Meritocracy and Asset Prices*

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Abstract

Meritocracy characterizes a political system wherein economic goods are allocated based on an individual's ability and effort, rather than social class. This paper constructs a measure of meritocracy, uncovers meritocracy's impact on asset prices, income inequality, and effort empirically, and proposes a theoretical model that is consistent with the empirical findings. Our empirical analysis demonstrates that higher levels of meritocracy are associated with a higher interest rate, lower stock price-dividend ratio, and lower stock risk premium and volatility. We also find that meritocracy plays a significant role in the real economy, with higher meritocracy related to higher levels of individual and aggregate effort and greater income inequality over the past 50 years. To shed light on these findings, we develop a dynamic model of financial markets that incorporates meritocracy in the economy. Our model provides insights that support our empirical results, uncovers the underlying mechanisms at play, and makes novel predictions regarding how heterogeneity in individual ability and social class modulates the relationship between meritocracy and inequality.

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Keywords: Meritocracy, asset prices, risk premium, interest rate, volatility, effort, income inequality, utility.

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1 Introduction

"Success does not depend on being born into wealth or privilege, it depends on effort and merit." - Barack Obama, former US President. Town Hall Education Arts Recreation Campus, Washington, D.C., December 2013.

"I want Britain to be the world's great meritocracy – a country where everyone has a fair chance to go as far as their talent and their hard work will allow." - Theresa May, former UK Prime Minister. British Academy, London, September 2016.

The landmark book of Young (1958) first coined the word meritocracy in the middle of the 20th century, and defined meritocracy as the degree to which a person's income and occupation depend on the person's ability and effort, as opposed to his or her social class. Since then, meritocracy has appeared in countless media articles, popular books, and political speeches debating its merits and drawbacks.[1] In addition, meritocracy has been widely studied in the academic sociology, psychology, and political science literatures, and to an extent in the economics literature. These studies have helped contribute to important policy debates and our understanding of concepts such as the American dream (Benabou and Tirole (2006), Newman, Johnston, and Lown (2015)), while work in the economics literature has helped our collective understanding of how meritocracy relates to redistributive taxation and labor market efficiency (Almas, Cappelen, and Tungodden (2020), Caselli and Gennaioli (2005)). However, despite its importance and far-reaching consequences, the study of meritocracy is largely absent from the finance literature. This may be somewhat surprising, considering meritocracy is likely to affect individual utility and influence individual decision-making with regard to consumption and labor, and so it is reasonable to postulate that meritocracy may also play a role in the financial markets. In this paper, we empirically show that meritocracy does indeed significantly affect asset prices and their dynamics, as well as real economic quantities such as effort and inequality. We then provide a dynamic asset pricing model with meritocracy that reconciles all our empirical findings and uncovers the underlying economic mechanisms at play.

In our empirical analysis, we employ data from the World Values Survey (WVS) in order to compute an annual time series of US meritocracy level.[2] In particular, we use responses

[1] For instance, see Appiah (2019), Ball (2021), Markovits (2019), May (2016), Sandel (2020), and Obama (2013).

[2] The US constitutes 61% of the world's stock market capitalization, and has among the best data availability in the WVS. In our empirical analyses, we employ both meritocracy level and meritocracy innovations measures for meritocracy. As discussed in Section 2, meritocracy innovations are computed as the AR(1) residuals of meritocracy level and represent the unexpected shocks to meritocracy.

to the question that asks participants to place themselves on a scale of 1 to 10 depending on how much they agree with the following statement: "In the long run, hard work usually brings a better life" (1) versus the statement "Hard work doesn't generally bring success - it's more a matter of luck and connections" (10). Since there are only four survey waves of the WVS that include the meritocracy question, we employ a cohort methodology (Bernile, Bhagwat, and Rau (2017), Fagereng, Gottlieb, and Guiso (2017), Malmendier, Tate, and Yan (2011), Mijs (2018b)) using a representative age of 55 years old to build an annual US perceived meritocracy index. The resulting data series covers 1969-2021. We then analyze the time-series properties of meritocracy, and find that it is stationary and exhibits mean-reversion. One plausible explanation for the observed mean-reversion is that meritocracy tends to evolve in cycles, similarly to political or business cycles.

Next, we document that empirically, the degree of perceived meritocracy in the US economy has a significant effect on asset prices. In particular, we find that the risk-free interest rate is positively associated with meritocracy. On the other hand, the stock market price-dividend ratio, risk premium, and return volatility are all negatively related to meritocracy. This finding is especially notable as proponents of the meritocratic system who believe in "do well by doing good" may find it somewhat surprising that higher meritocracy does not lead to higher stock returns and a higher stock market level in the future.

We further demonstrate that individuals' effort, utility, and income inequality are also affected by meritocracy. With regards to effort, which is measured as the average annual number of hours worked by an employed person in the US, we document that individuals exert more effort in the presence of higher meritocracy. This relation is motivated by the fact that income depends on effort to a higher degree in a more meritocratic economy, so individuals face more significant incentives to work harder when meritocracy is high. In terms of utility, we find that both life satisfaction and happiness—measured using the corresponding WVS questions—increase with perceived meritocracy. Finally, we measure inequality via two methods, the Gini coefficient (e.g., Alesina, Glaeser, and Sacerdote (2001)) and the variance of individuals' incomes (e.g., Robinson (1976), Pastor and Veronesi (2016, 2021)). We determine that over the past half century, meritocracy has been positively related to inequality. This may initially appear surprising for many who regard meritocracy as a virtuous construct, since if meritocracy rewards talented and hard-working individuals and such individuals are equally distributed across various echelons of society, then higher meritocracy should help narrow the income gap.

In order to help explain our empirical findings, we develop a tractable model with meritocracy that delivers closed-form solutions for the mechanisms through which meritocracy

affects asset prices, individual and aggregate effort, and income inequality. Our model is cast within a standard dynamic asset pricing environment. There are two sources of shocks in the economy: one from the economic output, and the other from meritocracy. There is a continuum of agents differing in ability, social class, and income. Meritocracy enters into the economy by affecting agents' utility as well as playing a role in their income process. In particular, agents' utility increases with both consumption and meritocracy. For the income process, meritocracy acts as a moderator so that in a more meritocratic society, the agents' income depends more on effort, while in a less meritocratic society, income depends more on social class.

Our model generates asset pricing implications that are consistent with the empirical evidence. It also sheds light on why asset prices are affected by meritocracy. The risk-free interest rate increases with meritocracy as higher meritocracy induces agents to consume more and save less, which then increases the interest rate in equilibrium. Meanwhile the stock price-dividend ratio decreases with meritocracy because the cost of consumption increases with meritocracy and so future dividends are valued lower. When meritocracy is relatively high, while its current shocks are large, the shocks to meritocracy in the future are expected to be lower. As a result, the stock risk premium responds negatively to an increase in meritocracy. Finally, as the stock's exposure to the meritocracy shocks decreases with meritocracy, the stock return volatility also declines with meritocracy.

In addition to helping explain the empirical asset pricing results, our model also provides implications and insights for effort and inequality. Agents' effort increases with meritocracy because hard work is rewarded more in a more meritocratic society, and this holds true both at the individual and at the aggregate level. With respect to inequality, we find that meritocracy is more likely to increase inequality when heterogeneity in ability is higher than heterogeneity in social class. In the opposing case, meritocracy is more likely to help reduce inequality. The rationale for this is that meritocracy helps the distribution of agent incomes more closely resemble the distribution of agents' abilities, and move away from the distribution of agents' social class. For the vast majority of our 1969-2021 sample period, we find that heterogeneity in agents' ability is higher than that of social class and so inequality should increase with meritocracy, which is consistent with our empirical findings.

Related Literature

The study of meritocracy has garnered much attention across diverse fields including sociology, psychology, and political science. Although our focus is on the financial implications of meritocracy, we here briefly summarize the existing literature on meritocracy in these fields.

In sociology, work has focused on identifying defining features of meritocracy (Talib and Fitzgerald (2015)), investigating hidden categories of a meritocratic society (Reynolds and Xian (2014)), and defining and measuring merit across nations and through time (Park and Liu (2014), S'liwa and Johansson (2014)).[3] In the psychology literature, research related to meritocracy includes studies on individuals' preference for fairness (Kesebir and Oishi (2015)) and experienced versus overall perceived happiness (Kahneman et al. (2006)). Another strand of the literature focuses on the political ramifications of meritocracy (Newman, Johnston, and Lown (2015), Teorell, Dahlstrom, and Dahlberg (2011), Charron et al. (2017)). The political science literature also points to the cyclical nature of meritocracy over time, and suggests two key reasons for it. First, meritocracy tends to be promoted to improve efficiency when society is struggling, but becomes less stressed under better conditions (Pareto (1935), Mosca (1896), Olson (2022), Moore (1966)). Second, political leaders often initially adopt meritocratic policies in order to gain electoral support, but later revert to nepotism in order to secure loyalty from a select elite (De Mesquita et al. (2005), Lasch (1996), Wright (2020)). Our findings of mean reversion in meritocracy are consistent with this rationale. We further contribute to the aforementioned literature by proposing an easy-to-construct measure of meritocracy based on the World Values Survey and cohort methodology, which can be used in further research.

More related to our work is a strand of literature that studies the relationship between inequality and meritocracy. People living in more unequal countries are less likely to reject the statement that their society is unmeritocratic (Solt et al. (2016)), individuals draw on their past experiences when observing unequal outcomes and infering whether meritocratic or structural forces brought these about (Mijs (2018a)), and income inequality appears to go hand in hand with belief in meritocracy (Markovits (2019), Mijs (2021)). Our empirical work complements the above by showing that over the past half century income inequality has indeed increased with meritocracy, while our theory also provides a novel channel through which inequality is affected by meritocracy. Specifically, we show that the relation between income inequality and meritocracy need not always be positive, but rather depends on the distribution of ability and social class in the society at the time. Our paper also contributes to the aforementioned areas of the meritocracy literature by formally documenting a positive relationship between individual and aggregate effort and meritocracy.

Our paper is also related to the economics literature that scrutinizes meritocracy. Arrow, Bowles, and Durlauf (2000) find that higher meritocracy, through targeted educational and

[3]Relatedly, Almas, Cappelen, and Tungodden (2020) find that Americans and Norwegians differ significantly in inequality views, but not in the importance assigned to meritocracy.

economic reforms, can help reduce the income gap. Benabou and Tirole (2006) present a model seeking to explain the equilibrium redistributive policies as a function of individual beliefs about meritocracy, while Caselli and Gennaioli (2005) analyze meritocracy through a competitive equilibrium model with skilled workers and managers. Chuprinin and Sosyura (2018) study meritocracy in the context of mutual fund managers. Morris (2001) argues that political correctness may distort social scientists' recommendations for meritocracy and affirmative action. Cestau, Epple, and Sieg (2017) and Ellison and Pathak (2021) investigate the meritocratic efficiency of affirmative action in high school admission, while Sarsons et al. (2021) document that female assistant professors in economics are less recognized in coauthored work, reflecting a lack of meritocracy in the economics profession. Other economic studies demonstrate that meritocratic beliefs influence support for social welfare policies (Alesina and Ferrara (2005), Fong (2001)). Our paper contributes to this literature because we provide novel theoretical implications as to how asset prices are associated with meritocracy, while the aforementioned economics papers focus on redistribution policies, inequality, and labor market efficiency.

To our knowledge, our paper is the first to empirically examine how meritocracy affects asset prices and to develop a model making predictions for stock market behavior that are consistent with this data. More broadly, the asset pricing literature has encompassed related concepts such as democracy, political preferences, and inequality. For instance, Pastor and Veronesi (2020) build a model that predicts higher average stock market returns under Democratic presidencies while Miller (2022) argues that democratic revolutions lead to lower stock returns. Gollier (2001) notes that the equity risk premium increases with inequality under specific utility specifications, while Pastor and Veronesi (2016), Favilukis (2013), and Gomez (2022) find that the stock market amplifies inequality, so that inequality increases with stock returns and higher inequality predicts lower stock returns. Wu and Zechner (2024) show how catering to the strong political preferences of highly risk tolerant investors can lead to lower expected stock returns of partisan firms. Our paper is also related to the theoretical asset pricing literature with settings that feature heterogeneous agents (Basak and Cuoco (1998), Constantinides and Duffie (1996), Garleanu and Panageas (2015), Panageas (2020)). Our paper differs from all these works because we introduce meritocracy, a different economic paradigm than either democracy or inequality.[4] We also differ from them in various aspects

[4]While democracy and inequality are related to meritocracy, it is important to note that meritocracy is a separate concept that possesses many distinctive features. For instance, prior work on democracy in the political economics and finance literatures has frequently focused on Democratic and Republican presidential regimes (Santa-Clara and Valkanov (2003), Pastor and Veronesi (2020)) or party affiliations (Cassidy and Vorsatz (2021)), while modeling democratic presidencies via high taxation (Pastor and Veronesi (2020)) or democratization via revolutions (Miller (2022)). In our paper, following the definition of meritocracy we

with respect to methodology, mechanism, and hence predictions. These predictions include meritocracy's effects on asset prices, consumption decisions and effort choices. Furthermore, while the existing literature studies how inequality interacts with asset prices, we argue that inequality itself is influenced by meritocracy. Finally, many of the previous works on democracy and inequality typically do not provide closed-form theoretical solutions and focus only on the risk-free interest rate and the equity risk premium, while we present a model with closed-form solutions of the risk-free interest rate, stock price-dividend ratio, its risk premium and volatility.

The rest of the paper is organized as follows. Section 2 describes the construction of the US perceived meritocracy measure using data from the World Values Survey. Section 3 presents our empirical findings on asset prices and meritocracy, while Section 4 provides the empirical results on the relations between meritocracy and effort, utility, and inequality. Section 5 presents our meritocracy model, and Section 6 provides our theoretical results on the asset prices and their dynamics, effort, and inequality. Section 7 concludes. Appendix A offers robustness tests for the empirical asset prices and inequality results, and includes international evidence featuring all G7 countries. Appendix B provides analyses underlying the choice of representative age, and Appendix C contains the proofs.

2 Measuring Meritocracy and Related Data

In this Section, we define meritocracy and detail the methodology we use to construct a time series of annual US perceived meritocracy data. We then provide descriptive statistics of the meritocracy process and discuss its properties.

2.1 Measuring Meritocracy

The word "meritocracy" was first coined by Michael Young in his 1958 novel *The Rise of the Meritocracy*. Young (1958) defines meritocracy as the degree to which a person's income and occupation correspond to the person's ability and effort, as opposed to his or her social class. Since the publication of Young's landmark book, this definition of meritocracy has been used in popular press and research alike (e.g., Appiah (2019), Ball (2021), Stiglitz

model meritocracy as a weight that allocates income depending on agent ability or social class. Meritocracy may thus be high during either Democratic or Republican presidencies, and is not directly linked to tax policies or revolutions. Furthermore, higher meritocracy can either reduce or increase inequality depending on the relative heterogeneity of the ability and social class distributions.

(1975)). Consequently, we adhere to this definition of meritocracy throughout our work. While meritocracy is related to other concepts such as social mobility and inequality, it is important to note that meritocracy is a distinct concept in its own right.[5]

A first step in measuring meritocracy is making the important distinction between actual meritocracy and perceived meritocracy. Actual meritocracy refers to an objective measure of meritocracy in a given society, while perceived meritocracy is an individual's subjective belief of how meritocratic a society is. Past literature on meritocracy has generally focused on using perceived meritocracy, which in turn is measured using survey data (see, for instance, Charron et al. (2017), Kunovich and Slomczynski (2007), Mijs (2018b), Mijs (2021), and Weinberg et al. (2021)).[6] We adopt a similar approach. One important advantage of using perceived meritocracy data is that it has the benefit of getting directly at individual beliefs, which are likely to be a direct determinant and what actually motivates people to put in effort, invest in stocks, and make certain consumption decisions. In addition, unlike measures for inequality (e.g., Gini coefficient) and mobility (e.g., income transition matrix), there is no universally established measure of actual meritocracy. Nevertheless, provided errors in individual meritocracy beliefs are not systematically biased, we can compute an average of individual meritocracy perceptions to get a sense of the actual meritocracy level at any given time.

The survey we use to measure perceived meritocracy is the World Values Survey (WVS), an independent global academic research program started by Inglehart from University of Michigan and his team (Inglehart et al. (2022)). The WVS is conducted globally every 5 years, and provides one of the most extensive data sources available on perceived meritocracy. It includes over one hundred questions overall and samples thousands of individuals, taking care to enforce measures that help make the survey sample as representative of the population as possible.[7] The WVS has been employed in a number of finance and economics studies

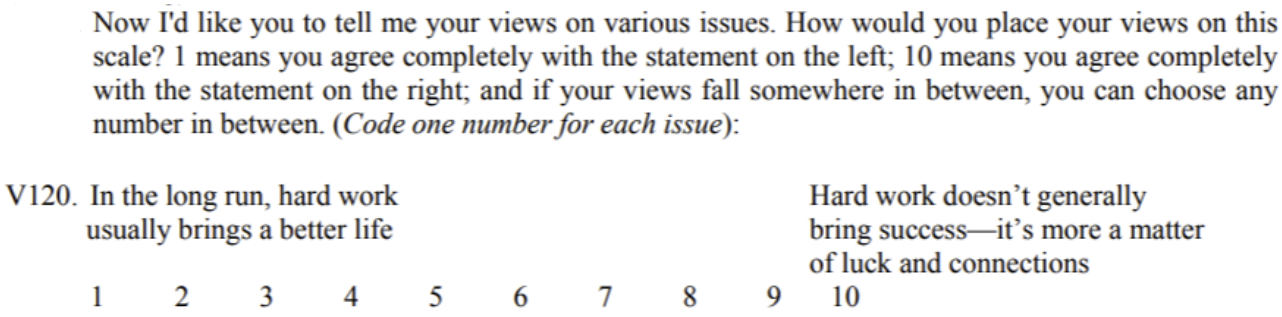
[5]Social mobility refers to the movement of individuals between social classes in society. A society with high social mobility allows individuals to change social class frequently. While social mobility may co-move with meritocracy in some instances, that need not be the case. For instance, a perfectly meritocratic society may have no movement between social classes—i.e., no social mobility—if individuals are already being rewarded according to their effort and ability. Similarly, higher meritocracy can correspond to either higher or lower income inequality. The relation between income inequality and meritocracy, and in particular the conditions under which higher meritocracy corresponds to higher income inequality, are discussed in more depth in Section 6.

[6]Moreover, survey data has also been extensively used in a wide range of finance and economics research, including works on stock return expectations (Greenwood and Shleifer (2014), Giglio et al. (2021)), inflation expectations (Coibion and Gorodnichenko (2012), Coibion, Gorodnichenko, and Kumar (2018), Malmendier and Nagel (2016), Mankiw, Reis, and Wolfers (2003)), and investment expectations (Lamont (2000), Gennaioli, Ma, and Shleifer (2014)).

[7]As of this writing, WVS is the largest non-commercial cross-national empirical time-series investigation of human beliefs and values ever executed. Participants in the WVS are selected at random, as part of a

ranging from trust and stock market participation (Guiso, Sapienza, and Zingales (2008)) to environmental and social factors and institutional ownership (Dyck et al. (2019)) to the relationship between religion and innovation (Benabou, Ticchi, and Vindigni (2015), Benabou, Ticchi, and Vindigni (2022)).

The WVS question we use to measure perceived meritocracy asks participants to place themselves on a scale of 1 to 10 depending on how much they agree with the following statement: "In the long run, hard work usually brings a better life" (1) versus the statement "Hard work doesn't generally bring success - it's more a matter of luck and connections" (10). The meritocracy question appears in four waves of the WVS survey for the US: Wave 3 (1995-1998), Wave 5 (2005-2009), Wave 6 (2010-2014), and Wave 7 (2017-2022). This particular question has also been used to help measure concepts related to meritocracy, such as beliefs about return to effort, in a number of interdisciplinary papers (e.g. Fisman and O'Neill (2009)). The exact wording of the question as it appears in the WVS is shown in Figure 1. In our analysis, we invert the original scale of 10 to 1 to make this measure more intuitive so that a higher score implies higher perceived meritocracy. We also scale the measure to the $[0, 1]$ range in our model for ease of interpretation.


Now I'd like you to tell me your views on various issues. How would you place your views on this scale? 1 means you agree completely with the statement on the left; 10 means you agree completely with the statement on the right; and if your views fall somewhere in between, you can choose any number in between. (*Code one number for each issue*):

V120. In the long run, hard work usually brings a better life

Hard work doesn't generally bring success—it's more a matter of luck and connections

1 2 3 4 5 6 7 8 9 10

Figure 1: **World Values Survey meritocracy question.** This figure shows the Question V120 portion of the World Value Survey (WVS) Wave 5 (2005-2009) questionnaire. Question V120 relates to how important hard work—versus luck and connections—is in bringing about success and a better life. The wording of the meritocracy question remains identical in all survey waves, and this is the question we use to measure perceived meritocracy. Source: World Values Survey (WVS).

One limitation of the WVS is that it is conducted every 5 years rather than annually. For this reason, we utilize an application of the cohort methodology to obtain a lengthier time

representative sample of the people living in a given country. WVS also seeks to minimize interviewer effects by (a) giving clear and identical instructions on how to conduct the interviews to each interviewer, and (b) giving a preference to using interviewers with at least 3 years of experience in population surveys. Source: World Values Survey Wave 7 Master Questionnaire.

period of annual perceived meritocracy data spanning 1969-2021. The cohort methodology has been previously used in the sociology literature for meritocracy (Mijs (2018b)), as well as employed by a number of household finance and behavioral finance papers (Bernile, Bhagwat, and Rau (2017), Fagereng, Gottlieb, and Guiso (2017) and Malmendier, Tate, and Yan (2011)).

The idea behind the cohort methodology is as follows. First, cohorts are constructed by grouping survey respondents based on their year of birth. Then the perceived meritocracy for each cohort is computed as the average perceived meritocracy of all respondents in that cohort. More precisely, for a representative agent age g and a k-year long cohort period, perceived meritocracy data using survey X is measured in the following way:

We first select a starting year t_0 and an ending year t_n. Note that since each cohort period length is k years, in order to have full cohorts we necessarily must have $t_n - t_0$ be a multiple of k. For each cohort $t \in \{t_0, t_0 + k, t_0 + 2k, ..., t_n\}$, we take the following two steps to compute cohort t's perceived meritocracy:

1. First, we select the subset of survey X respondents who turned age g in the period $[t - k + 1, t]$.

2. Next, we compute the average perceived meritocracy for this set of respondents. This average is cohort t's perceived meritocracy.

The question of which age cohort to use as the most representative for computing US perceived meritocracy over time is an important one. Since we are most interested in how perceived meritocracy affects asset prices, we would like to use a representative age at which participants command a relatively high level of capital. In Appendix B, we conduct analyses based on the mean value of assets and percent of total net worth held by various age groups, and find that the 55-64 years old age group commands the largest proportion of these quantities. Accordingly, for our main analysis we focus on the 1-year cohort perceived meritocracy with representative agent age of 55.[8]

A key underlying assumption of the cohort methodology is that the perceived meritocracy of a given individual is relatively constant over time. One potential reason for this could be that early life experiences have an outsized effect on meritocracy belief formation, and later life experiences are less pronounced in changing the initial perceived meritocracy. That is to say, once an individual reaches adulthood (18 years of age), his or her perceived meritocracy

[8]For robustness, we also re-run all of the analyses in this paper using the average meritocracy for the 55-64 year old age group as our measure of perceived meritocracy; all of our main inferences still hold.

stays relatively constant. Indeed, literature has shown that young adults are particularly impressionable in adolescence, and beliefs formed during those years are quite durable throughout a person's life (Alwin and Krosnick (1991), Sears and Funk (1999), Huddy, Sears, and Levy (2013)). Additionally, we also find supporting evidence that perceived meritocracy for a given cohort is relatively persistent over time, as discussed below.

To illustrate this, we first divide up the WVS survey participants into four groups based on birth period: those born in 1900-1924, those born in 1925-1949, those born in 1950-1974, and those born in 1975-1999. For each of the four WVS US surveys that included meritocracy data, we then compute the average perceived meritocracy for each of these four groups. The results are presented in Table 1. In Table 1, the columns correspond to birth period and the rows correspond to WVS survey year.

WVS Survey Year	Birth Period			
	1900-1924	1925-1949	1950-1974	1975-1999
1995	7.66	7.52	7.37	6.94
2006	7.68	7.34	7.11	6.81
2011		7.65	7.23	6.81
2017		7.88	7.44	6.96

Table 1: **Perceived meritocracy by birth period over time.** This table reports the average perceived meritocracy of people born in 1900-1924, 1925-1949, 1950-1974, and 1975-1999 in each of the four World Values Survey years that included perceived meritocracy data for the US. An average perceived meritocracy value was computed for each birth period group - survey year combination that included at least 25 survey participants. Individual perceived meritocracy is measured using the WVS survey question where respondents place themselves on a scale of 1 to 10 depending on how much they agree with the statement that "In the long run, hard work usually brings a better life" versus the statement "Hard work doesn't generally bring success - it's more a matter of luck and connections".

Table 1 demonstrates that the meritocracy perception of a given birth period cohort is relatively persistent over time. For instance, those born in the 1900-1924 period had very similar average perceived meritocracy over time in both the 1995 survey year (7.66) and in the 2006 survey year (7.68). Participants born in the 1925-1949 period had consistently higher perceived meritocracy than those born in 1950-1974 and than those born in 1975-1999; in fact, this was the case for each of the four WVS survey years. Those born in 1975-1999 consistently had the lowest perceived meritocracy among all four birth periods, and this remained true for each of the four WVS survey years as well. In fact, for each of the survey years, those born in the 1975-1999 period had an average perceived meritocracy

lower than 7 while perceived meritocracy was above 7 for each of the other birth period - survey year observations. In summary, this exercise demonstrates significant persistence in perceived meritocracy by each birth year cohort over time, and helps support the use of the cohort methodology.[9]

2.2 Perceived Meritocracy

Using the cohort methodology and WVS data, we obtain annual US perceived meritocracy data for the time period 1969-2021. The time series of US perceived meritocracy over this sample period is plotted in Figure 2. Visually, the meritocracy process exhibits a mean-reverting pattern. Intuitively, this could be explained via a rationale similar to that of political and business cycles. In particular, when meritocracy is low relative to its long-run mean, people in the society are likely to feel their effort is not adequately rewarded and push for more meritocratic policies. On the flip side, when meritocracy is high relative to its long-run mean, people may become concerned that certain segments of the population, such as those from disadvantaged backgrounds or with low innate ability, are being compensated poorly. As a result, meritocracy tends to occur in cycles and exhibits this mean-reverting property, consistent with the related political science literature discussed in the Introduction. We also note that meritocracy shows a higher variability near the start of the sample period.[10] Finally, most of the perceived meritocracy observations fall in the [7, 8] range indicating a relatively high perception of meritocracy.

Motivated by our observations from Figure 2, we next formally test and demonstrate that meritocracy is mean-reverting. To test the mean-reversion property, we employ the Phillips and Perron (1988) test for a unit root in the time series of perceived meritocracy. The Phillips-Perron test with lag window of size one yields a t-value of -8.98, which is well below the 1% critical value of -3.56. Tests with different assumptions about the lag structure (including two, three, and the optimal number of lags) as well as alternative tests (Augmented

[9]It is important to note that the WVS does not follow the same individuals through time. Therefore, the people questioned in each subsequent survey year vary. Thus even if there was no change in perceived meritocracy since adulthood for an individual, we would still expect to see some variation of cohort perceived meritocracy over time due to the fact that different people are surveyed in each survey wave. That said, we can expect the people questioned in each survey wave to be a representative sample of the population, so it is encouraging to see the persistence in perceived meritocracy through the survey years for people born in different cohorts.

[10]Much of the variability in the meritocracy series near the start of the sample period is due to a lower incidence of responses in earlier years. Consequently, there are fewer respondents going into the earlier cohorts, leading to lower sample sizes and by construction higher variance in the annual mean perceived meritocracy scores.

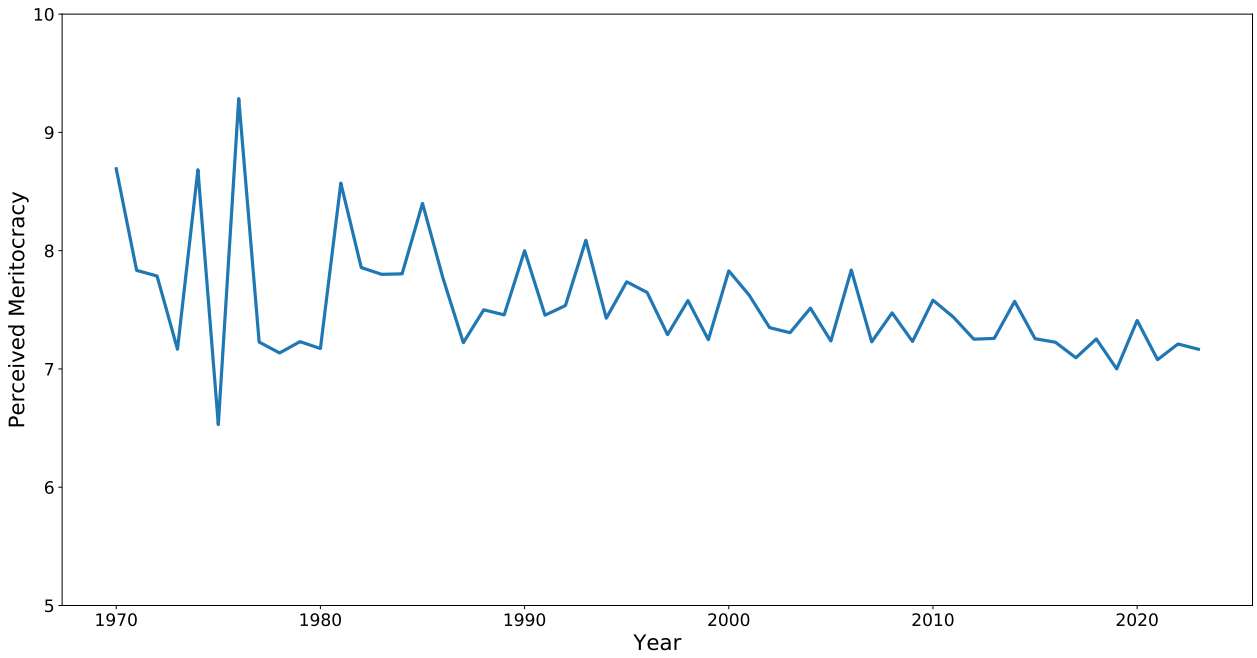


Figure 2: **US perceived meritocracy over time, 1969-2021.** The blue line plots perceived meritocracy over time by splitting up the World Values Survey (WVS) respondents into 1 year cohorts. A cohort's meritocracy is measured as the average meritocracy value given by the cohort's respondents to the WVS meritocracy question. The WVS meritocracy question asks survey participants to place themselves on a scale of 1 to 10 depending on how much they agree with the statement that "In the long run, hard work usually brings a better life" versus the statement "Hard work doesn't generally bring success - it's more a matter of luck and connections". The sample time period is 1969-2021, starting with the cohort that turned 55 years old in 1969 and ending with the cohort that turned 55 years old in 2021.

Dickey-Fuller (ADF)) also yield similar results.[11] These tests provide supporting evidence that the perceived meritocracy process is stationary and hence mean-reverting.

At this point, we also introduce a measure for meritocracy innovations. In particular, we define the perceived meritocracy innovations $\widetilde{m}_t$ as the residuals from an AR(1) regression of perceived meritocracy, computed in the following manner:

$$m_t = \alpha + \beta m_{t-1} + \nu_t, \tag{1}$$

$$\widetilde{m}_t = m_t - \hat{\beta} m_{t-1} - \hat{\alpha}. \tag{2}$$

We perform the Phillips-Perron test on perceived meritocracy innovations and obtain a t-

[11] The Phillips-Perron test with two lags, three lags, and the optimal number of lags yields t-values of -8.82, -8.75, and -8.83 respectively. Each is below the critical 1% value of -3.56. For the Augmented Dickey-Fuller test on meritocracy with one lag, the t-value is -4.29 and also below the 1% critical value.

value of -7.02, indicating the absence of a unit root at the 1% level of significance. Therefore, the time series of perceived meritocracy innovations is also stationary, which helps ensure we avoid possible spurious regressions with improperly estimated standard errors in our meritocracy innovation regressions.

The meritocracy innovations capture the unexpected change in meritocracy each period. The reason for looking at meritocracy innovations is two-fold. Firstly, since the precise data generating process for meritocracy is unknown, looking at meritocracy innovations improves robustness and allows us to ensure any relation we uncover is not due to persistence in meritocracy levels. Secondly, considering meritocracy innovations offers us an opportunity of isolating the causal impact of the unexpected change in meritocracy each year on the following year's variable of interest while controlling for past meritocracy changes. Throughout our empirical work in Sections 3 and 4, we alternately employ each of these measures of meritocracy as the key independent variable.

Table 2 presents the descriptive statistics for the perceived meritocracy data. We include statistics for both the level and innovation perceived meritocracy series. For the levels data, average perceived meritocracy over the sample period is 7.55, with a standard deviation of 0.49. The inter-quartile range is [7.23, 7.79], with a minimum value of 6.53 and a maximum at 9.29. For the innovations data, mean perceived meritocracy is 0 by design. The standard deviation is 0.45, indicating that for approximately two thirds of the years in the sample period, shocks to meritocracy are less than half a point. The inter-quartile range for meritocracy innovations is relatively symmetric at [-0.31, 0.24].

Variable	Meritocracy (level)	Meritocracy (innovation)
Date range	1969-2021	1970-2021
Mean perceived meritocracy	7.55	0.00
Standard deviation of meritocracy	0.49	0.45
Meritocracy inter-quartile range	[7.23, 7.79]	[-0.31, 0.24]
Min perceived meritocracy	6.53	-0.80
Max perceived meritocracy	9.29	1.56

Table 2: **Meritocracy descriptive statistics.** This table reports the descriptive statistics for annual US perceived meritocracy data using both levels and innovations in perceived meritocracy. Data is for the time period 1969-2021. The underlying question used to construct the annual perceived meritocracy measures comes from the World Values Survey, and is defined and discussed in detail in Subsection 2.1.

2.3 Other Data Sources

In our analysis of meritocracy, we also rely on a number of additional data sources. We broadly categorize these as (i) individual characteristics data, (ii) asset pricing data, and (iii) control variables data.

With regards to individual characteristics data, two quantities integral to the definition of meritocracy are ability and social class. We source data for both ability and social class from the WVS. In order to measure ability, we rely on educational achievement data (Bartels et al. (2002) and Deary and Fernandes (2007) show a strong positive correlation between educational achievement and ability). In particular, the WVS educational achievement question asks survey participants to provide their "Highest educational level attained" on a granular scale ranging from (0) No education / early childhood education all the way up to (8) Doctoral or equivalent. The WVS also includes a direct question on social class, which states "People sometimes describe themselves as belonging to the working class, the middle class, or the upper or lower class. Would you describe yourself as belonging to one of them?" Participants are then asked to place themselves on a scale from (1) Upper class to (5) Lower class, and this is the question we use to measure social class.

In order to measure effort, we obtain two datasets from the St Louis Federal Reserve Bank: (i) hours worked by full-time and part-time employees, and (ii) employment level. Effort is then calculated as the former divided by the latter, or as the average number of hours worked by employed Americans. Income is measured using the WVS question that asks "On this card is an income scale on which 1 indicates the lowest income group and 10 the highest income group in your country. We would like to know in what group your household is."

Finally, we also use two data sources to measure individual utility: the happiness question and the life satisfaction question from the WVS. The happiness question asks participants, "Taking all things together, would you say you are (1) Very happy, (2) Rather happy, (3) Not very happy, or (4) Not at all happy." The life satisfaction question asks participants, "All things considered, how satisfied are you with your life as a whole these days?" on a scale from (1) Completely dissatisfied to (10) Completely satisfied. Both of these questions can be used as proxies for measuring individuals' utility, and have been used for measuring life satisfaction in prior work (Ngamaba and Debbie (2018), Diener and Clifton (2002), and Oishi et al. (2009)).

Our second main category of data is asset pricing data. We measure the risk-free interest rate as the one-month Treasury bill rate from Ibbotson Associates. Data for this annual

risk-free interest rate is obtained from Kenneth R. French's data library.[12] The stock market return is computed as the market-weighted return of all CRSP firms incorporated in the US and listed on the NYSE, AMEX, or NASDAQ that have (i) a CRSP share code of 10 or 11 at the beginning of month t, (ii) good shares and price data at the beginning of month t, and (iii) good return data for month t. Stock risk premium and return volatility are obtained using the stock market returns data. Stock price is the total real S&P 500 index level (as in Shiller (2016)).

In our asset pricing empirical work in Section 3, we also utilize a number of control variables to account for known explanatory variables in the literature. We briefly list the data sources for these variables here. The dividend price ratio, dividend payout ratio, book-to-market ratio, cay, interest rate spreads, inflation, and investment to capital ratio data are computed as outlined in Goyal and Welch (2008). In addition, we also utilize level, slope, and curvature data of the yield curve from the St Louis Federal Reserve Bank. Monetary shocks data (the residuals of regressing changes in the federal funds rate on the forecasts for inflation and output growth) follows Romer and Romer (2004). We also include data for the aligned sentiment index (Huang et al. (2015)) based on the six individual investor sentiment proxies from Baker and Wurgler (2006) and Baker and Wurgler (2007). The data for this measure is available from Dashan Huang's website, which provides the updated data.[13] Data for NBER based recession indicators, Moody's Aaa long-term corporate bond yields, growth rate of the industrial production (seasonally adjusted) index, and growth rate of the monetary base are from the Federal Reserve Economic Data (FRED) database. Gini coefficient data is from the World Bank, and inflation data is from the OECD. We note that the macroeconomic expectations data and sentiment data do not feature in our main analyses, but are instead used in robustness tests in Appendix A.

In Table 3, we provide the correlation matrix for meritocracy and the main control variables. We find that meritocracy is not very highly correlated with any of the other control variables in our sample. For the level measure of perceived meritocracy, the highest magnitude correlation is -0.28. The second highest and third highest correlations are similar, and occur between meritocracy level and the curvature factor (-0.22) and between meritocracy level and the level factor (-0.22). The remaining correlations are all below 0.20. Meritocracy innovations likewise do not exhibit very high correlations with the other independent variables. The highest magnitudes are for meritocracy innovation and the level

[12]https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[13]The six individual investor sentiment proxies are (1) the closed-end fund discount rate, (2) share turnover, (3) number of IPOs, (4) first-day returns of IPOs, (5) dividend premium, and (6) equity share in new issues. The web page for the data is https://dashanhuang.weebly.com/.

factor (0.34) and for meritocracy innovation and the log dividend price ratio (-0.33). The relatively low correlations indicate that meritocracy is likely to capture new information above and beyond the most commonly used control variables for asset pricing.

Panel A: Correlations (meritocracy levels)						
	m	*pd*	*cay*	*level*	*slope*	*curve*
m	1.00					
pd	-0.28	1.00				
cay	0.15	-0.20	1.00			
level	0.22	-0.63	0.18	1.00		
slope	0.01	0.10	0.06	-0.69	1.00	
curve	-0.22	0.40	-0.15	-0.44	0.21	1.00
Panel B: Correlations (meritocracy innovations)						
	m_innov	*pd*	*cay*	*level*	*slope*	*curve*
m_innov	1.00					
pd	-0.33	1.00				
cay	0.22	-0.20	1.00			
level	0.34	-0.63	0.18	1.00		
slope	-0.09	0.10	0.06	-0.69	1.00	
curve	-0.31	0.40	-0.15	-0.44	0.21	1.00

Table 3: **Correlation matrix.** This table reports the correlations between meritocracy and the main control variables. Panel A shows results for meritocracy levels. Panel B shows results for meritocracy innovations. *pd* is the log price dividend ratio; *cay* is the cointegrating residual between log consumption, log asset wealth, and log labor income; and *level*, *slope*, and *curve*. are the three level, slope, and curvature PCA factors of the yield curve. Data for all variables is for 1969-2021.

3 Asset Prices and Meritocracy: The Empirical Evidence

In this Section, we empirically investigate the relationship between asset prices and meritocracy. We find that the risk-free interest rate is positively related to meritocracy, while the stock price-dividend ratio, stock risk premium, and stock return volatility are all negatively related to meritocracy.

We postulate that meritocracy plays an important role in an individual's decision-making for several reasons. For one, individual utility is positively associated with meritocratic feelings of fairness and trust (Kesebir and Oishi (2015)). Consequently, individuals are likely to feel more confident about their future income prospects and gain higher marginal utility when meritocracy is high, which could incentivize them to increase current consumption. Any changes in expectations about future meritocracy level could also affect the equilibrium discount rate, or the rate at which individuals value their future income. Additionally, uncertainty about future meritocracy constitutes a source of risk. Shocks to meritocracy are thereby liable to affect the stock risk premium demanded, as well as to contribute to stock return volatility. As such, it is plausible that meritocracy may affect individual consumption and savings decisions, as well as stock market returns and prices. We empirically investigate these relationships in this Section.

To study the relationship between asset prices and meritocracy, we employ the following general regression specification:

$$AP_{t+1} = \alpha + \beta m_t + \gamma' \text{Controls}_t + \epsilon_{t+1}, \tag{3}$$

where AP_{t+1} is the asset pricing variable of interest, m_t is perceived meritocracy, and $Controls_t$ include the covariates that we control for. The control variables are specific to the asset pricing variable of interest, and constitute the established factors with highest explanatory power in the literature. The standard errors are Newey and West (1987) to account for possible heteroskedasticity and autocorrelation.

The asset pricing variables we analyze are the risk-free interest rate, stock price-dividend ratio, stock risk premium, and stock return volatility. For each of these asset pricing variables, we employ several main specifications, including a bivariate regression and regression models incorporating the most commonly used controls. The reason for the first specification is to establish a baseline relationship between meritocracy and the asset pricing variables, which will be particularly useful for analyzing the predictions of the model that we develop in Section 5. The objective of the specifications with controls are to ascertain that the

relationship between the asset pricing variables and meritocracy is robust, and remains both economically and statistically significant even after controlling for the known covariates. For each of the main specifications, we also utilize both the level and innovation measures of perceived meritocracy, as discussed in Section 2.2. Finally, we include additional supporting analyses in the corresponding Appendix A.

3.1 Risk-free Interest Rate

We begin by testing the relationship between the risk-free interest rate and meritocracy. The risk-free interest rate is measured as the annualized one-month Treasury bill rate, as described in Section 2.[14]

We use both the level of meritocracy and the innovations in meritocracy as the key independent variables, and the level, slope and curvature factors of the yield curve as the controls (as in Diebold, Piazzesi, and Rudebusch (2005) and Afonso and Martins (2012)).

The following regression model tests the relationship between the risk-free interest rate and meritocracy:

$$r_{t+1} = \alpha + \beta m_t + \gamma_1 Level_t + \gamma_2 Slope_t + \gamma_3 Curvature_t + \epsilon_{t+1}, \tag{4}$$

where r_{t+1} is the risk-free interest rate, m_t is perceived meritocracy, and *Level*, *Slope*, and *Curvature* are the three PCA factors of the yield curve.

Results for this regression model are reported in Table 4. Columns (1) and (2) of the table use the perceived meritocracy level as the independent variable of interest, while columns (3) and (4) use the perceived meritocracy innovation as the key independent variable. Columns (1) and (3) include no control variables, while columns (2) and (4) control for the level, slope, and curvature factors. The standard errors are adjusted as in Newey and West (1987) to control for possible heteroskedasticity and autocorrelation, and the table reports the adjusted R^2.[15]

[14]Since the risk-free interest rate is stationary over our sample period we use its level as the dependent variable, but also provide supplementary analyses using the first-differences of the risk-free interest rate as the dependent variable in Appendix A.1.

[15]Note that the adjusted R^2 reported in the control specifications of Table 4 is on the order of 53-56%, which is lower than the explanatory power for the term structure of interest rates found in other studies (e.g., Nelson and Siegel (1987) produced a 96% R^2 for the yield curve using monthly data over a two-year sample period in the early 1980s). The reason for this is severalfold. First, our regression is at the annual frequency rather than at the monthly frequency. Second, the level, slope, and curvature factors have lower explanatory power when used to explain the time-series of a single maturity short-term risk-free interest rate rather than when employed to explain the full term structure of interest rates at any given point in

	Risk-free Interest Rate (r_{t+1})			
$m =$	Meritocracy level (m_t)		Meritocracy innovation ($\widetilde{m}_t$)	
	(1)	(2)	(3)	(4)
m	1.55**	0.88*	2.01***	1.29**
	(0.65)	(0.48)	(0.70)	(0.52)
level		0.73***		0.70***
		(0.11)		(0.11)
slope		0.42***		0.39***
		(0.10)		(0.10)
curvature		0.17**		0.21**
		(0.07)		(0.08)
Observations	52	52	51	51
Controls	No	Yes	No	Yes
Adjusted R^2	0.08	0.53	0.13	0.56

Table 4: **The risk-free interest rate and meritocracy.** This table reports the regression results of Equation (4). The risk-free interest rate is measured as the annualized one-month Treasury bill rate from Ibbotson Associates less the inflation rate. Inflation data is from the OECD. Column (1) uses meritocracy level as the main independent variable and does not include any controls. Column (2) uses meritocracy level as the main independent variable and includes level, slope, and curvature as controls. Column (3) uses meritocracy innovation as the main independent variable and does not include any controls. Column (4) uses meritocracy innovation as the main independent variable and includes level, slope, and curvature as controls. Level, slope, and curvature data are computed based on the Nelson and Siegel (1987) method using real yield curve data from the Federal Reserve Bank of St. Louis. The sample period range is 1969-2021. Standard errors are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

We find that the risk-free interest rate is positively and significantly associated with meritocracy, and that the results are consistent for both level and innovation measures of meritocracy. The results also hold under both no control and with control specifications. In terms of magnitude, for the control specifications a one point increase in meritocracy level is associated with approximately a 0.88% point increase in the risk-free interest rate in the following year. Consequently, meritocracy appears to have an economically sizable impact on the risk-free interest rate.

For meritocracy shocks, or innovations, the impact on the risk-free interest rate is even

time. Third, we investigate whether the future interest rates can be predicted by past meritocracy, level, slope, and curvature, while Nelson and Siegel (1987) study the contemporaneous decomposition of interest rates. Fourth, we use the real rather than the nominal risk-free rate in our regression model (if the nominal rate is used, the adjusted R^2 rises to a much higher 0.83). Finally, we note that when the level, slope, and curvature factors are used to forecast the short-term rate out-of-sample as in our regression, the predictability is significantly lower (e.g., Diebold and Li (2006)).

higher. In the control specification, a one point shock to meritocracy is associated with a 1.29% point increase in the real risk-free interest rate. Since the standard deviation of meritocracy innovations is 0.45 (from the descriptive statistics Table 2 in Section 2), this indicates that a one standard deviation positive shock to meritocracy innovations corresponds to an increase of approximately 58bps in the risk-free interest rate. Analogously, a one standard deviation shock to meritocracy level would correspond to a 40bps (0.88 * 0.45) increase in the risk-free interest rate.

In the two specifications with no controls, the relationship between the risk-free interest rate and meritocracy (both levels and innovations) is similarly significantly positive. A one point increase in either meritocracy level or meritocracy innovation is associated with an over 1.5% increase in the risk-free interest rate.

In order to further corroborate these results, we also employ three robustness checks. In the first supporting analysis, we include the expectations of inflation and employment—two key monetary policy variables—as control variables (Romer and Romer (2004)). In the second robustness test, we utilize the forecast interest rate following Diebold and Li (2006) as another control variable. In a third alternative specification, we use the first differences of the risk-free interest rate as the dependent variable. The results of these additional analyses provide further support for the main findings presented here, and are discussed in detail in Appendix A.1.

3.2 Stock Price-Dividend Ratio

We next turn to investigating the relationship between the stock price-dividend ratio and meritocracy. Once again, we use both the level of meritocracy and the innovations in meritocracy as the key independent variables. We consider both a bivariate and a control specification, where the control specification controls for the prior year's stock price-dividend ratio as in Cochrane (2008) and Lettau and Van Nieuwerburgh (2008).

The following regression model tests the relationship between stock price-dividend ratio and meritocracy:

$$ln(S_{t+1}/D_{t+1}) = \alpha + \beta m_t + \gamma ln(S_t/D_t) + \epsilon_{t+1}, \tag{5}$$

where $ln(S_{t+1}/D_{t+1})$ is the natural logarithm of the stock price-dividend ratio, and $ln(S_t/D_t)$ is the natural logarithm of the stock price-dividend ratio in the previous year.

Table 5 presents the results for the stock price-dividend ratio regressions. We find that the stock price-dividend ratio decreases with meritocracy, and this relationship is significant at the 5% level or better for all specifications.[16] In column (2) for the main control specification using meritocracy level, we see that a one-point increase in the meritocracy level is associated with approximately a 7% decrease in the stock price-dividend ratio in the following year.

	Stock Price/Dividend Ratio ($ln(S_{t+1}/D_{t+1})$)			
$m =$	Meritocracy level (m_t)		Meritocracy innovation ($\widetilde{m}_t$)	
	(1)	(2)	(3)	(4)
m	-0.74**	-0.07**	-0.84***	-0.08**
	(0.31)	(0.03)	(0.29)	(0.04)
$ln(S_t/D_t)$		0.97***		0.96***
		(0.02)		(0.03)
Observations	52	52	51	51
Controls	No	Yes	No	Yes
Adjusted R^2	0.13	0.97	0.16	0.96

Table 5: **Stock price-dividend ratio and meritocracy.** This table reports the regression results of Equation (5). We compute the stock price-dividend ratio as the total real S&P 500 price level divided by its dividend, with data sourced from Shiller's website. Column (1) uses meritocracy level as the main independent variable and does not include any controls. Column (2) uses meritocracy level as the main independent variable and includes cay, log price dividend ratio, the time trend, and the past price as controls. Column (3) uses meritocracy innovation as the main independent variable and does not include any controls. Column (4) uses meritocracy innovation as the main independent variable and includes cay, log price dividend ratio, the time trend, and the past stock price as controls. The sample period range is 1969-2021. Standard errors are Newey-West standard errors and are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

Examining the meritocracy innovations, we see that the results tell a similar story. For the main control specification in column (4), a one-point shock to meritocracy corresponds to a 8% decrease in the stock price-dividend ratio, which is economically significant. The no-control specifications in columns (1) and (3) are included as a way of looking at the raw relationship between stock price level and meritocracy. Since not all of the control variables are included in the model in Section 5, considering this raw relationship is also helpful when ascertaining that the model makes directionally correct predictions.

[16]Note that the adjusted R^2 in the control specifications in columns (2) and (4) is also very high. This is largely due to the inclusion of the prior price-dividend ratio in the regression model. The magnitude of the R^2 is consistent with Cochrane (2008) and Lettau and Van Nieuwerburgh (2008).

In robustness exercises, we follow Gabaix (2012) and add the Cochrane and Piazzesi (2005) factor as an additional control variable. We find a consistent negative and significant relationship between the stock price-dividend ratio and meritocracy, and report the full results in Appendix A.2.

People who adhere to the meritocracy ideology may be somewhat surprised at our empirical finding that the stock price-dividend ratio decreases with meritocracy. Since a meritocratic system encourages hard work and talent, it is natural to expect that aggregate firm valuation, measured by the stock price-dividend ratio, should rise with higher meritocracy. In Section 6.1, we will explain this seeming contrast via our model.

3.3 Stock Risk Premium

In this Section, we turn to investigating whether the stock risk premium is affected by meritocracy. We compute the stock risk premium as the value-weighted return on the US stock market of all CRSP stocks net of the annualized one-month Treasury bill rate. Over the sample period, the equity premium had a mean of 8.0% and a standard deviation of 17.8%.

The key independent variables of interest are the level and innovation measures of meritocracy, as in the prior asset pricing regressions. We control for variables that have been suggested in the academic literature to be good predictors of the risk premium. These covariates in large part follow Goyal and Welch (2008) and can be broadly categorized into three categories: valuation ratio variables, interest-rate related variables, and broad macroeconomic indicator variables.[17] The full list of variables, along with their construction details and use in prior literature, is reported in Table A.5 of Appendix A.3.

We include five main specifications for each measure of meritocracy: (i) a bivariate regression, (ii) a regression model including the valuation ratio variables as covariates, (iii) a regression model including the interest-rate related variables as covariates, (iv) a regression model including the broad macroeconomic indicator variables as covariates, and (v) a regression model including all of the variables in Table A.5 as covariates. We test the relationship

[17]Note that we do not include the dividend yield and the earnings to price ratio from Goyal and Welch (2008) in our regression specifications due to multi-collinearity issues with the dividend to price ratio and the dividend payout ratio variables, respectively. For robustness, we have also used the dividend yield and the earnings to price ratio as control variables instead of the dividend yield and the earnings to price ratio, and found that this exercise yields very similar results. Results incorporating sentiment measures, which include *ntis* and *eqis* from Goyal and Welch (2008) as constituents, are reported in Appendix A and are also consistent with our main findings.

between the stock risk premium and meritocracy as follows:

$$RP_{t+1} = \alpha + \beta m_t + \gamma' Controls_t + \epsilon_{t+1}, \tag{6}$$

where RP_{t+1} is the stock risk premium, m_t is perceived meritocracy (either meritocracy level or meritocracy innovation), and $Controls_t$ include the covariates for each of the five corresponding specifications. The coefficients $\gamma_1, .., \gamma_n$ of γ' can be interpreted as measures of how significant the corresponding independent variables are in predicting the equity premium.

Results for the regression model are reported in Table 6, and show that the stock risk premium decreases with meritocracy. The results of the negative relationship are statistically significant, consistent for both level and innovation measures of meritocracy, and hold under both the bivariate specification and each of the different control specifications. For the full control specification with meritocracy level in column (5), we see that a one point increase in meritocracy is associated with a 9.89% decrease in the stock risk premium in the following year. This is economically significant, since the average value of the stock risk premium over the sample period was 8.0%. In fact, a one standard deviation increase in meritocracy is associated with a 4.84% (9.89 * 0.49) decline in the stock risk premium or a 61% decline relative to the average stock risk premium.

Analogously, shocks to meritocracy are also associated with statistically and economically meaningful declines in the stock risk premium. A one point shock to meritocracy in the full control specification corresponds to a considerable 12.07% decrease in the following year's stock risk premium. This indicates that a one standard deviation increase in meritocracy innovation is associated with a 5.43% (12.07 * 0.45) decrease in the stock risk premium, or 67.9% of the average annual value. Empirically, this level is comparable with conventional macroeconomic predictors. For instance, a one standard deviation increase in the dividend price ratio and cay tend to increase the annual stock risk premium by 3.60% and 7.39% respectively (Lettau and Ludvigson (2001)).

Prior literature has also focused on equity premium predictability using sentiment measures (Baker and Wurgler (2006), Baker and Wurgler (2007), Huang et al. (2015)). We investigate the relationship of meritocracy and the risk premium after controlling for the sentiment measure (Baker and Wurgler (2007)) and the aligned sentiment measure (Huang et al. (2015)), and find that the negative relationship remains economically large and statistically significant. For conciseness, full results using the sentiment measures are reported in Appendix A.3.

In order to further corroborate the empirical results on stock risk premium and meritoc-

$m =$	**Stock Risk Premium** (RP_{t+1})									
	Meritocracy level (m_t)					Meritocracy innovation ($\widetilde{m}_t$)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
m	-9.25**	-10.53**	-9.64**	-8.41**	-9.89**	-9.48*	-11.36**	-10.94**	-8.93*	-12.07**
	(4.47)	(4.89)	(3.98)	(4.09)	(4.52)	(4.73)	(5.24)	(4.35)	(4.63)	(5.02)
dp		31.57**			26.54		31.36**			28.20
		(13.12)			(21.13)		(12.89)			(21.71)
de		-2.39			-13.97		-1.89			-15.37
		(6.91)			(9.18)		(6.64)			(9.55)
$bkmk$		-0.39*			-0.33		-0.37*			-0.37
		(0.20)			(0.44)		(0.19)			(0.47)
cay		-0.45			0.08		-0.39			0.07
		(0.79)			(1.42)		(0.80)			(1.43)
$ltrate$			-0.06		-0.10			-0.04		-0.05
			(0.15)		(0.19)			(0.15)		(0.21)
tms			1.97*		0.65			2.06*		1.28
			(1.10)		(3.03)			(1.11)		(3.32)
dfy			7.66*		10.44*			8.03*		11.06*
			(4.37)		(6.13)			(4.39)		(6.07)
$infl$				0.41	-0.47				0.47	-0.17
				(0.68)	(2.25)				(0.69)	(2.45)
ik				-14.67	-6.57				-14.48	-5.23
				(8.88)	(13.10)				(9.00)	(13.40)
Observations	52	52	52	52	52	51	51	51	51	51
Controls	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Adjusted R^2	0.05	0.05	0.06	0.08	0.02	0.04	0.05	0.06	0.07	0.02

Table 6: **The stock risk premium and meritocracy.** This table reports the regression results of Equation (6). Stock risk premium is computed as the value-weighted return on the US stock market of all CRSP stocks net of the risk-free interest rate, which is computed as the annualized one-month Treasury bill rate. Columns (1)–(5) use meritocracy level as the main independent variable while columns (6)–(10) use meritocracy innovation as the main independent variable. The control variables include the dividend price ratio (dp), dividend payout ratio (de), book-to-market ratio ($bkmk$), consumption, wealth, income ratio (cay), long-term rate of return on government bonds ($ltrate$), term spread (tms), default return spread (dfy), inflation ($infl$), and investment to capital ratio (ik). The sample period is 1969-2021. Standard errors are Newey-West standard errors and are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

racy, we also employ additional robustness tests. In an alternative specification test, we use the total return on the S&P 500 index (following Goyal and Welch (2008), Shiller (1981)) rather than the stock market return of all CRSP US stocks in our computation of the stock risk premium. Results for this analysis are consistent with the main findings presented in this section, and are available in Appendix A.3.

We also investigate the stock risk premium and meritocracy relationship across all other

G7 nations, and find it to hold. Specifically, meritocracy has a significantly negative relation with the stock risk premium in Canada, France, Italy, Japan, the UK, and the US. In Germany, the coefficient on meritocracy is positive yet very insignificant. Full results for all of the other G7 nations are presented in Appendix A.3.

Finally, it is interesting to note that conventional finance wisdom tells us that ceteris paribus, the decrease in stock price should be associated with a higher risk-adjusted discount rate. Therefore, given a lower stock price in the presence of high meritocracy, one may naturally expect the stock risk premium to increase. However, we empirically document that both the stock price and its risk premium decrease with meritocracy. In Section 6.1, we use our model to shed more light on this somewhat surprising empirical finding.

3.4 Stock Return Volatility

In this Subsection, we examine the relation between meritocracy and stock return volatility. As noted by Schwert (1989) and others, stock return volatility can be related to other economic quantities such as recessionary periods, monetary base growth rates, and bond yields. Therefore it is natural to ask whether meritocracy, too, may be related to stock market volatility.

To test the relationship between meritocracy and stock return volatility, we estimate the following predictive regression:

$$\sigma_{t+1} = \alpha + \beta m_t + \gamma_1 \sigma_t + \gamma_2 Controls_t + \epsilon_{t+1}, \tag{7}$$

where $\sigma_{t+1} = \log(\sqrt{\sum_{i=1}^{N_{t+1}} R_{i,t+1}^2})$ is the natural log of the annual aggregate stock market volatility in period $t+1$, N_{t+1} is the number of trading days during the year $t+1$, and $R_{i,t+1}$ is the daily excess return of the US stock market on the ith trading day of year $t+1$ (following Huang et al. (2015)). The daily excess return is computed as the daily return less the average daily return in the given year, and the daily returns data is computed as the CRSP value-weighted return for all firms incorporated in the US (following French, Schwert, and Stambaugh (1987), Schwert (1989), and Paye (2012)).

Since stock market volatility has been shown to be highly persistent, we also follow Andersen et al. (2001) and Paye (2012) by including lagged volatility σ_t as a control variable in equation (7).[18] We also employ both with and without controls specifications, where

[18]In prior literature, Huang et al. (2015) include one lag of volatility and Schwert (1989) includes 12 lags of volatility for the monthly volatility measure. In our model, we similarly do not include volatility lags

	Stock Return Volatility (σ_{t+1})					
$m =$	Meritocracy level (m_t)			Meritocracy innovation ($\widetilde{m}_t$)		
	(1)	(2)	(3)	(4)	(5)	(6)
m	-10.39	-6.10	-5.37	-16.50**	-11.85**	-12.70**
	(7.94)	(6.25)	(5.75)	(8.03)	(5.30)	(4.77)
σ_t		38.88***	41.18***		38.87***	41.14***
		(13.63)	(12.64)		(13.52)	(12.63)
Recession			12.62*			13.77*
			(7.25)			(7.32)
CB			-6.74			-6.29
			(5.04)			(5.26)
IP			-28.64***			-28.75***
			(8.96)			(8.97)
MB			11.77			11.38
			(7.43)			(7.21)
IR			9.83*			10.77**
			(5.34)			(5.31)
Observations	52	52	52	51	51	51
Controls	No	Yes	Yes	No	Yes	Yes
Adjusted R^2	0.00	0.13	0.16	0.02	0.15	0.19

Table 7: **Stock return volatility and meritocracy.** This table reports the regression results of Equation (7). We compute the stock return volatility using daily data of the CRSP value-weighted return for all firms incorporated in the US. Columns (1)–(3) use meritocracy level as the main independent variable while columns (4)–(6) use meritocracy innovation as the main independent variable. The control variables include the NBER recession indicator at the end of year t (*Recession*) and log standard deviations in year t of corporate bond yield growth (CB), industrial production growth (IP), monetary base growth (MB), and risk-free interest rate growth (IR). The sample period is 1969-2021. Standard errors are Newey-West standard errors and are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

$Controls_t$ include the NBER indicator for recession at the end of year t ($Recession_t$) and the log standard deviations in year t of corporate bond yield growth (CB_t), industrial production growth (IP_t), monetary base growth (MB_t), and risk-free interest rate growth (IR_t). Consistently with the previous asset pricing variable regression models, we measure meritocracy using both levels and innovations. For each of these measures of meritocracy, we look at three specifications: (i) a bivariate regression, (ii) a regression model controlling only for past volatility, and (iii) a regression model including past volatility and the full list of controls. Finally, we note that while stock return volatility is often episodic (wherein periods of high volatility tend to cluster together), in our sample period the annual stock return volatil-

going back further than a year. In an AR(12) model of our annual stock return volatility measure, we also find that only the first lag is significant.

ity series is stationary at the 1% level according to the Phillips and Perron (1988) unit root test.

Table 7 presents the results of our regression model. We find that stock return volatility decreases with meritocracy, and that the results are consistent for both level and innovation measures of meritocracy. In terms of magnitude, for the full control specification with meritocracy level a one point increase in meritocracy level is associated with a 5.37% decrease in stock return volatility the following year. The results are even larger in magnitude and significant at the 5% level for meritocracy innovations. In the full control specification, a one point shock to meritocracy is associated with a 12.70% decrease in the stock return volatility in the following year.

We also test the relationship between stock return volatility and meritocracy in an alternative specification. In particular, we employ the GARCH(1,1) model (Bollerslev (1986)). The results for this specification are provided in Appendix A.4, and also indicate a negative relationship between meritocracy and stock return volatility.

4 Meritocracy and Effort, Inequality, and Utility

In this Section, we investigate the effects of meritocracy on real economic quantities, which also allows us to better understand the precise channels through which meritocracy affects the economy. We first provide evidence that higher meritocracy induces individuals to exert more effort and work a larger quantity of hours. We then document that for most of the past century, meritocracy has had a positive relationship with inequality. Finally, we consider individual utility and find that higher meritocracy is associated with both higher life satisfaction and higher happiness.

4.1 Effort

We first consider the relation between meritocracy and effort. By definition, meritocracy governs the extent to which income is allocated based on an individual's ability and effort versus an individual's social class. While ability and social class are assigned to an individual at birth, effort level is a quantity that individuals are able to choose. Consequently, it is plausible that the level of meritocracy in a society could affect individual effort choice.

Empirically, we measure effort as the average number of hours worked per employed person per year in the US. As discussed in Section 2, this data is sourced from the Federal

Reserve Bank of St. Louis. We follow the following regression model specification to test the relationship between meritocracy and effort:

$$e_{t+1} = \alpha + \beta_1 m_t + \gamma' Controls_t + \epsilon_{t+1}, \tag{8}$$

where e_{t+1} is the average number of hours worked per employed person in year $t+1$, m_t is the perceived meritocracy in year t, and $Controls_t$ include individual characteristics.

	Effort (e_{t+1})			
$m =$	Meritocracy level (m_t)		Meritocracy innovation ($\widetilde{m}_t$)	
	(1)	(2)	(3)	(4)
m	28.04**	26.05**	22.96*	20.92*
	(12.25)	(12.12)	(12.36)	(12.32)
Controls	No	Yes	No	Yes
Observations	51	51	50	50
Adjusted R^2	0.10	0.14	0.05	0.07

Table 8: **Effort and meritocracy.** This table reports the regression results for Equation (8). We compute effort as the number of hours worked by full-time and part-time employees divided by employment level. Column (1) uses meritocracy level as the main independent variable and does not include any controls. Column (2) uses meritocracy level as the main independent variable and includes individual characteristics as controls. Column (3) uses meritocracy innovation as the main independent variable and does not include any controls. Column (4) uses meritocracy innovation as the main independent variable and includes individual characteristics as controls. The sample period range is 1969-2020. Standard errors are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

Table 8 reports the results. We find that a one standard deviation increase in meritocracy level is associated with a 12.76 (26.05*0.49) increase in the number of annual hours worked per employed person per year in the US when controlling for individual characteristics. In the no control specification, a one standard deviation increase in meritocracy level corresponds to an economically similar 13.74 (28.04*0.49) annual hours worked increase. Furthermore, the relationship between meritocracy and effort is statistically significant for all specifications and remains robust when using meritocracy innovations. These results are consistent with the notion that when people perceive society to be more meritocratic, they believe that their effort will be better compensated. Consequently, people exert more effort and work a higher number of hours.

4.2 Income Inequality

We next turn to investigating the relationship between meritocracy and inequality. The rationale for the existence of such a relationship is that meritocracy is a determinant in individual effort level and income, and thereby has a direct effect on the distribution of income in the society. Conscious of this link, it is then natural to anticipate that meritocracy, a supposedly virtuous socioeconomic system that honors those who are hardworking and intelligent, should reduce inequality. After all, individuals from all social classes can have high ability or work hard. Nevertheless, it is also possible that a meritocratic system could distribute a greater portion of resources to the rich, provided that the rich happen to be relatively more diligent and able.

To test this relationship, we rely on two measures of income inequality: (i) the well-known Gini coefficient and (ii) the variance of individual incomes. The more tractable variance measure in particular allows us to determine precise theoretical conditions under which meritocracy would increase or decrease inequality, as discussed in more detail in Section 6. Armed with the two measures, we regress the change in income inequality on meritocracy and control for the common explanatory variables according to the following regression model:

$$Ineq_t = \alpha + \beta m_t + \gamma' Controls_t + \epsilon_t, \tag{9}$$

where $Ineq_t \in \{\Delta Gini_t, \Delta \text{Var}(y_t)\}$ is the measure of change in income inequality, m_t is the level of perceived meritocracy, and $Controls_t$ include variables commonly used to help explain income inequality.

In order to combat issues of non-stationarity in the Gini coefficient, we use the first difference of the Gini coefficient as our dependent variable of interest. Similarly, we use the first difference of income variance as our second measure of inequality. We also take the first difference of the labor force participation rate, which then becomes a stationary predictor variable. As discussed earlier both meritocracy level and meritocracy innovations are stationary, and the remaining explanatory variables are also stationary according to the Phillips-Perron test at the 5% significance level.

Table 9 reports the results and demonstrates that income inequality in the US is actually positively associated with meritocracy. Panel A uses the Gini coefficient as our measure of income inequality, while Panel B relies on the annual income variance as the measure of income inequality. The significantly positive relationship holds for all of the eight specifications. In particular, Panel A demonstrates that a one standard deviation increase in

	Panel A: Gini Coefficient ($\Delta Gini_t$)			
$m =$	Meritocracy level (m_t)		Meritocracy innovation ($\widetilde{m}_t$)	
	(1)	(2)	(3)	(4)
m	0.22*	0.25*	0.28**	0.37**
	(0.12)	(0.13)	(0.13)	(0.14)
Δ *lfpr*		0.39		0.42
		(0.39)		(0.37)
gdpc_gr		-0.03		-0.03
		(0.03)		(0.03)
life_exp		0.03		0.05
		(0.05)		(0.05)
pop1564		0.04		0.03
		(0.09)		(0.08)
Observations	51	51	51	51
Controls	No	Yes	No	Yes
Adjusted R^2	0.03	0.08	0.05	0.11
	Panel B: Income Variance ($\Delta \text{Var}(y_t)$)			
$m =$	Meritocracy level (m_t)		Meritocracy innovation ($\widetilde{m}_t$)	
	(1)	(2)	(3)	(4)
m	1.19**	1.39**	1.06**	1.36**
	(0.47)	(0.52)	(0.51)	(0.60)
Δ *lfpr*		-0.35		-0.33
		(0.47)		(0.47)
gdpc_gr		0.20**		0.19**
		(0.09)		(0.09)
life_exp		0.11		0.14
		(0.11)		(0.12)
pop1564		0.00		-0.00
		(0.15)		(0.17)
Observations	51	51	51	51
Controls	No	Yes	No	Yes
Adjusted R^2	0.16	0.27	0.12	0.24

Table 9: **Income inequality and meritocracy.** This table reports the regression results of Equation (9), using the Gini coefficient in Panel A and income variance in Panel B as the measure of inequality. Data for the Gini coefficient is from the World Bank and the variance of income is from the World Values Survey. Columns (1)–(2) use meritocracy level as the main independent variable while columns (3)–(4) use meritocracy innovation as the main independent variable. The control variables include the change in labor force participation rate ($\Delta lfpr$), GDP per capita growth ($gdpr\_gr$), life expectancy ($life\_exp$), and the working age population aged 15-64 ($pop1564$). The sample period is 1969-2021. Standard errors are Newey-West standard errors and are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

meritocracy innovation corresponds to a 0.11 (0.26*0.45) increase in the Gini coefficient. In Panel B, we find that a one standard deviation increase in meritocracy level is associated with a 0.68 (1.39*0.49) increase in the variance of incomes.

Why is inequality positively associated with meritocracy in the US, despite the fact that allocating income according to effort and ability—rather than social class—sounds like it

could plausibly help reduce income inequality? In Section 6 our theory sheds light on this, and explains how the association between inequality and meritocracy can be affected by quantities such as the dispersion of social class and the dispersion of ability.

4.3 Utility

We next turn to analyze whether people derive higher utility from living in a more meritocratic society. As discussed in the Introduction, there is ample evidence that people are happier living in societies that are more fair and trustworthy (Kesebir, Oishi, and Diener (2011)) and have lower inequality (Kesebir, Oishi, and Diener (2011), Kesebir and Oishi (2015)). Furthermore, the idea of meritocracy as a system wherein rewards are impartially distributed according to individual ability and effort has gained support not only from the upper classes, but also from individuals at the bottom of the social ladder (Chong (2014), Newman, Johnston, and Lown (2015)). These suppositions are further supported by a large number of works that include agent preferences against unfair outcomes and inequality (e.g., Alesina and Angeletos (2005) employ preferences in which individuals dislike unfair outcomes; in Pastor and Veronesi (2021), individuals dislike inequality). Consequently, it is natural to postulate that individuals are happier living in more meritocratic societies.

In order to test the relationship between meritocracy and utility, we regress utility on meritocracy, log consumption, and other known covariates.[19] We also include time fixed effects in the regression to control for time-dependent factors, such as technological progress, which may affect utility through a channel other than meritocracy or consumption. All data is individual level data for the four WVS survey waves for which there is meritocracy data.

In order to measure utility, we rely on two relevant questions from the WVS. The first is the "happiness question" and the second is the "life satisfaction question"; the exact formulation for both of these questions is provided in Section 2.3. To proxy for log consumption, we rely on the income question from the WVS, which asks individuals to place themselves in an income decile from 1 to 10. Note that the specification of the question eliminates any left tail or right tail outlier responses. Since the income distribution is known to be significantly right skewed, the decile transformation can also be viewed as having similar effects to a log transformation. Since the WVS does not contain direct questions on consumption, the income decile question was chosen as the closest proxy.

We thus run the following regression to test whether utility increases with meritocracy,

[19] We use log consumption as a generic form that satisfies two well-known properties of the utility function, namely that it is increasing and concave in consumption.

	Happiness			Life Satisfaction		
	(1)	(2)	(3)	(1)	(2)	(3)
Meritocracy (m_t)	0.03***			0.10***		
	(0.00)			(0.01)		
Log cons. ($\log(c_t)$)		0.23***			0.55***	
		(0.03)			(0.05)	
Merit. * log cons. ($m_t \log(c_t)$)			0.01***			0.06***
			(0.00)			(0.00)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,125	7,125	7,125	7,125	7,125	7,125
Adjusted R^2	0.05	0.05	0.06	0.08	0.09	0.09

Table 10: **Utility and meritocracy.** This table reports the regression results of equation (10), where u_{it} takes on the value of individual i's reported happiness at time t in the first three columns and the value of individual i's reported life satisfaction at time t in the last three columns. Data is from the US World Values Survey for the four survey years (1995, 2006, 2011, and 2017) with perceived meritocracy data. Consumption is proxied by the income level of individual i at time t. The control variables include gender, income inequality, ability, and social class. All variables are as described in Section 2. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

log consumption, and meritocracy * log consumption:

$$u_{it} = \beta x_{it} + \gamma_t' Controls_t + \epsilon_{it}, \tag{10}$$

where $x_{it} \in \{m_{it}, \log(c_{it}), m_{it} * \log(c_{it})\}$, u_{it} is individual i's utility at time t, m_{it} is individual i's perceived meritocracy at time t, c_{it} is individual i's consumption at time t (proxied by income decile), and $Controls_t$ include gender, income inequality, education, and social class.

Results are presented in Table 10. As expected, utility positively depends on consumption. We also find a positive and significant coefficient on meritocracy for both happiness and life satisfaction, indicating that agents' utility increases when meritocracy is higher. Furthermore, the coefficient on the interaction term of meritocracy and consumption is positive and significant. The regression with the multiplicative term also possesses the best fit of the three models considered, as evidenced by its highest adjusted R-squared. We use this empirical evidence to support our model assumption for the utility function in Section 5.4.

5 The Economy with Meritocracy

In this Section, we develop a tractable model with meritocracy within a familiar dynamic asset pricing environment so as to shed light on our empirical findings of Sections 3–4. Our model features a finite-horizon securities market economy evolving in continuous-time and is populated by a continuum of agents differing in ability, social class, and income. The agents are influenced by the degree of meritocracy through their income and utility. The shocks in the economy are driven by two Brownian motion processes, w_δ and w_m, representing the uncertainty corresponding to economic output and meritocracy, respectively.

5.1 Securities Market

We consider a standard, dynamically complete securities market. There is a riskless bond and a risky stock available for trading. The stock is in fixed supply of one unit and is a claim to the exogenous dividend flow δ with dynamics:

$$d\delta_t = \delta_t \mu_\delta dt + \delta_t \sigma_\delta dw_{\delta t}, \tag{11}$$

where the dividend mean growth rate μ_δ and volatility σ_δ are constants, and w_δ is a Brownian motion driving the economic output shocks in the economy. The stock price process S, along with its mean return and return volatility, is to be determined endogenously in equilibrium.

The riskless bond is in zero net supply, with price B following the dynamics:

$$dB_t = B_t r_t dt, \tag{12}$$

where the interest rate r (or equivalently the bond price B) is to be determined endogenously in equilibrium.

Since the market is dynamically complete, we implicitly and plausibly assume the presence of an additional zero-net supply security completing the market (as there are two sources of uncertainty). Any non-redundant derivative security (e.g., stock option or futures contract) would suffice. However, given our focus is on the stock and bond markets, we do not explicitly consider the derivative security in our analysis.

5.2 Modeling Meritocracy

Meritocracy enters into the economy via two channels, agents' income and utility. The first channel is based on the definition of meritocracy, namely that meritocracy determines to what extent effort and ability versus social class contribute to the agents' income. The second channel is based on prior work in the sociology and psychology literatures and the empirical evidence of Section 4.3, which finds that people obtain greater utility with higher meritocracy.

Motivated by our finding in Section 2.2 that meritocracy over time is mean-reverting in our sample, we model the meritocracy process m as a strictly positive, mean-reverting process following Brennan and Schwartz (1980):

$$dm_t = \kappa_m(\overline{\mu}_m - m_t)dt + m_t\sigma_m dw_{mt}, \tag{13}$$

where the constants κ_m, $\overline{\mu}_m$, and σ_m represent the speed of mean reversion, long-run mean, and volatility of meritocracy m, and w_m is a Brownian motion that represents meritocracy uncertainty and is independent of w_δ so that there is zero correlation between stock dividends and meritocracy. This is motivated by the evidence that the correlation between the log differences of GDP per capita and meritocracy in our sample is very close to zero.[20] Given the mean reversion, relatively high meritocracy today would indicate lower meritocracy is anticipated in the future.

5.3 Ability, Social Class, and Effort

The continuum of agents in the economy are born with different abilities and social classes that stay constant over their lifetime.[21] Each agent's ability a_i follows a uniform distribution, $a_i \sim U[b, g]$, while her social class s_i follows another uniform distribution, $s_i \sim U[l, h]$. Agents' ability and social class are independent, that is ability is distributed equally among people of different social classes.[22]. Without loss of generality, we let $\int s_i di = \frac{l+h}{2} = 1$.

Each agent can exert effort e_{it} that earns income (Section 5.4), but also incurs a cost

[20] In particular, within our sample, the correlation between the log differences of GDP per capita and meritocracy is 0.03.

[21] In what follows, we find that agents' heterogeneity in ability and social class are important determinants of income inequality in the presence of meritocracy (Section 6.2).

[22] In their model, Caselli and Gennaioli (2005) similarly assume that managerial talent is not inheritable. On the other hand, Deckers et al. (2021) argue that children's ability may be a function of their parents' ability and social class and Plug and Vijverberg (2003) find that about 55 to 60 percent of the parental ability is genetically transmitted.

given by:

$$cost(e_{it}) = \frac{1}{2}\frac{c_e}{a_i + s_i}e_{it}^2, \tag{14}$$

where c_e is a constant scalar, e_{it} is the agent's effort at time t, and a_i and s_i are the agent's ability and social class respectively. The cost of effort function is consistent with a realistic version of the cost of education discussed in Iyigun (1999), and decreases with an agent's ability and social class because high-ability people can work more efficiently while high-social class people can use their connections and resources to achieve goals more easily.[23] The cost of effort increases with effort as a convex function. Finally, we assume that costs of effort do not disappear from the economy but are paid to the agents equally via a government transfer of $\tau_t = \int \frac{1}{2}\frac{c_e}{a_i+s_i}e_{it}^2 di$. We note that our asset pricing implications are robust to alternative model specifications of ability and social class.[24]

5.4 Agents' Preferences and Income

Given the evidence of Section 4.3 that agents' utility increases with both consumption and meritocracy, we postulate each agent's utility to be:

$$u(c_{it}) = \frac{m_t}{s_i}\log(c_{it}). \tag{15}$$

We also assume that higher social class agents obtain less utility from the society being more meritocratic, because high meritocracy obstructs them from exploiting more income from their high social standing.[25]

Each agent's income y_i is posited to be a share of the aggregate income. Aggregate

[23] One can draw a parallel between costly effort in the model and costly education in the real world, where education achieved is a function of both ability and social class. In fact, the notion that higher social class enables individuals to more easily achieve better test results and higher levels of education is widespread. For instance, in his speech to the North of England Educational Conference, UK Secretary of State for Education Crosland noted "the 11-plus [education exam] reflects not only IQ but also environmental factors, especially home and neighbourhood and parental aspirations." Iyigun (1999) similarly notes that higher social class parents create a better learning environment at home, directly influencing the potential of their children.

[24] In particular, ability and social class enter the model via individual cost of effort (14) and income (16). The asset pricing Propositions 1-2 are not affected by the specification of income or the cost of effort since the market clearing condition requires integrating the equations over all agents, which turn the terms that include ability and social class into constants, eliminating their effect on asset prices. The specific distribution of incomes may be different if we modify the cost of effort function, but that would not change a key takeaway of our implication (Proposition 4) that income inequality does not only depend on meritocracy, but also on the relative distribution of ability versus social class.

[25] Note that all of our asset pricing results go through even without the utility depending on social class (i.e., the s_i term being absent in the utility function). In addition, for clarity of exposition we do not include the impatience parameter in our model (i.e., e^{-rt}); including the impatience parameter similarly does not affect the main implications of our model.

income is defined as the total economic output other than dividends, and is postulated to be a fixed multiple α of the dividends and thus given by $\alpha\delta_t$ at time t. Individual agent i's income is given by:

$$y_{it} = [m_t \check{e}_{it} + (1 - m_t)\check{s}_i]\alpha\delta_t, \tag{16}$$

where $\check{e}_{it} = \frac{e_{it}}{\int e_i t di}$ is the agent's effort relative to the aggregate effort in the economy and $\check{s}_i = \frac{s_i}{\int s_i di}$ is the agent's social class relative to the aggregate social class in the economy.[26]

The agent's share of the aggregate income $\alpha\delta_t$ is driven by her relative effort $\check{e}_{it}$, her relative social class $\check{s}_i$, and meritocracy m_t. Meritocracy modulates the contribution of relative effort versus relative social class to the agent's share of the aggregate income. In a more meritocratic economy, the agent's income depends more on her relative effort, while in an unmeritocratic economy, the agent's income depends more on her relative social class.

From Equation (16), we see that income is also the meritocracy-weighted average of relative effort and social class. Note that while in theory, meritocracy has to lie between 0 and 1, we do not impose this restriction explicitly. In our simulations, however, the likelihood of m being negative is negligible.[27]

5.5 Optimization and Equilibrium

Each agent chooses her optimal consumption c_i, effort e_i, and stock-bond portfolio, to maximize her expected utility over her life-time consumption, given security prices and meritocracy:

$$\mathrm{E}\left[\int_0^T \frac{m_t}{s_i}\log(c_{it})dt\right], \tag{17}$$

subject to a dynamic budget constraint. Dynamic market completeness implies a unique state price density process ξ such that the agent's dynamic budget constraint can be restated as a static one:

$$\mathrm{E}\left[\int_0^T \xi_t \left(c_{it} + \frac{1}{2}\frac{c_e}{a_i + s_i}e_{it}^2 - (m_t \frac{e_{it}}{\int e_{it}di} + (1 - m_t)s_i)\alpha\delta_t - \tau_t\right) dt\right] = W_{i0}, \tag{18}$$

[26] We also note that since $\int s_i di = 1$, $\check{s}_i = s_i$. The aggregate income of all agents at time t, y_t, is equal to the total economic output other than dividends since $y_t = \int y_{it}di = \int [m_t\check{e}_{it} + (1 - m_t)\check{s}_i]\alpha\delta_t di = \alpha\delta_t$.

[27] Specifically, we first estimate the parameters of the meritocracy process (13) from the WVS US data of Section 2.2 with meritocracy scaled to be between [0,1]. We scale meritocracy from the WVS data m_{wvs} between [1,10] to m_{model} to be between [0,1] following $m_{model} = (m_{wvs} - 1)/9$. The sample mean μ_m and standard deviation σ_m are 0.72 and 0.09 respectively, and we obtain a κ_m of 0.23 from the AR (1) process. We set the initial value m_0 to be 0.85 as the meritocracy value of the first year in our sample. We then simulate 100,000 paths of the meritocracy process, and find that only 0.034% of the simulations fall outside of the [0,1] range.

where $W_{i0} = \overline{\theta}_{i0}$ is the agent's initial endowment in units of stock, with $\int \overline{\theta}_{i0} di = S_0$. Expression (18) accounts for the agent's consumption c_{it}, her cost of effort $\frac{1}{2}\frac{c_e}{a_i+s_i}e_{it}^2$, her income $(m_t \frac{e_{it}}{\int e_{it} di} + (1-m_t)s_i)\alpha\delta_t$, and the government transfer τ_t (that equally distributes the agents' aggregate cost of effort).

We define equilibrium in a standard way. Specifically, the economy with meritocracy is said to be in *equilibrium* if the security prices and the agents' consumption, effort, and portfolio strategies are such that (i) all agents choose their optimal consumption, effort, and portfolio strategies given the security prices and meritocracy, and (ii) security and consumption good markets clear.

6 Theoretical Implications of Meritocracy

In this Section, we employ the model of Section 5 to uncover the mechanisms through which meritocracy affects asset prices, as well as agents' effort and income inequality. In particular, we find that the interest rate increases with meritocracy, while the stock price-dividend ratio, its risk premium, and return volatility all decrease with meritocracy, consistent with our empirical evidence of Section 3. We further show that individual and aggregate effort increase with meritocracy, and that income inequality increases with meritocracy when meritocracy is relatively high, also consistently with the empirical evidence of Section 4.

Propositions 1 and 2 report the equilibrium interest rate, stock price-dividend ratio, stock risk premium and return volatility, and the corresponding empirical predictions regarding meritocracy. In what follows, the mean stock return μ_{St} is defined as $\mathrm{E}_t[(dS_t/S_t + \delta_t dt)/dt]$, and the stock return volatility σ_{St} as $\mathrm{Var}_t[dS_t/S_t]$.

6.1 Asset Pricing Implications

Proposition 1 (Equilibrium asset prices). *In the economy with meritocracy, the equilibrium interest rate is given by*

$$r_t = \mu_\delta - \kappa_m \frac{\overline{\mu}_m}{m_t} + \kappa_m - \sigma_\delta^2 + \sigma_\delta \sigma_m, \tag{19}$$

and the stock price-dividend ratio by

$$\frac{S_t}{\delta_t} = \frac{A_1}{m_t} + A_2, \tag{20}$$

where $A_1 = \overline{\mu}_m \left[(e^{-\kappa_m (T-t)-1})/\kappa_m + (T-t) \right] > 0, A_2 = (e^{-\kappa_m (T-t)-1})/\kappa_m > 0$.
Consequently, the equilibrium interest rate is increasing with meritocracy, while the equilibrium stock price-dividend ratio is decreasing with meritocracy.

Proposition 1 reveals that the risk-free interest rate is time-varying with meritocracy. In particular, the second term of equation (19) reveals a positive relation between r and m, indicating that higher meritocracy is associated with a higher interest rate, as also depicted in Panel A of Figure 3.

The mechanism behind this result is as follows. When meritocracy is relatively high, it is anticipated to be lower in the future. Agents gain even more utility from consumption in the presence of higher meritocracy, implying that they would obtain less utility from consuming the same amount in the future. Thus, agents consume more and save less today with high meritocracy, causing the interest rate to rise in equilibrium.

Equation (20) of Proposition 1 reveals that the stock price-dividend ratio depends on the level of meritocracy in the economy. In particular, since $A_1 > 0$, higher meritocracy is associated with a lower stock price-dividend ratio, as also demonstrated in Panel B of Figure 3.

The stock price-dividend ratio decreases with higher meritocracy because cost of consumption (i.e., the state price density) increases with meritocracy as meritocracy contributes to higher marginal utility. Since meritocracy is expected to decline in the future, the cost of consumption will also be lower in the future. Thus, when meritocracy is high, future stock dividends are valued lower (with a lower state price density), corresponding to a lower present valuation of future cash flows and a lower stock price-dividend ratio today.

Proposition 2 (Equilibrium stock dynamics). *In the economy with meritocracy, the equilibrium stock risk premium is given by*

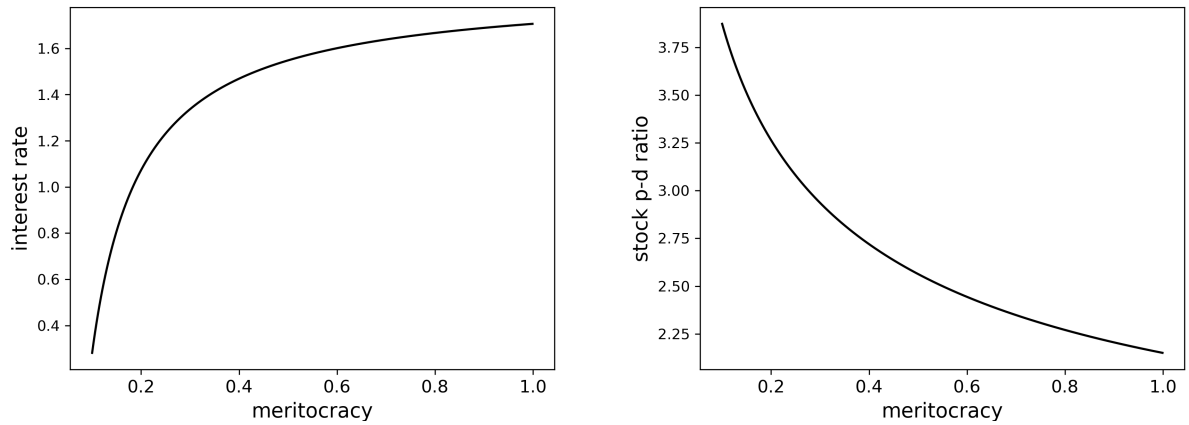
$$\mu_{St} - r_t = \sigma_\delta^2 + \frac{A_1}{A_1 + A_2 m_t} \sigma_m^2, \tag{21}$$

and the stock return volatility by

$$\sigma_{St} = \sqrt{\sigma_\delta^2 + \left(\frac{A_1}{A_1 + A_2 m_t} \right)^2 \sigma_m^2}. \tag{22}$$

Consequently, the equilibrium stock risk premium and stock return volatility are both decreasing with meritocracy.

Proposition 2 implies that the stock risk premium is affected by meritocracy. In partic-



(A) **Interest rate versus meritocracy** (B) **Stock p-d ratio versus meritocracy**

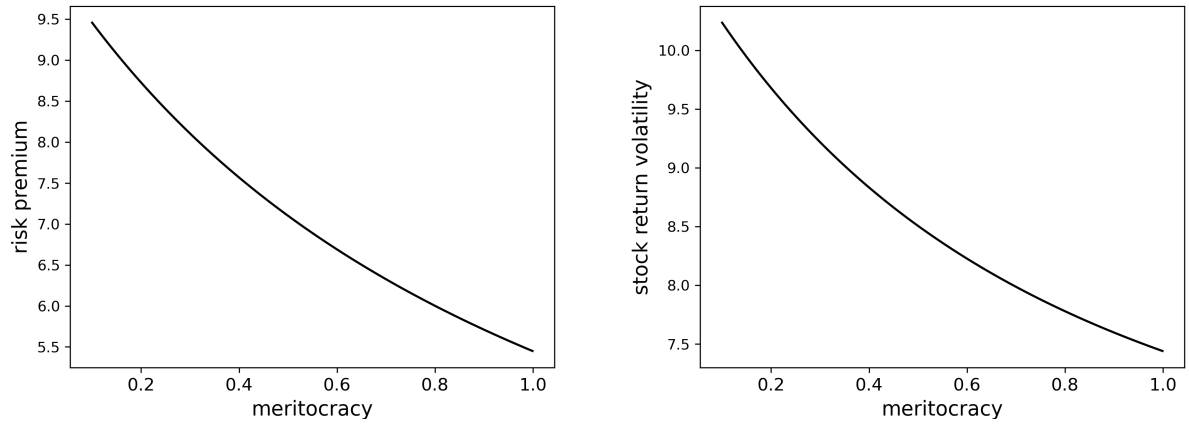
Figure 3: **Asset prices and meritocracy** This figure plots the equilibrium interest rate (Panel A) and the natural logarithm of the stock price-dividend ratio (Panel B) against meritocracy as in equation (19) and equation (20), respectively. Parameter values of m follow from footnote 27, while those for δ are estimated using US GDP per capita data obtained from the World Bank. Specifically, $\kappa_m = 0.23$, $\overline{\mu}_m = 0.72$, $\sigma_m = 0.09$, $m_0 = 0.85$, $T - t = 10$, $\mu_\delta = 1.66$, and $\sigma_\delta = 0.06$.

ular, as meritocracy becomes higher the stock risk premium decreases, as shown in Panel A of Figure 4. This may appear somewhat surprising in light of the stock price result that the price also decreases in meritocracy. To explain the negative risk premium relationship, we first note that the stock risk premium responds to two types of shocks: those from aggregate economic output and those from meritocracy. The output shocks are unaffected by the degree of meritocracy, since we take the meritocracy and economic output to be uncorrelated, consistent with the evidence in our meritocracy data.

On the other hand, in a highly meritocratic environment the absolute shocks to meritocracy are larger (since they are directly proportional to meritocracy). Consequently, when the society is highly meritocratic, it is anticipated that the corresponding shocks to meritocracy will be lower in the future. This indicates that higher meritocracy is associated with a lower stock risk premium.

Proposition 2 shows that the stock return volatility is also affected by meritocracy. In particular, when meritocracy is higher, the stock return volatility is decreased, as depicted in Panel B of Figure 4. The stock return volatility is determined by the stock's exposure to the economic output shocks, as well as its exposure to meritocracy shocks. The former is not affected by meritocracy. When meritocracy is relatively high, the stock's exposure to meritocracy shocks becomes smaller since the stock price is negatively associated with meri-

tocracy. Therefore, when meritocracy is relatively high, the stock's exposure to meritocracy will be lower, contributing to a lower stock return volatility.



(A) **Stock risk premium versus meritocracy** (B) **Stock volatility versus meritocracy**

Figure 4: **Stock price dynamics and meritocracy** This figure plots the equilibrium stock risk premium (Panel A) and stock return volatility (Panel B) against meritocracy as in equation (21) and equation (22), respectively. Parameter values are as in Figure 3.

6.2 Effort and Inequality Implications

Proposition 3 (Effort and meritocracy). *In the economy with meritocracy, the equilibrium individual effort and aggregate effort are given by:*

$$e_{it} = \frac{a_i + s_i}{\sqrt{c_e(1 + (b+g)/2)}} \sqrt{\alpha \delta_t m_t}, \tag{23}$$

$$e_t = \frac{\sqrt{1 + (b+g)/2}}{c_e} \sqrt{\alpha \delta_t m_t}. \tag{24}$$

Consequently, the equilibrium individual effort and aggregate effort are increasing with meritocracy.

Proposition 3 reveals that individual effort is increasing in meritocracy, and that this increase is more pronounced with higher ability and higher social class. The reason is as follows. Meritocracy determines the extent to which effort and social class contribute to an agent's income. When meritocracy is higher, individual income is relatively more dependent on individual effort. Therefore, agents strive to exert more effort in order to increase their income and subsequent consumption.

Moreover, since each agent exerts higher effort in a more meritocratic economy as the

meritocracy weight in the income process becomes higher, aggregate effort in the economy also naturally increases, as reported in Proposition 3.

We next turn to the relationship between meritocracy and inequality. We measure inequality using the variance of all agents' incomes, which encapsulates the dispersion of income in the economy. The measure of variance for inequality has also been employed in other studies (e.g., Robinson (1976), Pastor and Veronesi (2016, 2021)).

Proposition 4 (Inequality and meritocracy). *In the economy with meritocracy, the equilibrium inequality as measured by the variance of income* $\mathrm{Var}(y_{it})$ *is given by:*

$$\mathrm{Var}(y_{it}) = \frac{1}{12}\left((h-l)^2(1+(b+g)/2-m_t(b+g)/2)^2 + m_t^2(g-b)^2\right)\left(\frac{\alpha\delta_t}{1+(b+g)/2}\right)^2. \tag{25}$$

Consequently, income inequality is increasing with meritocracy when

$$m_t > \frac{\mathrm{Var}(s_i)(1+\mathrm{E}(a_i))}{\mathrm{Var}(s_i)\mathrm{E}(a_i) + \mathrm{Var}(a_i)\mathrm{E}(s_i)/\mathrm{E}(a_i)} \tag{26}$$

and decreasing with meritocracy otherwise.

Proposition 4 reveals that inequality in the presence of meritocracy is driven by dispersion in social class ($(h-l)^2 = \mathrm{Var}(s_i)$) and ability ($(g-b)^2 = \mathrm{Var}(a_i)$). In particular, meritocracy is more likely to increase inequality when the dispersion of ability is relatively high, and less likely to increase inequality when the dispersion in social class is high. The intuition is that higher meritocracy allocates more income according to ability rather than social class, so when agents' heterogeneity in ability is high relative to their heterogeneity in social class, higher meritocracy is more likely to result in increased heterogeneity in income and therefore higher income inequality.

To elaborate more on the underlying mechanism, we consider the index of dispersion, $\mathrm{Var}(x)/\mathrm{E}(x)$, in social class and ability. When the index of dispersion is higher in social class than in ability ($\mathrm{Var}(s_i)/\mathrm{E}(s_i) > \mathrm{Var}(a_i)/\mathrm{E}(a_i)$), condition (26) does not hold for any level of meritocracy, and so higher meritocracy always corresponds to lower income inequality. This occurs since a meritocratic economy reallocates income away from the highly dispersed social class distribution. When, on the other hand, the index of dispersion in ability is higher than that in social class and is above a threshold, meritocracy increases inequality and decreases it otherwise. Consequently since meritocracy acts as a weight in the income process, when meritocracy is relatively high already (above a certain threshold), increasing meritocracy further leads to higher income inequality (since agents' dispersion in ability is relatively high). However, when meritocracy is relatively low (below a certain threshold),

allocating income in a more meritocratic way based on ability at least to a small extent would be beneficial in reducing inequality. This is true because agent ability and social class are uncorrelated. Therefore, the critical meritocracy level at which inequality is lowest would include income that is allocated to some extent according to ability and to some extent according to social class.

Finally, it is important to reconcile our inequality result here with our empirical findings. As documented in Section 4.2, income inequality in the US has increased with meritocracy over the past several decades.[28] This is consistent with the theoretical mechanism presented here because for most of the sample period, condition (26) is satisfied.[29] In Appendix A.5, we test the relationship between meritocracy and inequality conditioning on whether (26) holds and find that the results are consistent with the predictions of Proposition 4.

7 Conclusion

In this paper, we take the first step towards understanding the effects of meritocracy on the financial markets. In particular, we first investigate the empirical relationship between meritocracy and the risk-free rate, and uncover that higher meritocracy is related to higher present consumption, lower demand for saving, and consequently a higher equilibrium risk-free interest rate. Somewhat surprisingly for a proponent of the meritocratic ideal, we also document a lower stock price-dividend ratio following higher meritocracy due to a lower valuation of future dividends. In the data, this is accompanied by a lower stock risk premium and lower stock return volatility, both as a result of lower future expected shocks to meritocracy. Throughout, we support our empirical findings with a dynamic asset pricing model with meritocracy that reconciles these findings, explains the mechanism and intuitions that underlie them, and makes predictions consistent with the data. In addition, we also study the impact of meritocracy on real economic quantities such as effort and inequality. While higher meritocracy corresponds to higher individual and aggregate effort, the relationship between meritocracy and inequality is more nuanced and depends on the relative hetero-

[28] While income inequality has increased in recent decades (Piketty and Saez (2003)), the relationship between income inequality and other key variables in the economy has been varied. Some of the most influential studies on income inequality, such as Kuznets (1955), show a non-linear and changing relationship between income inequality and economic growth, for instance. Income inequality tends to increase with economic growth while a country is in the developing phase, and decreases with economic growth once a country becomes more developed.

[29] The satisfaction of condition (26) implies that meritocracy is empirically greater than the relative variance of social class compared to that of ability. In our dataset of 43 observations with both meritocracy and social class data, condition (26) holds in 38 of the observations.

geneity of agent ability and social class as well as on the level of meritocracy. Over the past half century, this relationship between meritocracy and inequality has been positive.

Our work opens a research gateway into what we hope to be a fruitful area of further meritocracy research. In our work, we provide a plausible way of modeling perceived meritocracy that closely follows the data, and can conveniently be used in future research. Since our study focuses on perceived meritocracy, one area of possible future work could focus on developing a measure of actual meritocracy, i.e., to what degree the society actually allocates resources according to talent and hard work versus social class. A second area of exploration could be investigating the role of meritocracy as an additional factor to explain the cross-section of stock returns and operating financial performance at the firm level. Finally, this paper also has important policy implications beyond meritocracy and asset prices that also could be worthwhile to study more in depth. For instance, our result on meritocracy and costly effort could be used in conjunction with formulating better affirmative action policies, while our findings on inequality and meritocracy could help guide cost and benefit analyses of a more equitable distribution of income. With leaders across the western world echoing calls to meritocratic ideals in recent years, meritocracy is an important topic ripe for further investigation in the finance literature.

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Online Appendix

A Empirical Robustness

In this Appendix, we provide robustness tests for the empirical asset pricing and inequality results in Sections 3–4. To keep focus, we only report the relevant coefficient on meritocracy in our regressions and not the coefficients on the control variables as these are well-known to have explanatory power in the absence of meritocracy.

A.1 Risk-free Interest Rate

We first test the relationship between the risk-free interest rate and meritocracy when controlling for the Romer-Romer residuals. We use both the level of meritocracy and the innovations in meritocracy as the key independent variables, and employ the following regression model:

$$r_{t+1} = \alpha + \beta m_t + \gamma RR_t + \epsilon_{t+1}, \tag{A.1}$$

where r_{t+1} is the risk-free interest rate, m_t is perceived meritocracy, and RR_t are the monetary policy shocks from Romer and Romer (2004).

Results for this regression model are reported in Table A.1. Columns (1) and (2) of the table use the perceived meritocracy level as the independent variable of interest, while columns (3) and (4) use the perceived meritocracy innovation as the key independent variable. Columns (1) and (3) include no control variables, while columns (2) and (4) control for the level, slope, and curvature factors. The standard errors are adjusted as in Newey and West (1987) to control for possible heteroskedasticity and autocorrelation, and the table reports the adjusted R^2.

We find that under this specification the risk-free interest rate is still positively and significantly associated with meritocracy, and that the results are furthermore consistent for both level and innovation measures of meritocracy. The results also hold under both no control and with control specifications.

In the second robustness test, we investigate the relationship between the risk-free rate and meritocracy after controlling for the forecast interest rate following Diebold and Li (2006). Specifically, using yield curve data from the Fed, we first obtain the β_1, β_2, and β_3

$m =$	**Risk-free Interest Rate (r_{t+1})**			
	Meritocracy level (m_t)		Meritocracy innovation ($\widetilde{m}_t$)	
	(1)	(2)	(3)	(4)
m	1.55*	0.94**	2.01**	1.48***
	(0.82)	(0.48)	(0.99)	(0.53)
Controls	No	Yes	No	Yes
Observations	52	39	51	38
Adjusted R^2	0.08	0.09	0.13	0.15

Table A.1: **The risk-free rate and meritocracy, controlling for monetary policy shocks.** This table reports the regression results of Equation (A.1). The risk-free rate is measured as the one-month Treasury bill rate, sourced from Ken French's website. Inflation rate is from the OECD website. Column (1) uses meritocracy level as the main independent variable and does not include any controls. Column (2) uses meritocracy level as the main independent variable and includes Romer-Romer residuals as a control variable. Column (3) uses meritocracy innovation as the main independent variable and does not include any controls. Column (4) uses meritocracy innovation as the main independent variable and includes Romer-Romer residuals as a control variable. The sample period range is 1969-2021 for columns (1) and (3), and is 1969-2007 for columns (2) and (4) due to data availability of the Romer-Romer residuals. Standard errors are Newey-West standard errors and are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

estimates for each period of time, following:

$$r_t = \beta_1^t + \beta_2^t e^{-\lambda_t \tau} + \beta_3^t \lambda e^{-\lambda_t \tau}, \tag{A.2}$$

where t indicates the year-month, $\lambda_t = 0.0609$ is a constant as in Diebold and Li (2006), and τ is the number of months to maturity. β_1^t, β_2^t, and β_3^t can be interpreted as level, slope, and curvature.

We then employ an AR (1) model to predict β_1^t, β_2^t, and β_3^t, which are used to forecast the interest rate $\widehat{r}_{t,DL}$. We include $\widehat{r}_{t,DL}$ as a control variable to scrutinize whether meritocracy adds predicting power for the interest rate, following the regression model:

$$r_{t+1} = \alpha + \beta m_t + \gamma \widehat{r}_{t,DL} + \epsilon_{t+1}, \tag{A.3}$$

Table A.2 reports the regression results. The risk-free interest rate is still positively associated with meritocracy in columns (2) and (4) when we control for the forecast interest

rate following Diebold and Li (2006). The economic magnitudes of meritocracy's effect on the risk-free interest rate are similar in both the with and without control specifications. In all four regressions, the coefficient on meritocracy is statistically significant at the 5% or 1% level.

	Risk-free Interest Rate (r_{t+1})			
$m =$	Meritocracy level (m_t)		Meritocracy innovation ($\widetilde{m}_t$)	
	(1)	(2)	(3)	(4)
m	1.55*	1.49**	2.01**	1.74**
	(0.82)	(0.75)	(0.99)	(0.79)
Controls	No	Yes	No	Yes
Observations	52	52	51	51
Adjusted R^2	0.08	0.27	0.13	0.30

Table A.2: **The risk-free rate and meritocracy, controlling for forecast interest rate.** This table reports the regression results of Equation (A.3). The risk-free rate is measured as the one-month Treasury bill rate, sourced from Ken French's website. Inflation rate is from the OECD website. Column (1) uses meritocracy level as the main independent variable and does not include any controls. Column (2) uses meritocracy level as the main independent variable and includes the forecast interest rate following Diebold and Li (2006) as a control variable. Column (3) uses meritocracy innovation as the main independent variable and does not include any controls. Column (4) uses meritocracy innovation as the main independent variable and includes the forecast interest rate following Diebold and Li (2006) as a control variable. Level, slope, and curvature data of the yield curve is from the Federal Reserve Bank of St. Louis. The sample period range is 1969-2021. Standard errors are Newey-West standard errors and are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

Finally, we turn to testing the relationship between meritocracy and the risk-free rate by looking at the effect of meritocracy on the first-differences in the risk-free rate. We note that the real interest rate itself is already a stationary process as its Phillips-Perron test p-value is 0.072 and its ADF test p-value is 0.073, both below the critical point 0.1. Thus, using the real interest rate as the dependent variable in our sample period should not raise concerns regarding spurious regressions. Nevertheless, it is important to note that the macroeconomics literature (such as Romer and Romer (2004)) largely uses the first difference of the nominal interest rate instead of the nominal interest rate itself as the dependent variable because the latter is non-stationary.[30] We therefore also provide the regressions on the first difference of

[30]The Phillips-Perron p-value and the ADF p-value of nominal interest rate itself in our sample are 0.534 and 0.580, respectively, indicating that it is indeed non-stationary.

the real interest rate in Table A.3, following the regression model:

$$\Delta r_{t+1} = \alpha + \beta m_t + \gamma_1 Level_t + \gamma_2 Slope_t + \gamma_3 Curvature_t + \epsilon_{t+1}, \tag{A.4}$$

where r_{t+1} is the risk-free interest rate, m_t is perceived meritocracy, and *Level*, *Slope*, and *Curvature* are the three PCA factors of the yield curve.

Results are reported in Table A.3.

	Δ Risk-free Interest Rate (Δr_{t+1})			
$m =$	Meritocracy level (m_t)		Meritocracy innovation ($\widetilde{m}_t$)	
	(1)	(2)	(3)	(4)
m	2.58*	0.93**	3.12*	1.05***
	(1.41)	(0.44)	(1.60)	(0.46)
Controls	No	Yes	No	Yes
Observations	51	51	50	50
Adjusted R^2	0.12	0.82	0.15	0.82

Table A.3: **The risk-free rate (first differences) and meritocracy.** This table reports the regression results of Equation (A.4). Short-term (1-month) interest rate is taken from Ken French's website. The inflation rate is taken from the OECD website. We use the first-difference of short-term interest rate as our dependent variable. Column (1) uses meritocracy level as the main independent variable, without taking other controls. Column (2) uses meritocracy level as the main independent variable, taking level, slope, and curvature as controls. Column (3) uses the AR(1) residual of meritocracy as the main independent variable, without taking other controls. Column (4) uses the AR(1) residual of meritocracy level as the main independent variable, taking level, slope, and curvature as controls. Data range is 1969-2021 in the US. Standard errors are Newey-West standard errors and are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

We find that the first difference of the risk-free rate is also positively and significantly associated with meritocracy. For meritocracy shocks, or innovations, the impact on the risk-free interest rate is even higher. Both of these results are statistically significant, and provide further support for the positive relation between the risk-free rate and meritocracy.

A.2 Stock Price-Dividend Ratio

In this robustness check, we follow Gabaix (2012) to include the Cochrane and Piazzesi (2005) factor as an additional control variable. We employ the following regression model:

$$ln(S_{t+1}/D_{t+1}) = \alpha + \beta m_t + \gamma_1 ln(S_t/D_t) + \gamma_2 CP_t + \epsilon_{t+1}, \tag{A.5}$$

where $ln(S_{t+1}/D_{t+1})$ is the natural logarithm of stock price-dividend ratio, m_t is perceived meritocracy, $ln(S_t/D_t)$ is the prior year's natural logarithm of stock price-dividend ratio, and CP_t is the Cochrane and Piazzesi (2005) factor.

	Stock Price/Dividend ratio ($ln(S_{t+1}/D_{t+1})$)			
$m =$	Meritocracy level (m_t)		Meritocracy innovation ($\widetilde{m}_t$)	
	(1)	(2)	(3)	(4)
m	-0.74**	-0.07**	-0.84***	-0.09**
	(0.31)	(0.03)	(0.29)	(0.04)
$ln(S_t/D_t)$		0.97***		0.96***
		(0.02)		(0.03)
CP_t		0.01		0.01
		(0.01)		(0.01)
Observations	52	52	51	51
Controls	No	Yes	No	Yes
Adjusted R^2	0.13	0.96	0.16	0.96

Table A.4: **Stock price-dividend ratio and meritocracy.** This table reports the regression results of Equation (A.5). We compute the stock price and dividend as the total real S&P 500 price level and its dividend, with data sourced from Shiller's website. Column (1) uses meritocracy level as the main independent variable and does not include any controls. Column (2) uses meritocracy level as the main independent variable and includes cay, log price dividend ratio, the time trend, and the past price as controls. Column (3) uses meritocracy innovation as the main independent variable and does not include any controls. Column (4) uses meritocracy innovation as the main independent variable and includes cay, log price dividend ratio, the time trend, and the past stock price as controls. The sample period range is 1969-2021. Standard errors are Newey-West standard errors and are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

Table A.4 presents the results. We find that the stock price-dividend ratio decreases with meritocracy, and this relationship is significant for all specifications. Consequently, the negative relation between meritocracy and stock price-dividend ratio is robust to adding the Cochrane and Piazzesi (2005) factor as an additional control.

A.3 Stock Risk Premium

Table A.5 provides the construction details of the control variables for our main stock risk premium Table 6.

Variable	Full Name	Description	Prior Literature
		Valuation Ratio Variables	
dp	Dividend Price Ratio	Computed as the difference between the log of dividends and the log of prices	Ball (1978), Campbell (1987), Campbell and Shiller (1988a,b), Campbell and Viceira (2002), Campbell and Yogo (2006), the survey in Cochrane (1997), Fama and French (1988), Hodrick (1992), Lewellen (2004), Menzly, Santos, and Veronesi (2004), Rozeff (1984), and Shiller (1984)
de	Dividend Payout Ratio	Computed as the difference between the log of dividends and the log of earnings	Campbell and Shiller (1988a, 1998), Lamont (1998)
bkmk	Book-to-market ratio	Ratio of book value to market value for the Dow Jones Industrial Average (DJIA)	Kothari and Shanken (1997), Pontiff and Schall (1998)
cay	Consumption, wealth, income ratio	Computed as the residual to a regression of aggregate consumption on aggregate wealth and aggregate income, following Lettau and Ludvigson (2001)	Lettau and Ludvigson (2001)
		Interest-Rate Related Variables	
ltrate	Long Term Bond Return	Long-term government bond returns from Ibbotson's Stocks, Bonds, Bills and Inflation Yearbook	Campbell (1987), Fama and French (1989)
tms	Term Spread	Computed as the difference between the long term yield on government bonds and the Treasury bill rate	Campbell (1987), Fama and French (1989)
dfy	Default Yield Spread	Computed as the difference between BAA-rated and AAA-rated corporate bond yields	Fama and French (1989), Keim and Stambaugh (1986)
		Broad Macroeconomic Indicator Variables	
$infl$	Inflation	Consumer Price Index (CPI) from the Bureau of Labor Statistics	Campbell and Vuolteenaho (2004), Fama (1981), Fama and Schwert (1977), and Lintner (1975)
ik	Investment to Capital Ratio	Ratio of aggregate (private nonresidential fixed) investment to aggregate capital for the whole economy	Cochrane (1991)

Table A.5: **Stock risk premium covariates.** This table reports variables which have been documented to have predictive power for the stock risk premium in prior literature. The variable column displays the short name of the variable used in presenting regression results; the full name column includes the full name of the variable; the description covers methodological detail; and the prior literature column cites sample papers that have employed the corresponding measures.

We first investigate the relationship of meritocracy and the stock risk premium after controlling for the sentiment measure (Baker and Wurgler (2007)) and the aligned sentiment measure (Huang et al. (2015)), and find that the negative relationship between the risk premium and meritocracy remains economically large and statistically significant.

To test whether meritocracy remains a significant predictor of the stock risk premium

even after controlling for sentiment, we employ the following regression model:

$$RP_{t+1} = \alpha + \beta m_t + \gamma_1 sent_t + \gamma_2 cay_t + \gamma_3 dp_t + \epsilon_{t+1}, \tag{A.6}$$

where RP_{t+1} is the stock risk premium, m_t is perceived meritocracy, $sent_t$ is sentiment, cay_t is the cointegrating residual between log consumption, log asset wealth, and log labor income, and dp_t is the log dividend to price ratio.

Table A.6 reports the results. We find that even after controlling for sentiment, the stock risk premium remains negatively and significantly associated with meritocracy. This is true for both meritocracy level and meritocracy innovation measures.

	Stock Risk Premium (RP_{t+1})					
$m =$	Meritocracy level (m_t)			Meritocracy innovation ($\widetilde{m}_t$)		
	(1)	(2)	(3)	(4)	(5)	(6)
m	-9.25**	-7.52	-9.93*	-9.48*	-9.43*	-11.63**
	(4.47)	(4.79)	(5.17)	(4.73)	(4.94)	(5.54)
Sentiment measure	-	$sent_h$	$sent_{bw}$	-	$sent_h$	$sent_{bw}$
Controls	No	Yes	Yes	No	Yes	Yes
Observations	52	52	52	51	51	51
Adjusted R^2	0.05	0.10	0.03	0.04	0.10	0.03

Table A.6: **The stock risk premium and meritocracy, controlling for sentiment.** This table reports the regression results of Equation (6). Stock risk premium is computed as the value-weighted return on the US stock market of all CRSP stocks net of the risk-free interest rate, which is computed as the annualized one-month Treasury bill rate. Columns (1)–(3) use meritocracy level as the main independent variable while columns (4)–(6) use meritocracy innovation as the main independent variable. *sent_bw* is the Baker and Wurgler (2007) measure of sentiment and *sent_h* is the Huang et al. (2015) measure of aligned sentiment. Controls include the dividend price ratio (*dp*) and the consumption, wealth, income ratio (*cay*). The sample period is 1969-2021. Standard errors are Newey-West standard errors and are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

In a further supporting analysis, we compute the stock risk premium following Goyal and Welch (2008) as the log total return on the S&P 500 index net of the log Treasury bill rate. Recall that the main analysis computes the stock risk premium as the value-weighted return on the US stock market of all CRSP stocks net of the Treasury bill rate. We note that the correlation between these two measure of stock risk premium is over 98%. For robustness, we perform the main analysis using the S&P 500 measure of the stock risk premium. Results are

presented in Table A.7, and provide further supporting evidence for the consistently negative relationship between meritocracy and the stock risk premium.

	Stock Risk Premium (RP_{t+1})									
	Meritocracy level (m_t)					Meritocracy innovation ($\widetilde{m}_t$)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
m	-6.63*	-7.93*	-6.87**	-5.54	-6.45	-7.04	-9.16*	-8.35**	-6.10	-8.69**
	(3.83)	(4.27)	(3.37)	(3.50)	(3.93)	(4.23)	(4.74)	(3.78)	(4.14)	(4.26)
Controls	No	Yes, VR	Yes, IR	Yes, ME	Yes, All	No	Yes, VR	Yes, IR	Yes, ME	Yes, All
Observations	51	51	51	51	51	50	50	50	50	50
Adjusted R^2	0.02	0.04	0.03	0.05	0.07	0.02	0.04	0.03	0.05	0.08

Table A.7: **The stock risk premium and meritocracy, S&P 500 Index.** This table reports the regression results of Equation (3). Stock risk premium is computed as log total return on the S&P 500 index net of the log Treasury bill rate. Columns (1)–(5) use meritocracy level as the main independent variable while columns (6)–(10) use meritocracy innovation as the main independent variable. The control variables in the VR (valuation related) set include the dividend price ratio (dp), dividend payout ratio (de), book-to-market ratio ($bkmk$), and consumption, wealth, income ratio (cay); in the IR (interest rate related) set include long-term rate of return on government bonds ($ltrate$), term spread (tms), and default return spread (dfy); and in the ME (macroeconomy related) set include inflation ($infl$) and investment to capital ratio (ik). The sample period range is 1969-2020. Standard errors are Newey-West standard errors and are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

Finally, even though a comprehensive international analysis is outside the scope of this paper, we also investigate the validity of our stock risk premium findings across all other G7 nations. The results are shown in Table A.8. We find that similarly to the US, meritocracy has a significantly negative relation with the stock risk premium in Canada, France, Italy, Japan, and the UK. All of the relations of statistical significance in the table are negative.

A.4 Stock Return Volatility

In the main text, we control for past volatility and show that stock return volatility is negatively associated with meritocracy. We now employ an alternative method for modeling volatility as a robustness test. In particular, we use the GARCH model (Bollerslev (1986)) to examine the relation between stock return volatility and meritocracy.

The equation for the GARCH(1,1) model can be written as:

$$\sigma_t^2 = \omega + \alpha r_{t-1}^2 + \beta \sigma_{t-1}^2, \tag{A.7}$$

	Stock Risk Premium ($_{t+1}$)													
Country =	Canada		France		Germany		Italy		Japan		UK		USA	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
m	-8.53**	-11.64**	-11.98**	-14.34**	0.82	4.18	-5.62*	-4.76	-8.25*	-7.62	-1.26*	-1.31*	-9.25**	-8.09**
	(3.98)	(5.01)	(4.57)	(5.53)	(6.28)	(13.32)	(3.34)	(2.88)	(4.57)	(11.45)	(0.68)	(0.77)	(4.47)	(3.81)
gdppcg		-1.12*		0.81		-1.73		-2.23***		1.96		-1.21***		-1.7
		(0.63)		(1.31)		(1.04)		(0.5)		(1.36)		(0.35)		(1.37)
gdppc		-0.31*		-0.43		0.18		-0.48*		0.39		-0.28***		98.45
		(0.17)		(0.39)		(0.5)		(0.25)		(0.61)		(0.09)		(144.26)
infl		-0.24		-0.34		0.63		0.64		1.14		-0.31		0.39
		(0.66)		(1.18)		(1.67)		(1.16)		(2.15)		(0.42)		(0.8)
Observations	47	47	42	42	48	48	31	31	44	44	41	41	52	52
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Adjusted R^2	0.10	0.15	0.15	0.20	0.00	0.03	0.03	0.09	0.02	0.06	0.01	0.08	0.06	0.12

Table A.8: **The stock risk premium and meritocracy in G7 nations.** This table reports the regression results of Equation (6). Stock risk premium in the US is computed as the value-weighted return on the US stock market of all CRSP stocks net of the risk-free interest rate, which is computed as the annualized one-month Treasury bill rate. Stock risk premium in other G7 nations is computed as the MSCI total return (including dividends) net of the risk-free interest rate, which is the long-term government bond yield in each nation. Meritocracy is the main independent variable in each column. The control variables include the GDP per capita growth (*gdppcg*), GDP per capita (*gdppc*), and inflation (*infl*). Due to data limitations in different G7 nations, the sample periods for Canada, France, and USA data are 1969–2021, while the sample periods for UK, Germany, Italy, and Japan are 1980–2021, 1973–2021, 1990–2021, and 1977–2021, respectively. Standard errors are Newey-West standard errors and are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

where $\omega = \gamma V_L$ with V_L the long-term variance, r_{t-1}^2 is the return squared in period $t-1$, and σ_{t-1}^2 is the variance in period $t-1$.

In order to forecast volatility using the GARCH(1,1) model, we first use the sample period to estimate the parameters α and β and the long-run variance term V_L. We then employ the following regression model to estimate the effect of meritocracy on stock return volatility:

$$\sigma_{t+1}^2 = \beta_0 + \beta_1 \sigma_t^2 + \beta_2 m_t + \epsilon_{t+1}, \tag{A.8}$$

where $\beta_0 = V_L(1-\alpha-\beta)$, $\beta_1 = \alpha+\beta$, $\sigma_{t+1} = \log(\sqrt{\sum_{i=1}^{N_{t+1}} R_{i,t+1}^2})$ is the natural log of the annual aggregate stock market volatility in period $t+1$, N_{t+1} is the number of trading days during the year $t+1$, and $R_{i,t+1}$ is the daily excess return of the US stock market on the ith trading day of year $t+1$ (following Schwert (1989) and Huang et al. (2015)). The daily excess return is computed as the daily return less the average daily return in the given year, and the daily

returns data is computed as the CRSP value-weighted return for all firms incorporated in the US.

The results for the GARCH(1,1) volatility model are presented in Table A.9. The analysis demonstrates that the stock return volatility is significantly and negatively associated with meritocracy levels, and negatively associated with meritocracy innovations.

	Stock Return Volatility (σ_{t+1})			
$m =$	Meritocracy level (m_t)		Meritocracy innovation ($\widetilde{m}_t$)	
	(1)	(2)	(3)	(4)
m_t	-0.10***	-0.02**	-0.17	-0.12
	(0.00)	(0.01)	(0.16)	(0.13)
Controls	No	Yes	No	Yes
Observations	52	52	51	51
Log Likelihood	-38.15	-14.02	-22.30	-18.02

Table A.9: **Stock return volatility and meritocracy.** This table reports the regression results of applying the GARCH(1,1) model. Stock return volatility σ_{t+1} is the dependent variable and is computed following Huang et al. (2015). Column (1) uses meritocracy level as the main independent variable and includes no control variables. Column (2) uses meritocracy level as the main independent variable and includes past stock return volatility as a control. Column (3) uses meritocracy innovation as the main independent variable and includes no control variables. Column (4) uses meritocracy innovation as the main independent variable and includes past stock return volatility as a control. The sample period range is 1969-2021. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

A.5 Income Inequality

In the main text, we test the direct relationship between inequality and meritocracy, without considering the nuances of a specific social context. In the theory portion of the paper (Section 6.2), we derive the specific conditions which govern whether inequality is positively or negatively related to meritocracy. In particular, our model demonstrates that this relation depends on the relative dispersion of social class versus the dispersion of ability of agents in the economy. According to Proposition 4 of Section 6.2, the variance of agents' income (i.e., a measure of income inequality) at time t is given by:

$$\text{Var}(y_{it}) = \frac{1}{12}\left(\frac{\alpha\delta_t}{1+(b+g)/2}\right)^2\left[(h-l)^2(1+(b+g)/2 - m_t(b+g)/2 + (g-b)^2 m_t^2\right].$$

Defining

$$AS = \frac{\text{Var}(s_i)\text{E}(a_i)[1 + \text{E}(a_i)]}{\text{E}(a_i)^2\text{Var}(s_i) + \text{E}(s_i)\text{Var}(a_i)}.$$

as the relative variance of social class compared to ability, our model predicts that

$$\text{Var}(y_{it}) \text{ increases with } m_t \text{ when } m_t > AS_t,$$
$$\text{and Var}(y_{it}) \text{ decreases with } m_t \text{ when } m_t < AS_t.$$

To test this relation in the data, we first rewrite AS using a formula that can be used for arbitrary values of $\text{E}(s_i)$, rather than $\text{E}(s_i) = 1$ as we set without loss of generality in the model.[31] Accordingly, we compute AS for each year in our data sample via the following formula:

$$AS = \frac{\text{Var}(s_i)\text{E}(a_i)[\text{E}(s_i) + \text{E}(a_i)]}{\text{E}(a_i)^2\text{Var}(s_i) + \text{E}(s_i)^2\text{Var}(a_i)}.$$

Employing this measure of AS, we estimate the following two regression specifications:

$$\Delta\text{Var}(y_t) = \alpha + \beta m_t + \gamma' Controls_t + \epsilon_t, m > AS, \tag{A.9}$$
$$\Delta\text{Var}(y_t) = \alpha + \beta m_t + \gamma' Controls_t + \epsilon_t, m < AS. \tag{A.10}$$

where $Controls_t$ follow Section 4.2 and include the labor force participation rate, GDP per capita growth, life expectancy, and working age population aged 15-64.

Table A.10 reports the results. We find that the condition $m_t > AS$ holds in 33 out of the 51 years of our sample period. Since this condition holds for the majority of the sample period, it is not surprising that the overall relation between income inequality and meritocracy over the past half century is positive, as found in Section 4.2. Limiting our sample to those years in which the condition $m_t > AS$ holds, we estimate the regression specification (A.9) and find the relationship between income inequality and meritocracy to be positive in this case. This is consistent with our model prediction.

We then re-estimate the regression limiting our sample to those years when $m_t < AS$ as in specification (A.10). In line with the predicted relationship, we find that when this condition holds, income inequality decreases as meritocracy rises. The rationale behind this is that when the dispersion of social class is high relative to the dispersion of ability, higher meritocracy is able to move the economy further away from the highly unequal income

[31] Similarly, we scale m_t in the data to lie between 0 and 1 in order to match the model where m_t acts as a weight that allocates income based on relative effort and relative social class.

	Income Variance ($\Delta\text{Var}(y_t)$)							
	$m < AS$				$m > AS$			
$m =$	Meritocracy level (m_t)		Meritocracy innovation ($\widetilde{m}_t$)		Meritocracy level (m_t)		Meritocracy innovation ($\widetilde{m}_t$)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
m	-0.12	-0.07	-0.09	-0.03	0.06	0.06	0.07	0.07
	(0.18)	(0.21)	(0.16)	(0.20)	(0.06)	(0.07)	(0.06)	(0.07)
Δ *lfpr*		0.05		0.05		-0.10		-0.09
		(0.09)		(0.10)		(0.15)		(0.15)
gdpc_gr		-0.04*		-0.04*		-0.01		-0.01
		(0.02)		(0.02)		(0.02)		(0.02)
life_exp		-0.02		-0.02		-0.01		-0.01
		(0.02)		(0.02)		(0.03)		(0.03)
pop1564		-0.02		-0.02		0.04		0.04
		(0.07)		(0.07)		(0.03)		(0.03)
Observations	18	18	18	18	33	33	33	33
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Adjusted R^2	0.02	0.14	0.01	0.13	0.02	0.07	0.03	0.08

Table A.10: **Income inequality and meritocracy, model-implied test.** This table reports the regression results of Equations (A.10) and (A.9), restricted to the sample for which the condition $m < AS$ holds in the first four columns and for which the condition $m > AS$ holds in the last four columns. Income variance ($\Delta\text{Var}(y_t)$) is computed as the change in the standard deviation of the income shares of the five quintiles of the population, using data from the US Census Bureau. Columns (1)–(2) and (5)–(6) use meritocracy level as the main independent variable while columns (3)–(4) and (7)–(8) use meritocracy innovation as the main independent variable. The control variables include the change in labor force participation rate ($\Delta lfpr$), GDP per capita growth ($gdpr\_gr$), life expectancy ($life\_exp$), and the working age population aged 15-64 ($pop1564$). The sample period is 1969-2021. Standard errors are robust and are included in parentheses. *, **, and *** designate significance levels at 10%, 5%, and 1%, respectively.

distribution based on social class.

Although both sub-samples have a limited number of observations due to the nature of the data, it is nevertheless the case that coefficients on meritocracy in all four of the different specifications are negative when $m < AS$. Analogously, the coefficients on meritocracy are positive in all four specifications when $m > AS$, just as predicted by the model.

B Representative Age in Meritocracy Data

In this Appendix, we investigate which age cohort is most representative for computing US perceived meritocracy. In order to determine this representative age, we perform two analyses. First, we study which age group commands the highest level of capital, as measured by (i) total assets, (ii) direct equity, and (iii) direct bond ownership. The purpose of this analysis is to determine the approximate age when individuals are likely to have the most significant impact on financial markets and asset prices. Second, we consider the distribution of net worth by age. In particular, we compute the age that corresponds to the median of the net worth distribution and could therefore act as most representative.

In the first analysis, we employ data from the Survey of Consumer Finances and plot the mean value of assets held by each age group over time. Figure B.1 shows the results. Over the past three decades, the 55-64 year old group commanded the highest level of total assets for the majority of the sample period. In fact, for 8 out of the 11 SCF surveys conducted over the 1989-2019 sample period, total assets were highest for the 55-64 year old age group. Since our study seeks to uncover the effects of meritocracy on financial markets, it is the perceived meritocracy of this age group that is likely most relevant for our analysis.

Figures B.2 and B.3 show a breakdown of direct equity and direct bond ownership over time by age group. The results similarly demonstrate that people in the 55-64 age group command a large amount of capital in direct stock and direct bond investments.

In a second analysis, we calculate the proportion of total net worth owned by each age group in the US. Table B.1 reports the results. We find that the 55-64 age group commands the largest percent of total net worth out of all the age groups. Furthermore, we find that approximately the same portion of total net worth is owned by those in age groups younger than and older than 55-64. If we repeat the analysis for an earlier time period such as 2000, we find that the 45-54 year old and 55-64 year old age groups possess the largest percent of total net worth.

The two aforementioned analyses allow us to conclude that a significant portion of total assets, direct equity investments, direct bond investments, and net worth is owned by those in the 45-54 and 55-64 age groups. Consequently, individuals around age 55 command a significant amount of capital and are likely to play an influential role in financial markets. Since we seek to uncover the effects of meritocracy on asset prices, this motivates our decision to use 55 years as the representative agent age.

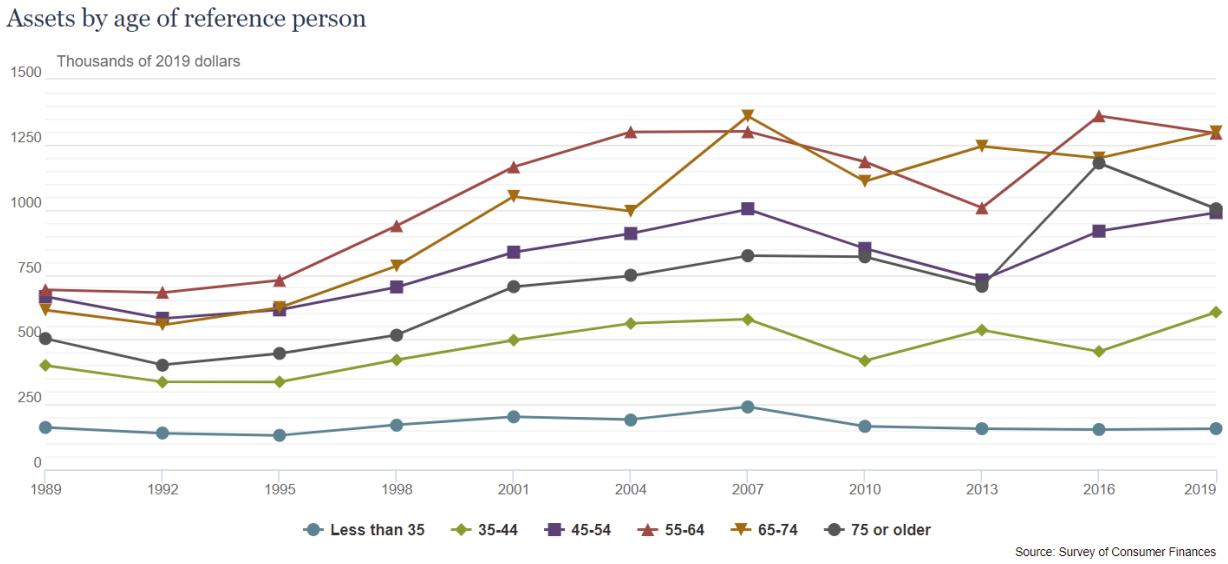

Figure B.1: **Mean assets by age in the US.** This figure reports the mean assets (in 2019 dollars) by age group. Age groups include less than 35 years old, 35-44 years old, 45-54 years old, 55-64 years old, 65-74 years old, and 75 and older. Assets are computed as the sum of financial assets (liquid assets, stocks, bonds, investment funds, quasi-liquid retirement accounts, other managed assets, and other miscellaneous financial assets) and non-financial assets (real estate, vehicles, businesses, and other miscellaneous non-financial assets). Source: Survey of Consumer Finances (SCF).

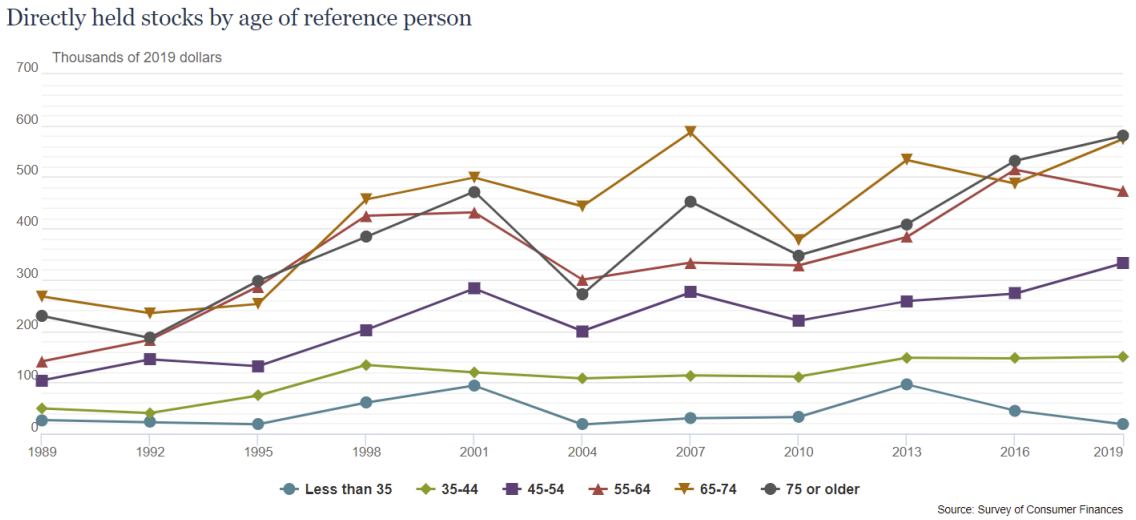

Figure B.2: **Mean direct stock investment by age in the US.** This figure reports the mean dollar value of directly held stocks (in 2019 dollars) by age group. Age groups include less than 35 years old, 35-44 years old, 45-54 years old, 55-64 years old, 65-74 years old, and 75 and older. Source: Survey of Consumer Finances (SCF).

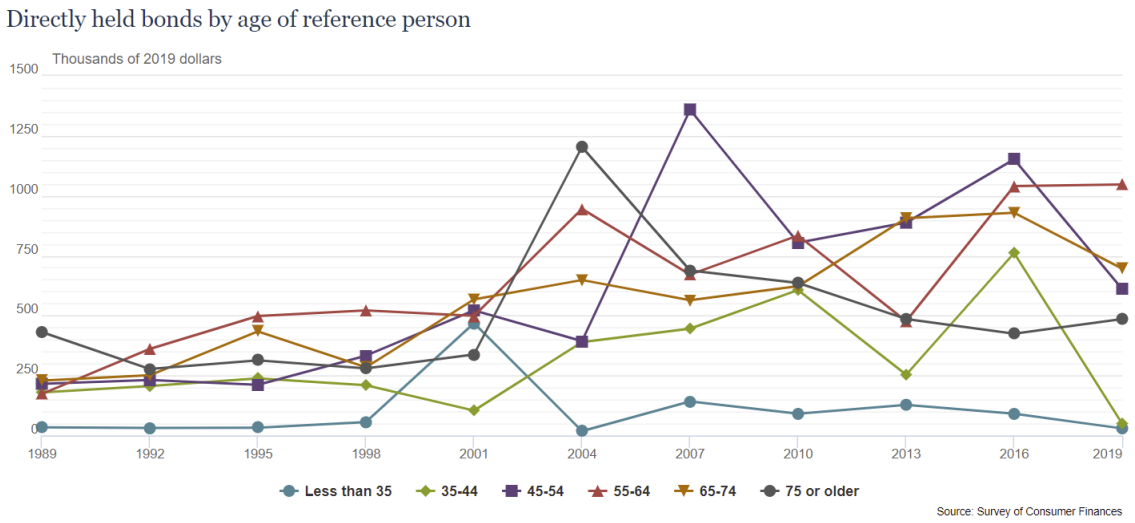

Figure B.3: **Mean direct bond investment by age in the US.** This figure reports the mean dollar value of directly held bonds (in 2019 dollars) by age group. Age groups include less than 35 years old, 35-44 years old, 45-54 years old, 55-64 years old, 65-74 years old, and 75 and older. Directly held bonds do not include bond funds or savings bonds. Source: Survey of Consumer Finances (SCF).

Age Group	Population %	Mean Net Worth	% of Net Worth	Cumulative % of Net Worth
Younger than 35	45.4%	76,300	6.5%	6.5%
35-44	12.8%	437,800	10.6%	17.1%
45-54	12.4%	833,800	19.6%	36.7%
55-64	12.9%	1,176,500	28.8%	65.5%
65-74	9.6%	1,215,900	22.1%	87.6%
75 or older	6.9%	958,400	12.4%	100.0%

Table B.1: **Net worth by age group.** This table reports the statistics for average and cumulative net worth by age group. Data for population by age group is from the 2019 American Community Survey (ACS) of the United States Census Bureau. Average net worth data is from the 2019 Survey of Consumer Finances (SCF).

C Proofs

In this Appendix, we provide the proofs for the Propositions of our theoretical model in Sections 5–6.

Proof of Proposition 1. We first determine the equilibrium state price density ξ, which follows, consistent with no arbitrage,

$$d\xi_t = -\xi_t r_t dt - \xi_t \kappa_{\delta t} dw_{\delta t} - \xi_t \kappa_{mt} dw_{mt}, \tag{C.1}$$

where κ_δ and κ_m are the market prices of aggregate output risk and meritocracy risk, respectively. We then proceed to obtain the interest rate and stock price in equilibrium, and deduce the corresponding comparative statistics.

Maximizing each agent i's expected life-time utility (17) subject to the budget constraint (18) leads to agent i's optimal consumption as

$$c_{it} = \frac{1}{\psi_i} \frac{m_t}{s_i \xi_t}, \tag{C.2}$$

where the constant $1/\psi_i$ solves (17). Imposing the consumption good market clearing condition $\int_i c_{it} dt = \int_i y_{it} di + \delta_t = (1+\alpha)\delta_t$, and substituting (C.2) leads to

$$\int_i \frac{1}{\psi_i s_i} di \frac{m_t}{\xi_t} = (1+\alpha)\delta_t,$$

which after rearranging yields the equilibrium state price density

$$\xi_t = A \frac{m_t}{\delta_t}, \tag{C.3}$$

where $A = \frac{1}{1+\alpha} \int_i \frac{1}{\psi_s s_i} di$.

We next apply Itô's Lemma to (C.3), and substitute the dynamics of ξ, m, and δ from (C.1), (11), and (13), respectively. By matching coefficients and manipulating expressions, we obtain the equilibrium market prices of aggregate output and meritocracy risks

$$\kappa_\delta = \sigma_\delta, \quad \kappa_m = -\sigma_m, \tag{C.4}$$

and the equilibrium interest rate as given in equation (19) of Proposition 1.

To determine the stock price in equilibrium, we first note that by no arbitrage, the stock

price is given by

$$S_t = \frac{1}{\xi_t} \mathrm{E}_t \left[\int_t^T \xi_s \delta_s ds \right]. \tag{C.5}$$

Substituting the equilibrium ξ (C.3) into (C.5) leads to

$$S_t = \frac{\delta_t}{m_t} \int_t^T \mathrm{E}_t \left[m_s \right] ds.$$

Further substituting the property of m in (13) that $\mathrm{E}_t \left[m_s \right] = \overline{\mu}_m + (m_t - \overline{\mu}_m) e^{-\kappa_m (s-t)}$, evaluating and rearranging the resulting expression yields the equilibrium stock price-dividend ratio (20) as reported in Proposition 1.

Properties (i) and (ii) that r is increasing in m and S is decreasing in m are straightforwardly derived by taking the partial derivatives of expressions (19) and (20). □

Proof of Proposition 2. We denote the stock price dynamics as

$$dS_t + \delta_t dt = S_t \mu_{St} dt + S_t \sigma_{S\delta t} dw_{\delta t} + S_t \sigma_{Smt} dw_{mt}, \tag{C.6}$$

where the stock mean return μ_S and volatility components are to be determined. Applying Itô's Lemma to the equilibrium stock price (20) and rearranging, we obtain the volatility components as

$$\sigma_{S\delta} = \sigma_\delta, \quad \sigma_{Smt} = -\frac{A_1}{A_1 + A_2 m_t} \sigma_m. \tag{C.7}$$

Substituting (C.7) into $\sigma_{St} = \sqrt{\sigma_{S\delta t}^2 + \sigma_{Smt}^2}$ leads the equilibrium stock return volatility expression in (22) of Proposition 2.

To determine the stock risk premium in equilibrium, we first note that by no arbitrage, the risk premium is given by

$$\mu_{St} - r_t = \kappa_{\delta t} \sigma_{S\delta t} + \kappa_{mt} \sigma_{Smt}. \tag{C.8}$$

Substituting the market prices of risk (C.4) and the stock volatility components (C.7) into (C.8) yields the equilibrium stock risk premium (21) of Proposition 2.

The stock risk premium and volatility Properties (i) and (ii) are easily derived by differentiating (21) and (22) with respect to m. □

Proof of Proposition 3. Maximizing each agent's expected utility (17) subject to (18)

with respect to effort leads to the agent's optimal effort as

$$e_{it} = \frac{a_i + s_i}{c_e} \frac{\alpha \delta_t m_t}{e_t}. \tag{C.9}$$

To determine the aggregate effort e in equilibrium, we substitute agents' optimal effort (C.9) to

$$e_t = \int_i e_{it} dt,$$

which after evaluating the integral and rearranging leads to the equilibrium aggregate effort expression (24) of Proposition 3. Further substituting (24) into (C.10) yields the equilibrium individual effort (23) of Proposition 3.

Properties (i) and (ii) are straightforwardly obtained by taking the partial derivatives of (23) and (24) with respect to meritocracy m. □

Proof of Proposition 4. Substituting the equilibrium individual effort (23) and aggregate effort (24) into (16) yields the agents' income process in equilibrium as

$$\begin{aligned} y_{it} &= \left(s_i + \frac{a_i - s_i(b+g)/2}{1 + (b+g)/2} m_t \right) \alpha \delta_t \\ &= \left(s_i (1 + \overline{a} - \overline{a} m_t) + a_i m_t \right) \frac{\alpha \delta_t}{1 + \overline{a}}, \end{aligned} \tag{C.10}$$

where $\overline{a} = (b+g)/2$.

Taking the variance of (C.10) and rearranging leads to expression (25) of Proposition 4.

We rewrite (25) as

$$\mathrm{Var}(y_{it}) = f(m_t) \frac{1}{12} \Big(\frac{\alpha \delta_t}{1 + \bar{a}} \Big)^2, \tag{C.11}$$

where $f(m_t) = (h-l)^2 (1 + \bar{a} - \bar{a} m_t)^2 + (g-b)^2 m_t^2$, which after rearranging leads to

$$f'(m_t) = 2 \left(m_t (\overline{a}^2 (h-l)^2 + (g-b)^2) - (\overline{a} + 1) \overline{a} (h-l)^2 \right). \tag{C.12}$$

From (C.11) and (C.12), we deduce that $\mathrm{Var}(y_{it})$ is increasing in m_t when

$$m_t > \frac{\overline{a}(\overline{a}+1)(h-l)^2}{\overline{a}^2 (h-l)^2 + (g-b)^2}, \tag{C.13}$$

and otherwise is decreasing in m_t. Substituting the fact that $\mathrm{E}[a_i] = \overline{a}$, $\mathrm{Var}(a_i) = (g-b)^2$, $\mathrm{E}[s_i] = 1$, $\mathrm{Var}(s_i) = (h-l)^2$ leads to condition (26) as reported in Proposition 4. □