, E. F., & Kenneth R, F. (2002). The Equity Premium. *Journal of Finance*, *57*(2 (April)), 637–659.

Fama, E. F., & Schwert, G. W. (1977). Asset returns and inflation. *Journal of Financial Economics*, *5*(2), 115–146. https://doi.org/10.1016/0304-405X(77)90014-9

Favilukis, J. (2013). Inequality, stock market participation, and the equity premium. *Journal of Financial Economics*, *107*(3), 740–759. https://doi.org/10.1016/j.jfineco.2012.10.008

Gârleanu, N., & Panageas, S. (2015). Young, old, conservative, and bold: The implications of heterogeneity and finite lives for asset pricing. *Journal of Political*

Economy, *123*(3), 670–685. https://doi.org/10.1086/680996

Giannikos, C. I., & Koimisis, G. (2021). Habits, Wealth and Equity Risk Premium. *Finance Research Letters*, *38*, 101518. https://doi.org/10.1016/j.frl.2020.101518

Goda, T., Stewart, C., & Torres García, A. (2020). Absolute income inequality and rising house prices. *Socio-Economic Review*, *18*(4), 941–976. https://doi.org/10.1093/ser/mwz028

Gollier, C. (2001). Wealth inequality and asset pricing. *Review of Economic Studies*, *68*(1), 181–203. https://doi.org/10.1111/1467-937X.00165

Gomez, M. (2019). Asset Prices and Wealth Inequality. *Working Paper*, 1–60.

Graham, M., Peltomäki, J., & Piljak, V. (2016). Global economic activity as an explicator of emerging market equity returns. *Research in International Business and Finance*, *36*, 424–435. https://doi.org/10.1016/j.ribaf.2015.09.030

Guo, H. (2004). Limited stock market participation and asset prices in a dynamic economy. *Journal of Financial and Quantitative Analysis*, *39*(3), 495–516. https://doi.org/10.1017/s0022109000004002

Guo, H. (2006). On the out-of-sample predictability of stock market returns. *Journal of Business*, *79*(2), 645–670. https://doi.org/10.1086/499134

Gupta, R., Pierdzioch, C., Vivian, A. J., & Wohar, M. E. (2018). The predictive value of inequality measures for stock returns : An analysis of long-span UK data using quantile random forests. *Finance Research Letters*, *August*, 1–8. https://doi.org/10.1016/j.frl.2018.08.013

Guvenen, F. (2009). A Parsimonious Macroeconomic Model for Asset Pricing. *Econometrica*, *77*(6), 1711–1750. https://doi.org/10.3982/ecta6658

Hassan, S., & Van Biljon, A. (2010). The equity premium and risk-free rate puzzles in a turbulent economy: Evidence from 105 years of data from south Africa.

South African Journal of Economics, *78*(1), 23–39. https://doi.org/10.1111/j.1813-6982.2010.01237.x

Hatchondo, J. C. (2008). A Quantitative Study of the Role of Wealth Inequality on Asset Prices. *Economic Quarterly*, *94*(1), 73–96.

Imran, M., Wu, M., Gu, S., Saud, S., & Abbas, M. (2019). Influence of economic and non-economic factors on firm level equity premium: Evidence from Pakistan. *Economics Bulletin*, *39*(3), 1774–1785.

Johnson, T. C. (2012). Inequality risk premia. *Journal of Monetary Economics*, *59*(6), 565–580. https://doi.org/10.1016/j.jmoneco.2012.06.008

Krusell, P., & Smith, A. A. (1997). Income and wealth heterogeneity, portfolio choice, and equilibrium asset returns. *Macroeconomic Dynamics*, *1*(2), 387–422. https://doi.org/10.1017/s1365100597003052

Kyriacou, K., Madsen, J. B., & Mase, B. (2006). Does inflation exaggerate the equity premium? *Journal of Economic Studies*, *33*(5), 344–356. https://doi.org/10.1108/01443580610706573

Lansing, K. J. (2015). Asset pricing with concentrated ownership of capital and distribution shocks. *American Economic Journal: Macroeconomics*, *7*(4), 67–103. https://doi.org/10.1257/mac.20110130

Lettau, M., Ludvigson, S. C., & Ma, S. (2019). Capital Share Risk in U.S. Asset Pricing. *Journal of Finance*, *74*(4), 1753–1792. https://doi.org/10.1111/jofi.12772

Levin, A., & Lin, C.-F. (1992). *Unit Root Test in Panel Data: Asymptotic and Finite Sample Properties* (Discussion Paper; 92-93).

Levin, A., & Lin, C.-F. (1993). *Unit Root Test in Panel Data: New Results* (Discussion Paper; 93-56).

Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, *108*(1), 1–24. https://doi.org/10.1016/S0304-4076(01)00098-7

Lintner, J. (1975). Inflation and security returns. *Journal of Finance*, *XXX*(2), 259–280.

Lucas, R. (1978). Asset Prices in an Exchange Economy. *Econometrica*, *46*(6), 1429–1445.

Łukowski, M., Gemra, K., Maruszewski, J., Śliwiński, P., & Zygmanowski, P. (2020). Equity premium puzzle — Evidence from Poland. *Journal of Behavioral and Experimental Finance*, *28*, 100398. https://doi.org/10.1016/j.jbef.2020.100398

Maddala, G. S., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics*, *61*(SUPPL.), 631–652. https://doi.org/10.1111/1468-0084.0610s1631

Marquis, M. H. (2011). *FEDERAL RESERVE BANK OF SAN FRANCISCO The Wage Premium Puzzle and the Quality of Human Capital*. *February*.

McGrattan, E. R., & Edward C, P. (2001). *Taxes, Regulations, and Asset Prices*.

Mehra, R., & Prescott, E. (1985). The Equity Premium - A puzzle. *Journal of Monetary Economics*, *15*, 145–161. https://doi.org/10.3905/jpm.2004.319936

Mehra, R., & Prescott, E. C. (2003). Abstract 1 Introduction 2 The equity premium : history Appendix B The original analysis of the equity premium puzzle. *Handbook of the Economics of Finance*.

Mehra, R., & Prescott, E. C. (2008). The Equity Premium: ABCs. In *Handbook of the Equity Risk Premium*.

Meinshausen, N. (2006). Quantile Regression Forests. *Journal of Machine Learning Research*, *7*, 983–999.

Milanovic, B. (2012). Global Income Inequality by the Numbers: in History and Now. In *The World Bank Development Research Group* (Issue November).

Morawakage, P. S., Nimal, P. D., & Kuruppuarachchi, D. (2019). Equity Risk Premium Puzzle: Evidence from Indonesia and Sri Lanka. *Bulletin of Indonesian Economic Studies*, *55*(2), 239–248. https://doi.org/10.1080/00074918.2018.1529406

MSCI Data Operations & Technology. (2012). *MSCI Index Calculation Methodology: Index Calculation Methodology for the MSCI Equity Indices* (Issue May).

Neal, B. T. (2015). "Estimating Heterogeneous Coefficients in Panel Data Models with Endogenous Regressors and Common Factors." *Workblacking Paper*, *2009*, 1–29.

Ohlson, J. A., & Juettner-nauroth, B. E. (2005). Expected EPS and EPS Growth as Determinants of Value. *Review of Accounting Studies*, *10*, 349–365.

Othieno, F., & Biekpe, N. (2019). Estimating the conditional equity risk premium in African frontier markets. *Research in International Business and Finance*, *47*, 538–551. https://doi.org/10.1016/j.ribaf.2018.09.015

Peress, J. (2004). Wealth, information acquisition, and portfolio choice. *Review of Financial Studies*, *17*(3), 879–914. https://doi.org/10.1093/rfs/hhg056

Pesaran, M. H. (2006). Estimation and inference in large heterogeneous panels with a multifactor error structure. *Econometrica*, *74*(4), 967–1012. https://doi.org/10.1111/j.1468-0262.2006.00692.x

Piketty, T., & Saez, E. (2014). Inequality in the Long Run. *Science*.

Pratt, J. W. (1964). Risk Aversion in the Small and in the Large. *Econometrica*, *32*(Jan-Apr), 15.

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata Journal*, *9*(1), 86–136. https://doi.org/10.1177/1536867x0900900106

Siegel, L. B. (2018). The Equity Risk Premium: A Contextual Literature Review. In

SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3088820

Singla, H. K., & Samanta, P. K. (2019). Determinants of dividend payout of construction companies: a panel data analysis. *Journal of Financial Management of Property and Construction*, *24*(1), 19–38. https://doi.org/10.1108/JFMPC-06-2018-0030

Toda, A. A., & Walsh, K. J. (2020). The equity premium and the one percent. *Review of Financial Studies*, *33*(8), 3583–3623. https://doi.org/10.1093/RFS/HHZ121

Tristani, O. (2016). Model Misspecification , the Equilibrium Natural Interest Rate , and the Equity Premium Wiley Stable. *Journal of Money, Credit and Banking*, *41*(7), 1453–1479.

UNCTAD. (2022). Development status groups and composition. In *United Nations Conference on Trade and Development - UNCTADStat* (Issue April). https://unctadstat.unctad.org/en/Classifications/DimCountries_All_Hierarchy.pdf

Virk, N. S. (2012). Equity Premium Puzzle: A Finnish Review. *International Journal of Economics and Finance*, *4*(2). https://doi.org/10.5539/ijef.v4n2p44

Walentin, K. (2010). Earnings inequality and the equity premium. *B.E. Journal of Macroeconomics*, *10*(1). https://doi.org/10.2202/1935-1690.1939

Welch, I. (2000). Views of financial economists on the equity premium and on professional controversies. *Journal of Business*, *73*(4), 501–537. https://doi.org/10.1086/209653

World Inequality Lab. (2022). *WORLD INEQUALITY REPORT 2022*.