

The Effect of Culture on Consumption: A Behavioral Approach

Rong He[±] Heqing Li[±] Zeng Lian^{±*} Jie Zheng^{‡*}

Abstract

This paper studies the connection between culture and consumption behavior. Linkages are drawn from manifestations of culture, involving both political style and personal preferences, to the key character traits of self-restraint and future focus. These character traits are then related to consumption behavior through a quasi-hyperbolic discounting model to generate hypotheses. Panel data for 89 countries and territories for the period 1999-2018 are used to test these hypotheses. With respect to political style, the results indicate that corruption, non-transparency in the public sector, and government intervention in banking reduce a country's consumption. With respect to personal attributes, a long-term view is found to lower consumption and individualism to raise it. This study is motivated by a concern that for China in particular, stronger consumption will be needed to sustain long-term growth. Of particular relevance to the Chinese case, we find that countries with Confucian traditions have national consumption rates that are lower than global norms by more than 10 percentage points as a share of GDP. Even against this backdrop, however, we suggest there is scope to boost consumption with policies that fight corruption, promote transparency, reduce government intervention in the economy, and foster a stronger sense of the individual.

Key Words: Political Style; Individual Cultural Preference; Consumption; Self-Restraint; Future Focus

JEL classifications: E21, J18

[±] He, Li, Lian: International Business School, Beijing Foreign Studies University, Beijing, China, 100089; [‡] Zheng: Department of Economics, School of Economics and Management, Tsinghua University, Beijing, China, 100084.

* Corresponding authors. Lian (lianzenzeng@bfsu.edu.cn); Zheng (jie.academic@gmail.com).

Acknowledgment: We thank the Editor Calla Wiemer and two anonymous referees for comments which greatly improved the manuscript. We gratefully acknowledge research funding support from the National Natural Science Foundation of China (#71873074 and #61661136002), the National Social Science Fund of China (No.17GBQY026), and the Fundamental Research Funds for the Central Universities (#2016QD012 and #2020JJ029). All errors are our own.

1. Introduction

Since China's reform and opening began, the country's economy has experienced a period of structural change and rapid development characterized by high saving rates and low consumption. In 2018, China's consumption expenditure accounted for 53.4% of GDP, which was well below the ratios of developed countries. By comparison, consumption rates were 64.7% for Korea, 75.3% for Japan, 82.3% for the US, and 84.0% for the UK. Even as consumption has been recognized in China as the long-term source for sustainable growth, in the past decade China's consumption rate has nevertheless remained low. Concerned about this low consumption, the Chinese government in 2015 committed to carrying out reforms to improve resource allocation and stimulate domestic demand (Lien et al., 2016).¹ A natural question thus arises: What is the root cause of China's low consumption relative to other countries?

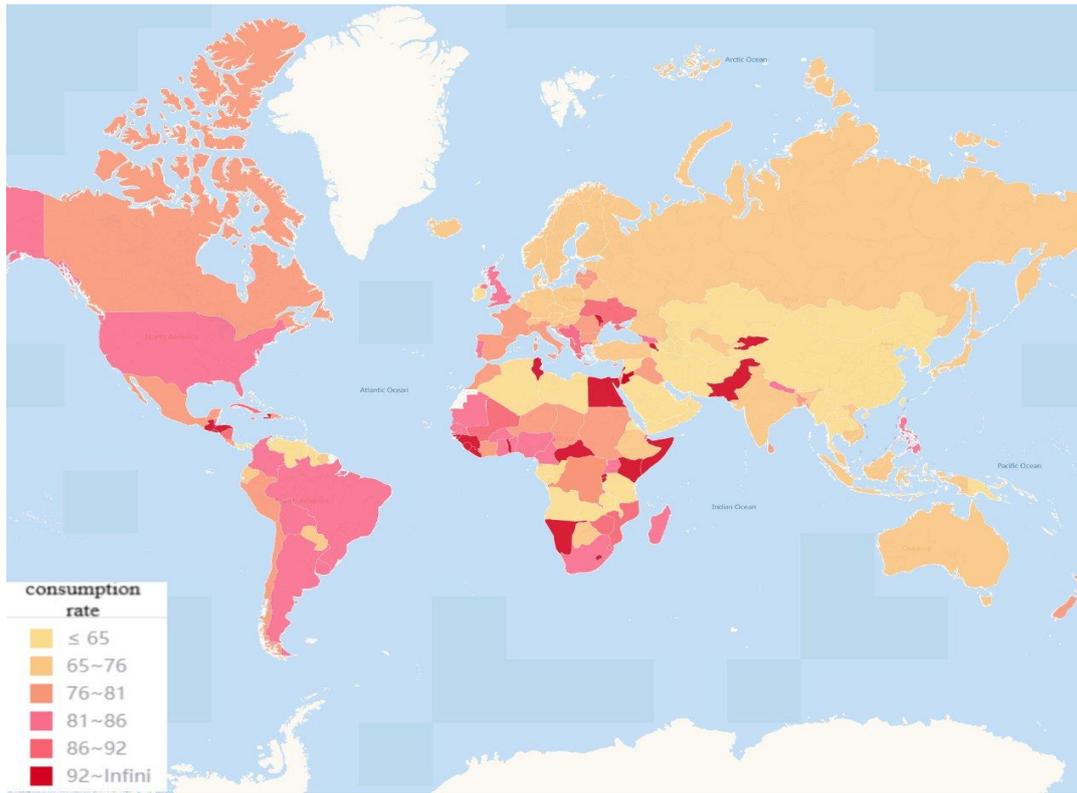
Scholars have attempted to explain China's low consumption from a number of perspectives: precautionary saving behavior, buffer stock savings, and liquidity constraints (e.g., Ren and Qin, 2006; and Yi et al., 2008). The Chinese government has been informed by these perspectives in implementing policies intended to stimulate consumption. However, consumption as a share of GDP has grown at a rate of only 0.3 percentage points a year, which suggests standard explanations for China's high saving may be missing something.

A possible explanation needing more attention involves culture. Few existing studies have analyzed saving behavior from the cultural perspective. One such study is Ye et al. (2012), which used Confucianism and self-control to explain consumption differences across countries. A key reason why cultural analysis has rarely been seen in the empirical literature may be that culture is difficult to quantify.

In this paper, we incorporate culture into a behavioral economics framework in order to better understand the mechanism by which culture influences consumption. Figure 1 suggests that differences in consumption levels are smaller within continents, especially for countries sharing borders. For China, Korea, and Vietnam, for example, consumption rates appear much lower than for Europe and the Americas. Note that lower consumption does not necessarily align with level of economic development even though traditional consumption theories have been based largely on income. It is possible that geographical factors, such as similarities in cultural heritage shared by contiguous countries, may account for observed patterns.

¹ Ouyang et al. (2016) conducted empirical research based on the threshold cointegration model with annual data for 1955-2013. They found that the key to transform the investment-driven Chinese economy to a demanded-driven one, was to enlarge the relative proportion of domestic consumption. To achieve this, a reform on the supply side would enable markets to better cater to consumers' needs.

Figure 1: Consumption rates by country, 2018



Note: The data describe the ratio of final consumption expenditure to GDP in the year of 2018 and cover 156 countries and regions, which can be sourced to the World Bank database.

Our work advances understanding of cross-country consumption differences by elucidating how cultural factors expressed through political style and individual preferences act on behavior. Specifically, political style is measured by corruption, transparency, and state intervention, while following Hofstede, et al. (2010), individual preferences are characterized with respect to individualism, indulgence, power distance (social hierarchy), and long-term view. We propose a behavioral mechanism in which political style and individual preferences affect consumption by influencing the personal attributes of self-restraint and future focus, which are captured by the present bias parameter β in the behavioral literature on time preference. Then, we develop a theoretical model that shows an increase in self-restraint and future focus (β) leading to a decrease in consumption. Finally, combining the behavioral mechanism with the theoretical model, we develop hypotheses on the relationship between cultural factors and consumption, and we then test these hypotheses empirically.

To test for the effects of culture on consumption, we make use of data for 89 countries over the period 1999-2018. Our results show that with regard to political style, a country's level of transparency in the public sector has a strong positive impact on consumption while its levels of corruption and government intervention have negative effects. As for individual preferences, long-term view restrains consumption while individualism raises it. We also consider how population age structure and belief systems affect consumption, and find that population ageing is

negatively (though not statistically significantly under all specifications) related to consumption and that Confucian countries show relatively low consumption. By taking culture into account, our research expands the scope of policy options for economies that are currently less consumption driven to achieve greater prosperity.

The main contributions of our work are threefold. First, at the theoretical level, a quasi-hyperbolic discounting model is introduced to provide a framework for relating consumption to personal attributes such as self-restraint and future focus. In turn, a connection is drawn between these personal attributes and culture as embodied in political style and individual preferences. Second, at the empirical level, corruption, transparency, and government intervention indices are used to measure a country's political style, while individualism, indulgence, power distance, and long-term view indices are adopted to characterize preferences. On this basis, cross-country panel data are used to test the hypothesis that culture affects consumption. Third, policy implications are drawn on how to stimulate sluggish domestic demand, which in the case of China and many other countries has inhibited economic growth.

The paper is organized as follows. Section 2 provides a literature review that places our work into context. In Section 3, we propose a behavioral mechanism and a theoretical model to show how culture affects consumption. The data and variables are described in Section 4 and our empirical results are shown in Section 5. Finally, Section 6 concludes the paper.

2. Literature Review

Our work is related to four strains of literature: traditional theories of consumption; behavioral models of consumption; studies on national culture; and studies on the effect of ageing on consumption. Given space concerns, we introduce only the most relevant or influential studies in each literature.

2.1 Traditional theories of consumption

Early studies on consumption behavior date back to *The General Theory of Employment, Interest, and Money* written by Keynes in 1936. Keynes introduced the concept of marginal propensity to consume (MPC), which stated that consumption had a positive relation with income and that such inclination decreased as income increased. However, Keynes's theoretical framework could not explain consumption and saving behavior under the Great Depression. Pigou (1943), Brady and Friedman (1947), and Duesenberry (1949) then developed the Absolute Income Theory and the Relative Income Theory. These theories all suggest a positive relationship between consumption and income. However, they do not analyze consumption behavior across different time periods, a shortcoming later overcome by intertemporal analysis. Modigliani and Brumberg proposed the Life-Cycle Hypothesis in 1954, in which consumers smooth their expenditures over a lifetime. The Modigliani and Brumberg model started from the utility function of an individual consumer defined over consumption in current and future periods. The individual was then assumed to maximize

utility subject to the resources summed over current and discounted future earnings. Later, Friedman (1957) proposed the Permanent Income Hypothesis, in which income could be categorized as either permanent or temporary with consumption being a function of permanent income.

Beyond these early foundations, Modigliani (1954) elaborated on how uncertainty affects saving, incorporating a precautionary motive and the need to pay in advance for the use of durable goods. Leland (1968) then formalized a theory of Precautionary Saving using a two-period model and positing that saving could mitigate future risk. Sibley (1975) and Miller (1976) improved upon this theory by extending the number of time periods. Deaton (1989) asserted that consumers who were more prudent and earned relatively unstable incomes tend to maintain higher levels of precautionary saving, and thus lower levels of consumption. Zeldes (1989) and Dynan (1993) went further by demonstrating that uncertainty avoidance caused individuals to consume less and save more. Moreover, Kimball (1990) showed that under standard assumptions about utility and expectations, the introduction of uncertainty in noncapital income increased the MPC at a given level of consumption, but not necessarily at a given level of wealth; and Carroll and Kimball (2008) showed that the introduction of uncertainty caused the MPC to rise at any given level of wealth, and that the MPC increased more for consumers at lower levels of wealth. Based on the work of Dreze and Modigliani (1972), Kimball and Weil (2009) found that the elasticity of the precautionary motive to uncertainty avoidance was greater than one. This implies that individuals might overreact to uncertainty by consuming less than the optimal amount. Of final note, Carroll et al. (1992) and Carroll (1997, 2004) proposed the Buffer Stock Saving Theory in which individuals continuously seek a balance between consumption and permanent income to maintain wealth at a certain level and smooth lifetime consumption.

Instead of using a macro and classical framework commonly shared by the above-mentioned studies, our research adopts a more micro and behavioral framework.

2.2 Behavioral models of consumption

Our work belongs to the behavioral approach to consumption theory, which emphasizes the role of individual preferences. Evidence has shown that consumers' time preferences do not follow classical assumptions, but are rather characterized by a hyperbolic form and time inconsistency in weighting the present versus the future. Historically, thinking on consumption and saving was based on the utility maximization framework, with the Standard Discounting Model proposed by Modigliani and Brumberg (1954) as the foundation. The model could be written as $U(c_1, c_2, \dots, c_T) = \sum_1^T \delta^{t-1} * u(c_t)$, where the decision maker lives for T periods, c_t represents the consumption level at period t , and δ represents the fixed (exponential) time discounting factor. The decision maker chooses the consumption flow for each period in order to maximize lifetime utility. Laibson (1997) improved upon this model by introducing β as the parameter of present-bias, which represents the taste for instant gratification, within a lifetime utility specification given as $U(c_t) + \beta[\sum_{k=t+1}^T \delta^{k-t} u(c_k)]$. This model is known as the quasi-hyperbolic discounting model or the $\beta - \delta$ model. A main difference between the $\beta - \delta$ model and the standard exponential discounting

model is that if the agent is naïve (commonly assumed in the behavioral literature), the optimal consumption path will vary over time as the agent makes dynamic utility maximization decisions. As Krusell et al. (2002) pointed out, if $\beta = 1$, individuals have standard, time-consistent, geometric preferences. When $\beta \neq 1$, there may be time inconsistency at period 1, as the trade-off between future periods is perceived differently from the vantage point of the present compared to that of the future. Applying the $\beta - \delta$ model in empirical analysis, Angeletos et al. (2001) confirmed that many consumers did not make optimal consumption decisions.

Another class of behavioral models of consumption involves the notion of self-control. Bernheim and Rangel (2004) first proposed this addition. Gul and Pesendorfer (2001) studied temptation averse preferences, and Fudenberg and Levine (2006) adopted the concept of a dual-self. Wang and Zheng (2012, 2015) extended the individual decision-making model by Fudenberg and Levine (2006) to a game-theoretic framework. Lien and Zheng (2018) studied consumers' self-control across different domains of activity including consumption of food. Lien et al. (2016) used historical data to study how experiencing an earthquake in early life affects time preference and consumption behavior.

Our model incorporates quasi-hyperbolic discounting, allowing for both the usual present bias ($\beta < 1$) and the possibility of future focus ($\beta > 1$). The parameter β serves as the behavioral link between culture and consumption.

2.3 Studies of culture

Our research is also closely related to the literature on culture. The cultural basis of preferences has been carefully studied by Geert Hofstede and his coauthors. Hofstede et al. (2010) proposed the Cultural Dimensions Theory based on studies of how values in the workplace are influenced by culture. The authors collected employee value scores within the company IBM in more than 100 countries, and later extended the respondent groups to commercial airline pilots, students, civil service managers, 'up-market' consumers, and 'elites' to validate their earlier results. It is by far the most convincing work on culture, with culture being defined as “the collective programming of the mind distinguishing the members of one group or category of people from others.” Hofstede et al. divided culture into six dimensions, of which in our work we include individualism, indulgence, power distance, and long-term view.² A country's position along the dimension of *individualism* is reflected by the degree of focus on self-recognition and self-realization as opposed to the collective good. *Indulgence* involves emphasis on free gratification of human drives related to enjoying life and having fun as opposed to suppressing gratification of needs and restraining behavior under strict social norms. *Power distance* represents

² The other two dimensions of culture, in Hofstede et al. (2010), are uncertainty avoidance and masculinity. Masculinity represents a preference in society for achievement, heroism, assertiveness, and material rewards for success. The uncertainty avoidance dimension expresses the degree to which the members of a cultural group feel uncomfortable with uncertainty and ambiguity. Since the direct link between masculinity and self-restraint lacks any theoretical foundation and uncertainty avoidance is highly correlated with age, which is included as an existing explanatory variable in our model, we do not consider these two dimensions in our analysis.

the degree to which individuals accept inequality of power, such that in countries with a high power distance a more hierarchical order prevails versus a more equal distribution of power. Lastly, countries that score high on *long-term view* emphasize pragmatism, which encourages thrift and other preparation for the future as through education. The Hofstede approach on culture has been used by Kristjansdottir et al. (2017) to study the relationship between national culture and international trade.

The other key concept of this study, political style, is based on the Country Risk Model utilized by the Economist Intelligence Unit (EIU). The model provides risk scores and rankings for six risk categories, including sovereign debt risk, currency risk, banking sector risk, political risk, economic structure risk, and overall country risk. Each category contains 10 variables, such that by adjusting the weights of the 60 elements, emphasis can be shifted across categories.³ Our model incorporates three elements from the political risk category, specifically, *corruption*, *transparency in the public sector*, and *state intervention*.

Ye et al. (2012) used self-control in sexual activities and Confucianism as explanatory variables in a study of consumption patterns across 48 countries for the period 1978-2007. Though providing new insights into consumption behavior, their research did not distinguish any alternative belief systems to Confucianism. Our work extends the representation of belief systems to include Islam, Catholicism, and Socialism in addition to Confucianism. In sum, we incorporate influences on behavior that span four aspects of individual preferences, three measures of political style, and four belief systems.

2.4 Studies of ageing and consumption

The consumption pattern of a country may also depend on the age structure of its population. One channel of influence is that individuals of different ages exhibit different risk attitudes, which influence their consumption levels. Morin and Suarez (1983) and Palsson (1996) showed that awareness of risk increases as people become older. Riley and Chow (1992) argued that a risk attitude showed a “U-shape” pattern: before retirement age (65) relative risk aversion decreases over time and afterward it increases. Bakshi and Chen (1994) carried out empirical analysis of risky investments to test this Life-Cycle Risk Aversion Hypothesis, and their results suggested that relative risk aversion increased with age. Similarly, Ma and Li (2011) found that individuals aged above 45 were more risk averse in terms of venture investment in China. Feng et al. (forthcoming) studied the welfare consequences of different retirement policies and showed that different retirement policies under the same population age structure also lead to different consumption patterns. This implies that another possible channel may be that individuals of different ages have different incomes (for example, due to different retirement policies), which influence their consumption levels.

³ For a detailed description, see <https://www.eiu.com/handlers/publicDownload.ashx?mode=m&fi=risk-section/country-risk-model.pdf>.

Inspired by the existing studies showing that seniors tend to be more patient (for example, Huffman et al., 2019), we extend our model to consider how age structure affects consumption acting through the personal attributes of self-restraint and future focus.

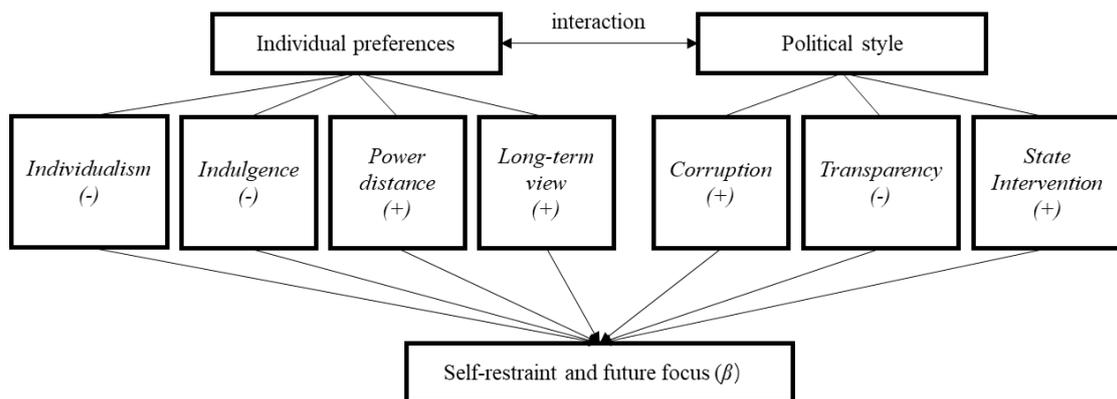
3. Theory and Hypotheses

In this section, we propose a theoretical framework for analyzing how culture affects consumption. The framework consists of two parts: a behavioral mechanism describing how political style and cultural preferences influence the personal attributes of self-restraint and future focus; and a theoretical model relating these personal attributes to consumption. By combining the behavioral mechanism with the theoretical model, we are able to generate hypotheses on the relationship between cultural factors and consumption to be tested in the next section.

3.1 Behavioral mechanism relating culture to personal attributes

We first describe the mechanism by which cultural factors affect the personal attributes of self-restraint and future focus (β), as illustrated in Figure 2. Culture can be represented by individual preferences at the micro level and by political styles at the macro level. Not only is political style a reflection of culture as embodied in the preferences of individuals, it also helps shape the preferences of individuals. Individual preferences and political style thus interact with each other within a nation. We first elaborate on how each aspect of individual preferences influences β , and then discuss how each aspect of political style affects β .

Figure 2: Behavioral Mechanism relating culture to personal attributes



We measure preferences with respect to four aspects: individualism (vs collectivism); indulgence (vs restraint); power distance; and long-term (vs short-term) view. A culture that favors individualism tends to have low levels of self-restraint and future focus. Similarly, an emphasis on indulgence also corresponds to a low level of self-restraint and future focus. On the other hand, a

culture with a high degree of power distance emphasizes social hierarchy and cultivates tolerance and patience which are consistent with high levels of self-restraint and future focus. Finally, long-term view indicates frugality and pragmatism which imply high levels of self-restraint and future focus.

For political style, we adopt three measures: corruption, transparency, and state intervention. A political environment of high corruption or strong state intervention entails a culture of submissiveness and prudence, in which individuals tend to show greater self-restraint and future focus. On the other hand, in a transparent political environment, people will have clearer understanding of risks at both microeconomic and macroeconomic levels, and will therefore be less worried about the future, resulting less self-restraint and future focus.

3.2 Basic model relating personal attributes to consumption

To establish the link from self-restraint and future focus to consumption, we adopt the quasi-hyperbolic discounting model proposed by Laibson (1997), which is represented by a lifetime utility function of $U(c_t) + \beta[\sum_{k=t+1}^T \delta^{k-t} u(c_k)]$ where $u(\cdot)$ is an increasing and concave function; c_t is consumption in period t ; δ is the one period discount factor; and β is the present-bias parameter which reflects behavioral deviation from the optimal choice between present and future. Hyperbolic discount functions are usually characterized by a comparatively high discount rate over short horizons and a relatively low discount rate over longer horizons. This discount structure sets up a conflict between today's preferences, and the preferences that will be held in the future. Formally, the discount factors can thus be written as $(1, \beta\delta, \beta\delta^2, \dots, \beta\delta^t)$. This model has been applied in the analysis of dynamically inconsistent consumption behavior over time.

Based on the value of β , the consumption choice will differ over time. If $\beta = 1$, individuals have standard, time-consistent, geometric preferences. When $\beta \neq 1$, there is time inconsistency in that the trade-off between periods in the distant future is perceived differently than the trade-off between periods in the near future. Specifically, if $\beta > 1$, individuals feel inclined to save excessively whereas if $\beta < 1$, they feel a strong compulsion to consume. Thus, the effect on consumption of the attributes of self-restraint and future focus are reflected in β . An increase in β indicates greater self-restraint and future focus.

In the extended model, we also consider how age structure affects consumption. We classify consumers according to their ages, assuming that different age groups have different levels of self-restraint and future-focus.

For simplicity, we assume an individual lives for three periods, $t = 0, 1, 2$, where $t = 0$ is a dynamic planning period and $t = 1$ is an initial endowment period in which the individual receives wealth of W .⁴ Consumption takes place in both periods 1 and 2. In period 0, the individual makes a plan for allocating wealth between consumption and investment in period 1. This represents a

⁴ For simplicity, we assume that wealth is exogenously given. Similar results can be obtained by allowing individuals to make labor supply decisions through their utility maximization problem.

optimal choice between the long term and the short term from the perspective of period 0. When period 1 arrives, the individual implements an allocation choice between consumption and investment from the perspective of period 1. In period 2, the individual consumes all available wealth.

Let I represent investment in period 1, thus $(W - I)$ is consumption in period 1. Investment generates a return at rate R such that in period 2, a wealth of $I(1 + R)$ is received to be spent on consumption. In addition, we assume that investment I has a direct psychological utility of $v(I)$ in period 1, where $v(\cdot)$ is an increasing and concave function.

According to the hyperbolic discounting model, in period 0 the discounting structure is $(1, \beta\delta, \beta\delta^2)$ for the 3 periods. In period 0, the individual's utility maximization problem is as follows:

$$\max_I \beta\delta \cdot [u(W - I) + v(I)] + \beta\delta^2 \cdot u(I(1 + R)) \quad (1)$$

Therefore, the optimal level for planned investment is uniquely determined by:

$$u'(W - I_0^*) = v'(I_0^*) + \delta(1 + R)u'(I_0^*(1 + R)) \quad (2)$$

However, when period 1 arrives, the decision maker has a different utility maximization problem, as follows:

$$\max_I [u(W - I) + v(I)] + \beta\delta \cdot u(I(1 + R)) \quad (3)$$

The optimal implemented investment level is uniquely determined by:

$$u'(W - I_1^*) = v'(I_1^*) + \beta\delta(1 + R)u'(I_1^*(1 + R)) \quad (4)$$

Comparing equations (2) and (4), due to the additional factor of β in the second term in equation (4), the optimal choices for investment (and consumption) differ in periods 0 and 1. This difference is caused by the present-bias parameter β . If $\beta < 1$, implemented investment in period 1 (I_1^*) is less than planned investment at period 0 (I_0^*), which implies over-consumption in period 1. Conversely, if $\beta > 1$, implemented investment in period 1 (I_1^*) is greater than planned investment at period 0 (I_0^*), which implies under-consumption in period 1. And if $\beta = 1$, the individual makes time-consistent investment decisions. We summarize these results in the following proposition.

Proposition 1: $\frac{\partial I_1^*}{\partial \beta} > 0$. In particular, when $\beta < 1$, $I_1^* < I_0^*$; when $\beta > 1$, $I_1^* > I_0^*$; when $\beta = 1$, $I_1^* = I_0^*$.

Note that for simplicity we have assumed individuals consume in only two periods and save in only one. The model can be easily extended to the case of more than two periods and individuals can therefore save (or invest) in multiple periods, and our main result will still hold. Since there is a positive relationship between β and investment and thus a negative relationship between β and

consumption, countries characterized by low β exhibit relatively high consumption, and vice versa.

3.3 Hypotheses on the effects of culture on consumption

Combining the negative relationship between β and consumption with the behavioral mechanism relating the cultural variables to β summarized in Figure 2, we propose two broad hypotheses for empirical testing.

Hypothesis 1: *Political style affects β positively and consumption negatively through higher corruption or state intervention or through lower transparency.*

Hypothesis 2: *Individual preferences affect β positively and consumption negatively through higher power distance or long-term view or through lower individualism or indulgence.*

These hypotheses are summarized in Table 1.

Table 1: Expected relationship with consumption

Variable	<i>Corruption</i>	<i>Transparency</i>	<i>Intervention</i>	<i>Individualism</i>	<i>Indulgence</i>	<i>Power distance</i>	<i>Long-term view</i>	<i>Elderly share</i>
Sign	–	–	–	+	+	–	–	–

3.4 Extended model & hypothesis on ageing

As a society's ageing may result in a more prudent culture in which people tend to have a high level of self-restraint and future focus, age structure could have an impact on a country's consumption. To extend our basic model, we divide individuals into two groups by age with the older group showing a higher level of self-restraint and the younger group being more indulgent. The older group constitutes a share of θ in the population, the younger group a share of $1 - \theta$. The discount factors between present and future are β^O and β^Y for the two groups, respectively where it is assumed that $\beta^O > \beta^Y$.

In period 0, the overall utility model for the society is as follows:

$$\theta\{\beta^O \delta \cdot [u(W^O - I^O) + v(I^O)] + \beta^O \delta^2 \cdot u(I^O(1 + R))\} + (1 - \theta)\{\beta^Y \delta \cdot [u(W^Y - I^Y) + v(I^Y)] + \beta^Y \delta^2 \cdot u(I^Y(1 + R))\} \quad (5)$$

The optimal planned investment choices of the two groups are thus determined by:

$$u'(W^O - I_0^{O*}) = v'(I_0^{O*}) + \delta(1 + R)u'(I_0^{O*}(1 + R))$$

and $u'(W^Y - I_0^{Y*}) = v'(I_0^{Y*}) + \delta(1 + R)u'(I_0^{Y*}(1 + R)) \quad (6)$

In period 1, the overall utility model for the society becomes:

$$\begin{aligned} & \theta\{[u(W^O - I^O) + v(I^O)] + \beta^O \delta \cdot u(I^O(1 + R))\} + \\ & (1 - \theta)\{[u(W^Y - I^Y) + v(I^Y)] + \beta^Y \delta \cdot u(I^Y(1 + R))\} \end{aligned} \quad (7)$$

The optimal implemented investment choices are thus determined by:

$$\begin{aligned} & u'(W^O - I_1^{O*}) = v'(I_1^{O*}) + \beta^O \delta(1 + R)u'(I_1^{O*}(1 + R)) \\ & \text{and } u'(W^Y - I_1^{Y*}) = v'(I_1^{Y*}) + \beta^Y \delta(1 + R)u'(I_1^{Y*}(1 + R)) \end{aligned} \quad (8)$$

Since $\beta^O > \beta^Y$, and assuming $W^O = W^Y = W$, it is easy to show that $I_1^{O*} > I_1^{Y*}$. Since the total investment of a society is $I_1^{Total*} \equiv \theta I_1^{O*} + (1 - \theta)I_1^{Y*}$, given $I_1^{O*} > I_1^{Y*}$, we can easily conclude that the greater θ , the higher the country's total investment. We summarize these findings in the following proposition.

Proposition 2: Assuming $W^O = W^Y = W$ and $\beta^O > \beta^Y$, then: (1) $I_1^{O*} > I_1^{Y*}$; (2) $\frac{\partial I_1^{Total*}}{\partial \theta} > 0$.

Based on the results in Proposition 2, we should observe that in societies with more aged populations, self-restraint in consumption will be enhanced. This gives us the third hypothesis.

Hypothesis 3: *Self-restraint in consumption behavior is greater for countries with larger shares of elderly in the population as given by higher θ .*

4. Data

We make use of annual data for 89 countries over the period 1999-2018.⁵ The sample includes all G20 members. The total GDP of the sample countries accounts for more than 90% of world GDP.

4.1 Data sources

The data source for our economic variables is the World Bank. These include the dependent variable, *Consumption*, taken as the consumption share in GDP, and the age structure variable, *Elderly share*, taken as the share of population over age 65. In addition, we include three control variables: *lnGDP/capita* representing GDP per capita expressed in logarithmic form; *Interest rate*, given in real terms; and *Credit/GDP*, the ratio of financial sector credit to GDP.

⁵ The countries and territories are Angola, Albania, Argentina, Australia, Azerbaijan, Bangladesh, Bulgaria, Bahrain, Bosnia and Herzegovina, Belarus, Bolivia, Brazil, Botswana, Canada, Switzerland, Chile, China, Cote d'Ivoire, Congo, Colombia, Costa Rica, Czech Republic, Dominican Republic, Algeria, Egypt, United Kingdom, Guatemala, Hong Kong, Honduras, Croatia, Hungary, Indonesia, India, Iran, Iraq, Iceland, Israel, Italy, Jamaica, Jordan, Japan, Kenya, Korea, Kuwait, Lebanon, Libya, Sri Lanka, Moldova, Mexico, Macedonia, Malta, Myanmar, Mongolia, Mozambique, Mauritius, Malawi, Malaysia, Namibia, Nigeria, Nicaragua, Netherlands, New Zealand, Oman, Pakistan, Panama, Peru, Philippines, Papua New Guinea, Paraguay, Qatar, Romania, Russian Federation, Senegal, Singapore, Sierra Leone, Serbia, Sweden, Seychelles, Thailand, Tanzania, Uganda, Ukraine, Uruguay, United States, Venezuela, Vietnam, South Africa, Zambia, Zimbabwe.

The three variables on political style are drawn from the EIU Country Risk Model. We incorporate scores as assessed by averaging monthly value each year. Each variable is calibrated as an index defined on a 0 to 4 scale. The levels of *Corruption* and *Intervention* increase as the index value increases whereas the level of transparency, as the variable is defined by the EIU, decreases as the index value increases. We diverge from the EIU and relabel the transparency indicator as “*Non-transparency*” for easier interpretation. The state intervention variable is defined specifically with respect to the banking sector.

For the variables on preferences – *Individualism*, *Indulgence*, *Power distance*, and *Long-term view* – the data source is the work of Hofstede et al. (2010), *Cultures and Organizations: Software of the Mind*. These variables are specified in country cross-section only. All are calibrated as indexes on a 1 to 100 scale.

The four belief system variables are defined as country level dummies. *Confucianism* pertains to seven countries/territories;⁶ *Islam* to ten countries;⁷ *Catholicism* to 20 countries,⁸ and *Socialism* to nine countries.⁹

4.2 Data discussion

Table 2 provides summary statistics for all variables.

Table 2: Variable definitions, statistics, and data sources

Variable	Mean	Std Err	Min	Max	Definition	Data Source
<i>Consumption</i>	77.54	14.62	24.45	121.46	Consumption share in GDP, in % [0, 100]	World Bank
<i>Corruption</i>	2.66	1.26	0	4	Index of corruption [0, 4]	EIU
<i>Transparency</i>	1.95	1.18	0	4	Index of public sector transparency (higher score means more non-transparent) [0, 4]	EIU
<i>Intervention</i>	2.00	1.16	0	4	Index of state intervention in banks [0, 4]	EIU
<i>Individualism</i>	36.97	22.04	6	91	Index of individualism, [0, 100]	Hofstede, et al.
<i>Indulgence</i>	47.77	23.53	4	100	Index of indulgence, [0, 100]	Hofstede, et al.
<i>Power distance</i>	65.90	19.89	13	100	Index of power distance, [0, 100]	Hofstede, et al.

⁶ Confucian countries/territories include China, Hong Kong, Macau, Korea, Japan, Singapore, and Vietnam.

⁷ Islamic countries include Albania, Bangladesh, Egypt, Iran, Kuwait, Morocco, Nigeria, Pakistan, Saudi Arabia, and Turkey.

⁸ Catholic countries include Argentina, Belgium, Chile, Columbia, Czech Republic, France, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Mexico, Peru, Philippines, Poland, Portugal, Slovak, Slovenia, and Uruguay.

⁹ Socialist countries include Albania, Bulgaria, China, Czech Republic, Hungary, Poland, Romania, Slovak, and Vietnam.

<i>Long-term view</i>	41.71	22.19	7	100	Index of long-term view, [0, 100]	Hofstede, et al.
<i>Elderly share</i>	8.05	5.30	0.72	27.58	Share of population over 65 [0,100]	World Bank
<i>lnGDP/capita</i>	8.64	1.36	5.61	11.28	Log of GDP per capita (current USD)	World Bank
<i>Interest rate</i>	7.44	36.30	-85.73	1158.03	Real interest rate, in %	World Bank
<i>Credit/GDP</i>	65.21	53.16	-114.69	298.09	Ratio of financial sector credit to GDP, in %	World Bank

Note: Sample is for 89 countries for the period 1999-2018. Variables from Hofstede et al. vary across country but not over time.

The correlation matrix for culture related variables is shown in Table 3. Correlations between political style variables and preference variables suggests interaction among these different manifestations of culture. *Corruption*, *Non-transparency*, and *Intervention* have moderate positive correlations with *Power distance*, and negative correlations with *Individualism*, *Long-term view*, and *Indulgence*. On the one hand, lack of integrity and short-term view of government officials, together with tolerant attitudes and self-restraint among the citizenry may all contribute to the prevalence of corruption. On the other hand, a culture of corruption may create social norms that support hierarchical structures in which individuals tend to focus on the present and make moral compromises rather than perpetuate an individual sense of ethics. Similar arguments can be applied to state intervention and transparency as well.

Table 3: Correlations between political style and preference variables

Variable	<i>Corruption</i>	<i>Transparency</i>	<i>Intervention</i>	<i>Individualism</i>	<i>Indulgence</i>	<i>Power distance</i>	<i>Long-term view</i>
<i>Corruption</i>	1.00						
<i>Transparency</i>	0.67	1.00					
<i>Intervention</i>	0.78	0.71	1.00				
<i>Individualism</i>	-0.65	-0.42	-0.54	1.00			
<i>Indulgence</i>	-0.30	-0.09	-0.28	0.25	1.00		
<i>Power distance</i>	0.67	0.44	0.51	-0.71	-0.38	1.00	
<i>Long-term view</i>	-0.24	-0.28	-0.19	0.09	-0.41	-0.04	1.00

We are also interested in how different aspects of political style are related to each other. High correlations are shown among the three political style variables, which makes intuitive sense and

is also in line with existing findings in the literature.

Among the preference variables, we observe that *Individualism* has a strong negative correlation with *Power distance* (-0.71) suggesting that a high level of individualism may lead to a preference for decentralized authority. *Indulgence* is negatively correlated with *Power distance*, but at a weaker level (-0.38), which can be explained using a similar argument. Thus, it follows that *Individualism* and *Indulgence* are positively correlated (0.25). Even though the correlations both between *Long-term view* and *Individualism* (0.09) and between *Long-term view* and *Power distance* (-0.04) are rather weak, the relationship between *Long-term view* and *Indulgence* is strongly negative (-0.41), which makes intuitive sense: in a culture in which indulgence prevails, people are more short-sighted.

5. Empirical results

Formally, the regression equation can be expressed as follows:

$$Consumption_{it} = \alpha X_{it} + \sigma Control_{it} + \delta_t Year_t + c + u_{it}$$

where X_{it} refers to the explanatory variables related to culture to be chosen selectively under different model specifications.

Results are presented in Table 4. Since the political style variables (*Corruption*, *Non-transparency* (non-transparency in the public sector), and *Intervention* (state intervention in banking)) and the preference variables (*Individualism*, *Indulgence*, *Power distance* (social hierarchy), and *Long-term view*) measure culture from different perspectives, following the tradition in the literature, we estimate how these two sets of cultural variables influence consumption separately. The results are shown in Columns (1) and (3) of Table 4, respectively, which also suppress the effect of belief systems. The belief system variables (*Confucianism*, *Islam*, *Catholicism*, and *Socialism*) are added in Columns (2) and (4). Then, since the political style and preference variables may influence each other, it is helpful to put them all in a single regression as a robustness check, with results given in Column (5) and belief system variables added in Column (6). All regression specifications include the variables *Elderly share*, *lnGDP/capita*, *Interest rate*, and *Credit/GDP* (capturing financial development).

Table 4: Estimation Results for the Effect of Culture on Consumption Share

Variables	(1)	(2)	(3)	(4)	(5)	(6)
<i>Corruption</i>	-0.858** (0.357)	-1.107*** (0.352)			-0.666* (0.399)	-0.804** (0.398)
<i>Transparency</i>	-0.814** (0.341)	-0.852** (0.337)			-0.810** (0.360)	-0.875** (0.359)

<i>Intervention</i>	-0.828**	-0.825**			0.191	0.276
	(0.390)	(0.383)			(0.381)	(0.380)
<i>Individualism</i>			0.171**	0.0793	0.172**	0.0713
			(0.0773)	(0.0911)	(0.0749)	(0.0905)
<i>Indulgence</i>			-0.0655	-0.0896	-0.0683	-0.0909
			(0.0562)	(0.0612)	(0.0543)	(0.0606)
<i>Power distance</i>			-0.0494	-0.129	-3.43e-05	-0.0876
			(0.0953)	(0.104)	(0.0931)	(0.104)
<i>Long-term view</i>			-0.0957*	-0.00829	-0.112**	-0.0101
			(0.0578)	(0.0734)	(0.0565)	(0.0731)
<i>Elderly share</i>	-0.742***	0.116	-0.207	-0.349**	-0.217	-0.435**
	(0.193)	(0.157)	(0.165)	(0.169)	(0.169)	(0.175)
<i>Confucianism</i>		-13.62***		-10.96**		-12.61***
		(4.353)		(4.815)		(4.801)
<i>Islam</i>		-4.805		-3.700		-3.680
		(3.867)		(4.108)		(4.065)
<i>Socialism</i>		-0.346		0.697		1.782
		(4.081)		(3.738)		(3.714)
<i>Catholicism</i>		4.763		4.062		4.429
		(3.228)		(2.867)		(2.841)
<i>lnGDP/capita</i>	-13.17***	-9.674***	-4.353***	-4.219***	-4.802***	-4.636***
	(1.172)	(0.751)	(0.953)	(0.989)	(0.994)	(1.044)
<i>Interest rate</i>	0.0440***	0.0465***	0.110***	0.105***	0.110***	0.105***
	(0.0119)	(0.0121)	(0.0201)	(0.0200)	(0.0204)	(0.0202)
<i>Credit/GDP</i>	0.0808***	0.0827***	0.0385***	0.0414***	0.0459***	0.0506***
	(0.00771)	(0.00760)	(0.00679)	(0.00684)	(0.00744)	(0.00753)

<i>Constant</i>	195.5***	161.3***	116.0***	122.9***	119.5***	127.2***
	(10.14)	(6.637)	(12.53)	(13.49)	(12.56)	(13.74)
<i>Country Fixed</i>						
<i>Effects</i>	yes	no	no	no	no	no
<i>Observations</i>	1,513	1,513	935	935	912	912
<i>R-squared</i>	0.207	0.181	0.157	0.158	0.174	0.181

Note: (1) ***, ** and * represent significance at 1%, 5% and 10% level separately and the numbers in parentheses are standard errors; (2) The dependent variable is the percentage of final consumption expenditure in GDP (*Consumption*); (3) The sample size difference between specifications 1/2 and all other specifications is due to data availability issue on preference variables for the following countries: Azerbaijan, Bahrain, Bosnia and Herzegovina, Belarus, Bolivia, Botswana, Cote d'Ivoire, Congo, Costa Rica, Algeria, Guatemala, Honduras, Israel, Jamaica, Kenya, Kuwait, Sri Lanka, Moldova, Macedonia, Myanmar, Mongolia, Mauritius, Malawi, Namibia, Nicaragua, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Qatar, Senegal, Sierra Leone, Seychelles, Uganda, Zimbabwe; (4) The difference in number of observations between specifications 3/4 and specifications 5/6 is because observations of political style variables for Albania, Egypt, Iceland, Malta, and Serbia are missing for certain years.

5.1 Political Style and Consumption

We first focus on the effect of political style on consumption, with empirical results shown in Columns (1), (2), (5), and (6). In both Columns (1) and (2), *Corruption* is shown to have a significantly negative effect on the consumption rate. If *Corruption* increases by one unit, the share of consumption in GDP drops by about one percentage point. The effect remains statistically significant when the preference variables and/or belief system variables are included in the regression, with the minimum estimate of the effect being 0.67 percentage points and the maximum 1.11 percentage points. This result confirms **Hypothesis 1**, and the intuition is the following: Higher corruption entails a culture of more submissiveness and prudence such that individuals show greater self-restraint in postponing their consumption and allocating more of their income to saving.

Similarly, the regression results show that opaque government policies have a negative effect on consumption rate. If the level of *Non-transparency* increases by 1 unit, the share of consumption in GDP drops by 0.8-0.9 percentage points across all four specifications in which the variable is included. This finding again supports **Hypothesis 1** and can be explained as follows: Individuals are rational and forward-looking, and they are willing to cut their consumption to prepare against future frustration brought by the uncertainty of living under a non-transparent regime. In an environment of opaque government policies, individuals have higher expectation of risks at both

microeconomic and macroeconomic levels, and therefore they consume less and save more for the future. Conversely, relaxing the needs for precautionary saving can stimulate consumption, and from this perspective, greater transparency will raise consumption.

The impact of state intervention in the banking system on consumption does not exhibit such a consistent pattern across different model specifications as the other political style variables. In Columns (1) and (2), where the preference variables are not included, *Intervention* shows a statistically negative effect on consumption. An increase in *Intervention* by 1 unit leads to a decrease in the consumption share in GDP of about 0.83 percentage points. This confirms **Hypothesis 1**, indicating that a political environment characterized by high state intervention tends to be associated with prudence and submissiveness such that individuals are more reserved in their consumption. It is widely acknowledged that a market economy facilitates efficient allocation of resources, thus fostering economic growth. A high level of intervention in banking not only empowers government officials, which might breed corruption, but also makes the public sector less transparent. Zhang and Wan (2004) found that liquidity constraints and increased uncertainty during the reform era in China were responsible for low consumption levels, which is in line with our finding. However, once we include preference variables in the regression, as reported in Columns (5) and (6), the coefficient for *Intervention* becomes statistically insignificant with an opposite sign. Given that *Intervention* is highly correlated with the four individual preference variables (see Table 3), it is not surprising that the estimation does not exhibit a robust pattern across different specifications.

In summary, our results confirm that a nation's political style has a significant influence on its consumption level. Under a political style characterized by corruption, opaque government behavior, and high intervention in banking, individuals are more tolerant of inequality in power, less present focused, and more self-restrained. In the hyperbolic discounting framework, this is represented by a higher value of β . Personal traits of self-restraint and future-focus lead to low household consumption which on a societal basis manifests as low aggregate consumption.

5.2 Preferences and Consumption

We now turn attention to empirically testing the relationship between individual cultural preferences and consumption. Note that the data on preferences is country specific and time invariant. We thus make an implicit assumption that cultural preferences were relatively stable over the period 1999-2018. and will not experience drastic changes within the same country and across different years.

Column (3) shows how individual cultural preferences affect consumption without taking into account the effect of political style and belief systems. *Individualism* and *Long-term view* both show a statistically significant impact on consumption, while the impact of *Indulgence* and *Power distance* are not statistically significant. If *Individualism* increases by one unit, the consumption rate increases by about 0.17 percentage points. The estimate remains robust in terms of both statistical significance and magnitude when political style variables are also included in the

regression as shown in Column (5). This finding supports **Hypothesis 2**, and the intuition is that a culture that favors individualism tends to have a low level of self-restraint and a high level of present focus, which implies high consumption in the present. It is worth noting that the coefficients of *Individualism* become insignificant when we include the belief system variables in the regressions as in Columns (4) and (6). Nevertheless, the sign of the estimated coefficients remains unchanged.

Across all specifications in columns (3)-(6), the result suggests that consumption rate moves negatively with the level of indulgence, which is to the opposite of our expectation. However, such a result is not statistically significant at all, and the estimated coefficient has a size of no more than 0.09 percentage point. This unexpected finding may be due to the quality of the data, and we should be cautious to conclude that there is no strong relationship between indulgence and consumption based on our data analysis.

Power distance is negatively, although not statistically significantly, associated with consumption across all specifications in Columns (3)-(6). The negative value of the coefficient estimates indicates that tolerance of power inequality restrains the propensity to consume. This result is consistent with **Hypothesis 2** and the intuition is the following: In a society where individuals have low acceptance of social hierarchy, behavior leans towards self-expression and against self-restraint, and thus higher consumption. Conversely, a culture with more emphasis on social hierarchy tends to be more restrained and less driven toward consumption. That the coefficient estimates are not significant may be due to measurement difficulty and data limitations.

Countries with a greater preference for the long-term view tend to consume less in order to pursue opportunities to accumulate wealth. The result in Column (3) indicates that an increase in *Long-term view* of one unit leads to a reduction in the consumption rate of about 0.1 percentage points. Such an effect is roughly unchanged when political style variables are also taken into account, as illustrated in Column (5). This finding again supports **Hypothesis 2** and can be intuitively understood because a long-term view implies frugality and self-restraint, making people consume less at present. However, when belief system variables are also included in the regression in Columns (4) and (6), the coefficients of *Long-term view* become no longer significant with the absolute value close to zero. Despite the weak significance, the sign of the estimates remains unchanged and in accordance with our hypothesis.

All in all, the preference-based cultural variables find expression in self-restraint and future focus, with greater restraint and future orientation being associated with reduced consumption. Conversely, people living in cultures that emphasize individualism and a short-term view may be more oriented towards self-realization and personal gratification which lead to a higher propensity to consume for individual enjoyment and living for the moment.

5.3 Belief System and Consumption

Thus far, we have focused on how political styles and individual cultural preferences affect

consumption. Hypothetically, the belief system of a nation may play an important role in affecting consumption behavior, in addition to affecting political style and individual preferences. In this subsection, we explore the common consumption tendencies within given cultural circles as defined by Confucianism, Islam, Catholicism, and socialism. The four belief system variables are added in Columns (2), (4), and (6) of Table 4. We assume that the belief system of a nation is relatively stable with no material change within the same country over time.

The results show a consistent pattern of Confucian countries having significantly lower consumption rates by 11-14 percentage points. This is consistent with findings in the existing literature. A Confucian culture is linked to other variables included in the model, such as power distance and long-term view in the positive sense and individualism and indulgence in a negative sense. In such a cultural environment, self-restraint and future-focus are emphasized, which leads to a low rate of consumption.

The Islamic culture has different belief tenants than the Confucian culture. The Five Pillars of Islam are the framework of the Muslim life: the testimony of faith, praying, giving zakat (support of the needy), fasting during the month of Ramadan, and the pilgrimage to Makkah. Among the five, the culture of fasting during the month of Ramadan may have an effect in daily life as it inculcates abstinence and the suppression of desire, which would be expected to lead to lower consumption. Indeed the sign on the coefficient estimate for Islam is negative (by 3-5 percentage points), as expected, although the value is not statistically significant.

The coefficient estimates of *Catholicism* are consistently positive although not statistically significant. Nevertheless, values of the estimates in the range of 4-5 percentage points are high in economic terms. A pattern of relatively high consumption rates among predominantly Catholic western countries also finds support in Figure 1.

The socialist countries do not exhibit a consistent pattern of either higher or lower consumption relative to non-socialist countries. Of note, among the nine countries categorized as socialist, China and Vietnam are also categorized as Confucian, which is associated with low consumption, while the Czech Republic, Hungary, Poland, and Slovak are also categorized as Catholic, which is associated with high consumption. The competing effects on consumption of these religious influences may override or obscure any common socialist tendencies within this group.

5.4 Elderly Share, Control Variables and Consumption

We hypothesize that an ageing population tends to exhibit a lower consumption rate due to greater self-restraint among the elderly. Across five of six model specifications, *Elderly share* has negative coefficient estimate, with the statistical significance in three of these cases. These findings yield a degree of support for **Hypothesis 3**. A number of factors may account for the lack of robustness. First, our measure for age structure of the population is limited as it only captures the share of population over age 65, with this group accounting for only a small part of aggregate consumption. Second, our theoretical result (**Proposition 2**) is derived by assuming equal wealth

distribution among groups of different ages, which does not hold in reality. If senior people are in generally wealthier than younger generations, the effect of self-restraint and future-focus on consumption will be offset by the income effect. Third, the Life Cycle model predicts a high saving rate during working years and a low saving rate during retirement as the elderly consume but do not generate much income, relying instead on savings accumulated in previous years (either through personal saving or social programs). This suggests that a population with many elderly people could actually have a low saving rate. To better study the relationship between age structure and consumption, one would need richer data and a more careful model specification, which is beyond the scope of this study.

Regarding control variables, the coefficient estimates for *lnGDP/capita* are in all cases negative and statistically significant at the one percent level. This suggests that as income increases, the propensity to consume declines, as suggested by Keynes's Relative Income Theory. The coefficient estimates for *Interest rate* are in all cases positive and significant at the one percent level. The literature on the relationship between interest rates and saving has delivered mixed results with respect to both theory and evidence, in part because both variables are enmeshed in other factors that tend to occur in an economy simultaneously. Weber (1970) used US data to show that the interest rates and aggregate consumption were positively related, which is consistent with our result. Elmendorf (1996) provided an analysis of the interest elasticity of saving in a lifecycle model, deriving various conditions bearing on the sign of the relationship. Focusing on developing countries, Giovannini (1985) argued that the relationship between the interest rate and saving in an international context depends on the level of financial liberalization. Finally, the coefficient estimate for the *Credit/GDP* ratio is found to be positive and significant at the one percent level across all model specifications. This indicates that consumption tends to rise with financial development, a finding that is as expected.

5.5 Policy Implications

The relationships between cultural variables and consumption provide hints about policy guidance for countries seeking to increase the share of consumption in expenditures as an economic driver.

Even taking the basic political environment as given, there is scope for measures to be taken that would encourage consumption. Anti-corruption efforts, promotion of transparency in government, and less intervention in banking could all help to overcome the self-restraint and future focus that inhibit consumption. Such measures would at the same time contribute to more efficient resource allocation that would raise disposable incomes. In terms of individual cultural preferences, a possible channel of influence is to allow greater scope for individuality.

Returning attention to the Chinese situation that motivated this study, the teachings of Confucianism are deeply embedded as a guiding principle for living and a core social value. Within this tradition, pragmatism and frugality are held as virtues. Yet the education system may be overstressing the importance of self-restraint. Education of the next generation could do better

in highlighting independence and self-realization. Our research suggests such a shift could stimulate consumption as a means of sustaining economic growth.

5. Conclusion

Consumption and saving behavior is a subject long and richly studied by scholars. Nevertheless, this body of work has failed to satisfactorily explain differences across countries. In this paper, we propose a behavioral mechanism that links culture to the key personal attributes of self-restraint and future focus that in turn bear on the individual consumption/saving choices that then play out collectively for a nation. To test our hypotheses, we use panel data for 89 countries and territories for the period 1999-2018. Our indicators of culture include three measures of political style (corruption, non-transparency, and intervention) and four measures of individual preferences (individualism, indulgence, power distance, and long-term view). We further incorporate the influences of belief systems (Confucianism, Islam, Catholicism, and socialism) and population age structure.

Our results on political style indicate that corruption, non-transparency in the public sector, and state intervention in banking all affect consumption negatively. As for individual preferences, a more long-term view restrains consumption while greater individualism favors it. Among belief systems, Confucianism is revealed to have the strongest effect, reducing the national consumption rate by more than 10 percentage points.

This study was motivated by a sense that for China to achieve sustained growth, the country's consumption rate must rise from the very low levels prevailing in recent decades. Confucian values are deeply embedded in Chinese culture and have a restraining effect on consumption. Nevertheless, our results suggest avenues for policy to be proactive. Within the political realm, these include combatting corruption, promoting transparency, and reducing state intervention in the economy. Further, an educational channel might work to nudge future generations of Chinese toward a greater sense of individualism and desire for self-realization.

References

- Angeletos, G., Laibson, D., Repetto, A., Tobacman, J., & Weinberg, S. (2001). The Hyperbolic Consumption Model: Calibration, Simulation, and Empirical Evaluation. *Journal of Economic Perspectives*, 15(3), 47-68.
- Bakshi, G., & Chen, Z. (1994). Baby Boom, Population Aging, and Capital Markets. *The Journal of Business*, 67(2), 165-202.
- Bernheim, B. D., & Rangel, A. (2004). Addiction and Cue-Triggered Decision Processes. *The American Economic Review*, 94(5), 1558-1590.
- Brady, D. S., & Friedman, R. D. (1947). Savings and the income distribution. NBER Chapters.
- Carroll, C. D., Hall, R. E., & Zeldes, S. P. (1992). The Buffer-Stock Theory of Saving: Some Macroeconomic Evidence. *Brookings Papers on Economic Activity*, 1992(2), 61-156.
- Carroll, C. D. (1997). Buffer-Stock Saving and the Life Cycle/Permanent Income Hypothesis. *Quarterly Journal of Economics*, 112(1), 1-55.
- Carroll, C. D. (2004). Theoretical Foundations of Buffer Stock Saving. National Bureau of Economic Research.
- Carroll, C. D., & Kimball, M. S. (2008). Precautionary Saving and Precautionary Wealth. *The New Palgrave Dictionary of Economics*, 1-9.
- Deaton, A. (1989). Saving and Liquidity Constraints. *Econometrica*, 59(5), 1221-1248.
- Dreze, J. H., & Modigliani, F. (1972). Consumption decisions under uncertainty. *Journal of Economic Theory*, 5(3), 308-335.
- Duesenberry, J. S. (1949). *Income, saving, and the Theory of Consumer Behavior*. Cambridge: Harvard University Press.
- Dynan, K. E. (1993). How Prudent are Consumers. *Journal of Political Economy*, 101(6), 1104-1113.
- Elmendorf, D. W. (1996). The effect of interest-rate changes on household saving and consumption: a survey. *Social Science Research Network*, 1996(27), 1-84.
- Feng, Z., Lien, J. W., & Zheng, J. (forthcoming). Flexible or Mandatory Retirement? Welfare Implications of Retirement Policies for a Population with Heterogeneous Health Conditions. *International Review of Economics and Finance*.
- Friedman, M. (1957) *A Theory of the Consumption Function*. Princeton University Press, Princeton.
- Fudenberg, D., & Levine, D. K. (2006). A Dual Self Model of Impulse Control. *American Economic Review*, 96(5): 1449-1476.
- Giovannini, A. (1985). Saving and the real interest rate in LDCs. *Journal of Development Economics*, 197-217.
- Gul, F., & Pesendorfer, W. (2001). Temptation and Self-Control. *Econometrica*, 69(6), 1403-1435.
- Hofstede, G., Hofstede, G. J., Minkov, M., & New, M. (2010). *Cultures and Organizations: Software of the Mind*. Revised and Expanded 3rd Edition. New York: McGraw-Hill USA.
- Huffman, D., Maurer, R., & Mitchell, O. S. (2019). Time discounting and economic decision-making in the older population. *The journal of the economics of ageing*, 14, 100121.

- Keynes, J. M. (1936). *The General Theory of Employment, Interest, and Money*. London: Macmillan.
- Kimball, M. S. (1990). Precautionary saving in the small and in the large. *Econometrica*, 58(1), 53-73.
- Kimball, M., & Weil, P. (2009). Precautionary saving and consumption smoothing across time and possibilities. *Journal of Money, Credit and Banking*, 41(2-3), 245-284.
- Kristjansdottir, H., Gudlaugsson, P.O., Gudmundsdottir, S., & Adalsteinsson, G.D. (2017). Hofstede national culture and international trade. *Applied Economics*, 49, 5792-5801.
- Krusell P., Kuruşçu B., & Smith A. A. (2002). Equilibrium welfare and government policy with quasi-geometric discounting. *Journal of Economic Theory*, 105(1): 42-72.
- Laibson, D. (1997). Golden eggs and hyperbolic discounting. *The Quarterly Journal of Economics*, 112(2), 443-478.
- Leland, H. E. (1968). Saving and Uncertainty: The Precautionary Demand for Saving. *Quarterly Journal of Economics*, 82(3), 465-473.
- Lien, J. W., Peng, Q., & Zheng, J. (2016). Major Earthquakes and Present Focused Expenditures. working paper.
- Lien, J. W., Wang, W., & Zheng, J. (2016). A Model of Capital Allocation, Education and Job Choice in China. *The Chinese Economy*, 49(5): 307-326.
- Lien, J. W., & Zheng, J. (2018). Are Work Intensity and Healthy Eating Substitutes? Field Evidence on Food Choices under Varying Workloads. *Journal of Economic Behavior and Organization*, 145: 370-401.
- Ma, L. L. & Li, Q. (2011). Chinese investors' risk preferences in china. *Statistical Research.*, (08):63-72.
- Miller, B. L. (1976). The effect on optimal consumption of increased uncertainty in labor income in the multiperiod case. *Journal of Economic Theory*, 13(1), 154-167.
- Modigliani, F. & Brumberg, R. (1954). Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data. In: Kurihara, K., Ed., *Post Keynesian Economics*, New Brunswick: Rutgers University Press, 388-436.
- Morin, R., & Suarez, A. F. (1983). Risk Aversion Revisited. *Journal of Finance*, 38(4), 1201-1216.
- Ouyang, Y., Fu, Y. H., & Wang, S. (2016). The Scale Effect and Evolution Mechanism of Resident Consumption. *Economic Research Journal*, (02):56-68.
- Palsson, A. M. (1996). Does the degree of relative risk aversion vary with household characteristics?. *Journal of Economic Psychology*, 17(6), 771-787.
- Pigou, A. C. (1943). The classical stationary state. *Economic Journal*, 53(212), 343-351.
- Ren, R. E., & Qin, X. (2006). Measuring the Comparable Household Saving Rates of China and USA, 1992-2001. *Economic Research Journal*, 3: 67-81.
- Riley, W. B., & Chow, K. V. (1992). Asset allocation and individual risk aversion. *Financial Analysts Journal*, 48(6), 32-37.
- Sibley, D. S. (1975). Permanent and transitory income effects in a model of optimal consumption with wage income uncertainty. *Journal of Economic Theory*, 11(1), 0-82.
- Wang, W., & Zheng, J. (2012). Multi-Period Complete-Information Games with Self-Control: A Dual-Self Approach.

Operations Research Transactions, 16(4): 95-104.

Wang, W., & Zheng, J. (2015). Infinitely Repeated Games with Self-Control: A Dual-Self Interpretation of the Monks Story. *Automation and Remote Control*, 76(3): 521-534

Weber, W. E. (1970). The effect of interest rates on aggregate consumption. *The American Economic Review*, 60(4), 591-600.

Ye D. Z., Lian, Y. J., & Ng, Y. K. (2012), Consumption Culture, Cognitive Bias and Consumption Anomalies. *Economic Research Journal*, 2: 80-92.

Yi, X. J., Wang, J. H., & Yi, J. J. (2008). The Fluctuation and Regional Difference of the Strength of Precautionary Saving Motive. *Economic Research Journal*, 2: 119-131.

Zeldes, S. P. (1989). Consumption and liquidity constraints: an empirical investigation. *Journal of Political Economy*, 97(2): 305-346.

Zhang, Y., & Wan, G. H., (2004). Liquidity constraint, uncertainty and household consumption in China. *Applied Economics*, 36, 2221- 2229.