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Cross-country variation in patience, persistent current account imbalances and the external wealth of nations ☆

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ABSTRACT

This paper is the first to utilize large-scale international surveys on economic preferences to examine the long-run relationships between patience, current accounts and external wealth. We find robust empirical evidence that countries with more patient individuals tend to run persistent current account surpluses, which in turn result in the accumulation of foreign assets. This theoretically plausible but empirically unexplored relationship holds true for euro area current account imbalances, global current account imbalances and net foreign asset positions worldwide. While the existing current account literature concentrates on proximate macroeconomic determinants, this paper's extension of inferences from deep determinants (i.e., time preferences) to the distribution of external wealth of nations (i.e., net foreign asset positions) makes a unique contribution to the literature. Our finding showing that deep heterogeneities contribute to external imbalances suggests that the pattern of current account imbalances as well as the distribution of external wealth of nations might be very persistent.

1. Introduction

Time preference is one of the most fundamental concepts in economics (see, e.g., Frederick et al., 2002 for a historical foundation of the discounted utility model). Standard economic theory proposes that if two countries with different time preference factors integrate, the country with less patient individuals becomes a net debtor, while the country with more patient individuals becomes a net creditor. However, due to the lack of a global dataset on economic preferences, this proposition has not been empirically tested before our paper. Falk et al. (2018) introduce the Global Preferences Survey (GPS) and provide comprehensive evidence that although within-country heterogeneity in economic preferences is larger than heterogeneity across countries, there is substantial between-country variation, for example, in patience. Additionally, a study by Wang et al. (2016), who performed the first large-scale international survey on time preferences, reveals large cross-country variation in patience.

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This paper utilizes the first two large-scale international surveys on economic preferences mentioned above and provides a novel behavioral economics related answer to the following two research questions: 1) What are the determinants current account imbalances? 2) What are the determinants of the external wealth of nations? In this paper, we show that these external imbalances are explained, among other factors, by cross-country variation in patience. This new macro-level finding is in line with experimental individual-level studies that show that patience is positively related to saving (Sutter et al., 2013; Falk et al., 2018) and negatively related to indebtedness (Meier and Sprenger, 2010). In our analysis, we go deeper than the usual proximate macroeconomic determinants of current accounts and to take a step from net capital flows (i.e., current accounts) to net foreign asset positions. The fact that our results are based on two independent surveys on economic preferences increases the credibility of our findings.

Until the 2009 euro crisis, the euro area as a whole had been in balance with the rest of the world. However, at the country level, several countries in the Economic and Monetary Union (EMU) experienced substantial current account imbalances (see Fig. A1 in the Appendix B). These imbalances had a tendency to increase after the adoption of the common currency in 1999. Most often, this pattern is explained by a catching-up process between rich Northern Europe and poor Southern Europe (see, e.g., Blanchard and Giavazzi, 2002; Schmitz and von Hagen, 2011) or by a divergence in cost competitiveness between the two regions (see, e.g., Arghyrou and Chortareas, 2008; Belke and Dreger, 2013). However, it is well known that there were large and persistent differences in the short-term interest rates among the EMU-12 countries[1] before they entered the third phase of the EMU (see Figs. A2-A3 in the Appendix B). According to economic theory, differences in autarky interest rates are linked with differences in time preferences (see Eq. (4) in Section 2 and Fig. A4 in the Appendix B). Countries that accumulated the largest current account deficits after the adoption of the euro were those that had the highest short-term interest rates before the EMU period (Fig. A5 in the Appendix B) and the lowest patience measures (Fig. A6 in the Appendix B).

Many studies have explored the medium-term determinants of current accounts in a global context (see, e.g., Chinn and Prasad, 2003; Chinn and Ito, 2007; Gruber and Kamin, 2007; Ca' Zorzi et al., 2012). The literature has concentrated on macroeconomic factors such as GDP per capita and government budget balance as well as institutional variables that measure differences in financial development and political stability. In this paper, we provide robust empirical evidence that patience (impatience) is associated with persistent current account surpluses (deficits). This holds true both for the euro area current account imbalances and the global current account imbalances. This empirical finding provides an unconventional yet theoretically plausible answer to the research question "What are the determinants of current account imbalances?" As preferences are fundamental determinants of economic development, our argumentation delves deeper than previously proposed hypotheses, which, for the most part, are based on proximate macroeconomic determinants.

One can legitimately ask why current accounts matter. The main reason they matter is that over the long run, the cumulated current account tracks the net foreign asset position (Obstfeld, 2012). Hence, we extend our analysis to include the external wealth of nations and show that there is a positive relationship between patience and net foreign asset positions. This empirical result provides an unconventional yet theoretically plausible answer to the research question "What are the determinants of the external wealth of nations?" Overall, our findings showing that deep heterogeneities contribute to external imbalances suggest that the pattern of global current account imbalances as well as the distribution of external wealth of nations might be surprisingly persistent and less influenced by policy makers. We cannot rule out the possibility that financial integration among countries with heterogeneous time preferences results in unsustainable divergence in external positions. Hence, when assessing a country's eligibility to join the EMU, considering similarities in time preferences across countries along with the Maastricht convergence criteria might be worthwhile.

To produce any scientifically credible findings on the relationship between patience and net foreign asset positions, we must use economic theory as well as a rich dataset. Economic theory is needed to derive testable hypotheses and to explain empirical findings. An extensive set of control variables is needed to rule out any other plausible explanations. Hence, in Section 2, we derive testable hypotheses from economic theory, and in Section 3, we introduce our data and econometric specifications. In Section 4, we present our empirical results on the relationships between patience, current accounts and external wealth. Section 5 includes conclusions and a discussion.

2. Theoretical framework and testable hypotheses

We present the simplest economic model from which we can derive testable hypotheses on time preference and current accounts. In the empirical analysis, we implicitly allow for a more rigorous theoretical model by controlling for several factors suggested by these alternative theories. Obstfeld and Rogoff (1996) show that if we generalize a time-separable utility function to an infinite-horizon setting, the representative agent maximizes

$$U_t = \lim_{T\to\infty}\left(u(C_t) + \beta u(C_{t+1}) + \beta^2 u(C_{t+2}) + \cdots\right) = \sum_{s=t}^{\infty} \beta^{s-t} u(C_s), \tag{1}$$

[1] EMU-12 refers to the twelve countries that adopted the euro by 2001.

where $u(C_t)$ is the period utility function, β is the time preference factor (also called the subjective discount factor),[2] and C_t is consumption in period t. The intertemporal Euler equation is a necessary first-order condition for utility maximization. For every period $s \geq t$, it must hold that

$$u'(C_s) = (1 + r)\beta u'(C_{s+1}), \tag{2}$$

where $u'(\cdot)$ denotes the first derivative of the utility function, and r is the interest rate.[3]

By definition, consumption is constant in the steady state. Hence, if we assume that the time preference factor β does not depend on consumption, Eq. (2) implies that in the infinitely lived, representative agent, small country model, the following equality holds in the steady state:

$$\beta = \frac{1}{1+r}. \tag{3}$$

(Obstfeld and Rogoff, 1996, pp. 60-72.) This can be written as follows:

$$r^A = \frac{1}{\beta} - 1, \tag{4}$$

where r^A is the autarky interest rate (i.e., interest rate equating saving and investment in a closed economy) and $\beta \in (0, 1)$.

According to Eq. (4), the autarky interest rate is determined by the time preference factor. In other words, we expect the following:

Auxiliary Hypothesis 1A There is a negative relationship between patience and autarky interest rates.

Let us assume that the world consists of two countries called Patient and Impatient. A representative agent of Patient has a high time preference factor, β, whereas a representative agent of Impatient has a low time preference factor. If the two countries become financially integrated, in equilibrium, the world interest rate equates global saving to global investment (Obstfeld and Rogoff, 1996, p. 31). As illustrated by a Metzler diagram, Patient becomes a net creditor, whereas Impatient becomes a net debtor (see Fig. A7 in the Appendix B; Obstfeld and Rogoff, 1996, pp. 31-34; Metzler, 1960). In other words, we expect the following:

Auxiliary Hypothesis 1B After financial integration, there is a negative relationship between autarky interest rates and current account balances.

On the other hand, Eq. (4) implies that if the world consists of two countries with different rates of time preferences, there cannot be a steady state with international mobility of financial capital. This point is made, for example, by Buiter (1981). To solve this problem, he proposes an overlapping-generations model in which individuals live for two periods and time preference determines the lifetime consumption profile.[4] In this case, the steady state is the sequence of momentary equilibria in which each generation's lifetime consumption remains constant. In the steady state, first-period consumption does not need to equal second-period consumption, and thus, the interest rate does not need to equal the rate of time preference (Buiter, 1981). In other words, the difference in the rate of time preference has only a limited effect in an overlapping-generations model because the chain of planning for the future is blocked by the lack of intergenerational linkage (Fukao and Hamada, 1989, p. 12.) Another way to circumvent the problem is to assume varying time preferences (intertemporally nonadditive preferences) (see, e.g., Fukao and Hamada, 1989; Obstfeld, 1990).

In addition to the problems posed by the concept of steady state, there is one practical issue: can the autarky interest rates be proxied by some actual rates, and when do countries become financially integrated? Despite these difficulties, standard economic theory suggests that if there is cross-country variation in patience, these differences are linked to the pattern of current account imbalances. All in all, we expect the following:

Hypothesis 1. There is a positive relationship between patience and long-run current account balances.

As stated, the main reason current accounts matter is that over the long run, the cumulated current account tracks the net foreign asset position (Obstfeld, 2012). If we do not consider valuation changes in gross foreign assets and liabilities, it holds that

$$CA_t = NFA_t - \mathrm{NFA}_{t-1}, \tag{5}$$

where CA_t is the current account balance in period t, and NFA_t is the net foreign assets position at the end of period t. Although valuation changes can be substantial (see, e.g., Gourinchas and Rey, 2014, Section 2.3) and the initial net foreign asset position plays a role, the balance of payments (e.g., Eq. (5)) implies the following:

[2] A low β implies impatience, and a high β implies patience.

[3] It is assumed that the period utility function $u(C_s)$ is strictly increasing in consumption and strictly concave ($u'(C_s) > 0$ and $u''(C_s) < 0$) and $\lim_{C_s \to 0} u'(C_s) = \infty$.

[4] See also Ghironi et al. (2008), who build a general equilibrium model that generates non-zero steady-state net foreign asset positions by allowing for different discount factors across countries.

Auxiliary Hypothesis 2A Over long time spans, there is a close connection between cumulative current accounts and end-of-period net foreign asset positions.

If we combine the lessons from the two-country general equilibrium model and the balance of payments, we expect that in the long-run, cross-country variation in patience is linked to the dispersion of external wealth of nations. All in all, we expect the following:

Hypothesis 2. There is a positive relationship between patience and net foreign asset positions.

In sum, Hypothesis 1 relates to our first research question, "What are the determinants of current account imbalances?" and Hypothesis 2 relates to the second research question, "What are the determinants of the external wealth of nations?"

3. Data and econometric specifications

3.1. Survey-based data on patience

Our data on patience are taken from two independent surveys, i.e., the GPS introduced by Falk et al. (2018) and survey data by Wang et al. (2016). Throughout the paper, all estimations are carried out using both of these data separately. At no stage do we mix these two data. By patience we refer to survey-based data on intertemporal choices between sooner-smaller and later-larger rewards, which is our proxy for time preference (i.e., β in the time-separable utility function (Eq. (1))). Cohen et al., (2020) call these "money earlier or later" (MEL) experiments.

The GPS introduced by Falk et al. (2018) is an experimentally validated survey dataset. The GPS data were collected within the framework of the 2012 Gallup World Poll. Consequently, the GPS is the first global dataset on economic preferences that is representative at the country level. It covers 76 countries and more than 80,000 participants worldwide. The measure for patience is derived from the combination of responses to two survey measures, one with a quantitative format (intertemporal choice sequence using the staircase method) and one with a qualitative format ("How willing are you to give up something that is beneficial for you today in order to benefit more from that in the future?") (Falk et al., 2018). The values are differences to the world mean in the standard deviation of patience.[5]

Wang et al. (2016) conducted the first large-scale international survey on time preferences. The survey was part of a larger study called the International Test on Risk Attitudes (INTRA) conducted by the University of Zurich. In total, 6912 university students in 53 countries participated in the survey. One question was "Which offer would you prefer, a payment of 3400 US dollars this month, or a payment of 3800 US dollars next month?" The measure for patience was the share of the participants in each country who chose to wait for the 3800 US dollars next month. (Wang et al., 2016.)

We call these two measures of patience "Patience (GPS)" and "Patience (Wang et al. 2016)". Both of them are time-invariant as Patience (GPS) was measured in 2012 and Patience (Wang et al. 2016) mainly in 2008 and 2009 (Rieger et al., 2015, p. 645). Having conducted a large field study, Meier and Sprenger (2015) provide empirical evidence that with regard to time preference, aggregate choice profiles and corresponding estimates of discount parameters are stable over time. Becker et al. (2018) utilize the GPS data and show that differences in preferences between populations are significantly increasing in the length of time elapsed since the ancestors of the respective groups drifted away from each other. In other words, ancient origins explain a large fraction of the global variation in economic preferences. Using different data, also Galor and Özak (2016) provide evidence for the historical origins of time preference. Based on these observations, we infer that it is reasonable to assume stability in our measures of patience. Yet, results on the relationship between patience and current accounts in 2015 are provided in Table A7 in the Appendix B. Overall, the relationship is insensitive to the time period of current accounts.

The country-level correlation between the two measures of patience is 0.58 (see the scatter plot in Fig. A8 in the Appendix B). Descriptive statistics of these two variables are provided in Table 1.[6] One should remember that as shown by Falk et al. (2018, Table 3), in addition to between-country variation, there is substantial within-country variation in patience.

Although the GPS is representative at the country level and covers a larger number of countries than Wang et al. (2016), the latter is utilized for the following two reasons: It enables us to perform a robustness check on our empirical results on patience, and it covers some additional countries that the GPS does not cover. As this is an empirical study on the relationship between patience and external imbalances, it is of great importance that our results are insensitive to which survey dataset is used to measure patience.

3.2. Testing Hypothesis 1

We test Hypothesis 1, "There is a positive relationship between patience and long-run current account balances", in Section 4.1. We estimate the following cross-sectional regression model by the OLS estimator:

[5] Negative values do not imply negative betas in equation (1).

[6] A detailed description of the other independent variables and the data sources are provided in Table 2 in Section 3.4 and in Table A1 in the Appendix A.

Table 1
Descriptive statistics for the measures of patience.

Variable/Statistic	Global country panel
Patience (GPS)	
Min	−0.613
Max	1.071
Mean	0.064
St. dev.	0.395
# Countries	54
Patience (Wang et al. 2016)	
Min	0.080
Max	0.890
Mean	0.654
St. dev.	0.173
# Countries	35

Notes: The statistics are calculated from a sample that includes only the countries for which we have comprehensive data on current accounts for the 1984–2015 period.

$$\bar{CA}_i = \alpha + \delta Patience_i + \bar{\mathbf{x}}_i'\phi + \varepsilon_i, \tag{9}$$

where the dependent variable is a multi-year average of the current account balance, α is an intercept, Patience_i is the patience measure for country i from the GPS or the share of participants choosing the 'wait' option in country i in Wang et al. (2016), $\mathbf{x}_i$ is a vector of control variables, and ε_i is a residual. The set of control variables is derived from the current account literature (see the listing of variables in Section 3.4).

3.3. Step-by-step testing procedure for Hypothesis 2

A step-by-step testing procedure for Hypothesis 2 is based on the following reasoning: variation in patience across countries is related to cross-country variation in cumulative current account balances[7], which in turn is related to cross-country variation in net foreign asset positions. In addition, we test the direct association between patience and net foreign asset positions.

3.3.1. Testing Auxiliary Hypothesis 2A

In Section 4.2.1, we test how well net foreign asset positions can be tracked by cumulative current accounts over long time spans. This corresponds to testing Auxiliary Hypothesis 2A. We estimate the following cross-sectional regression model by the OLS estimator:

$$\text{NFA}_{i,2014} = \alpha + \delta_1 \sum_{t=1985}^{2014} CA_{i,t} + \delta_2 NFA_{i,1984} + \varepsilon_i, \tag{10}$$

where the dependent variable is net foreign asset position (ratio to GDP) of country i at the end of 2014, α is an intercept, CA_{it} is the current account balance (ratio to GDP) of country i in period t, and ε_i is a residual. Net foreign asset position is measured at the end of 2014 because this is the latest year for which we have data.

3.3.2. Testing Hypothesis 2

In Section 4.2.2, we test Hypothesis 2: "There is a positive relationship between patience and net foreign asset positions". We estimate the following cross-sectional regression model by the OLS estimator:

$$\text{NFA}_{i,2014} = \alpha + \delta Patience_i + \bar{\mathbf{x}}_i'\phi + \varepsilon_i, \tag{11}$$

where the dependent variable is net foreign asset position (ratio to GDP) of country i at the end of 2014, α is an intercept, Patience is the patience measure on the GPS or the share of participants choosing the 'wait' option in Wang et al. (2016), $\mathbf{x}_i$ is

[7] There is one-to-one relation between the cumulative current account balance over time period t and the long-run average of the current account balance over the same period.

a vector of control variables, and ε_i is a residual. Net foreign asset position is measured at the end of 2014 because this is the latest year for which we have data.

3.4. Descriptive statistics, model selection and different samples

As already mentioned, to produce any scientifically credible findings on the relationship between patience and current accounts or on the relationship between patience and net foreign asset positions, we must use economic theory as well as a rich dataset. Economic theory is needed to derive testable hypotheses and to explain empirical findings. An extensive set of control variables is needed to rule out any other plausible explanations.

We have exhaustive data on the possible determinants of current accounts. The set of control variables is derived from the current account literature (see, e.g., Chinn and Prasad, 2003; Chinn and Ito, 2007; Gruber and Kamin, 2007; Ca' Zorzi et al., 2012). The descriptive statistics are provided in Table 2.[8]

If we consider a linear regression model such as (9) or (11), there is uncertainty about which explanatory variables to include on the right-hand side of the equation. In order to control for this model uncertainty, we follow Fernández et al. (2001) by utilizing Bayesian model averaging with uniform model prior and some other reasonable assumptions. In Sections 4.1 and 4.2.2, we provide posterior inclusion probabilities for each of the explanatory variables in Eqs. (9) and (11) as well as posterior densities for the most significant explanatory variables. The results of posterior inclusion probabilities and posterior densities are based on all possible specifications of the explanatory variables, that is, in this case 65,535 different specifications.[9]

To test the statistical significance of explanatory variables, we rely on the following model selection criteria when carrying out a regression analysis on current accounts (Eq. (9)) or net foreign asset positions (Eq. (11)):[10]

Bayesian information criterion We rank all specifications in accordance with the Bayesian information criterion (BIC), which takes into account the statistical goodness of fit but also imposes a penalty for the number of explanatory variables. We run the "best" specification (i.e., the specification with the minimum BIC value), which includes Patience, and we report its ranking score.

Akaike information criterion We rank all specifications in accordance with the Akaike information criterion (AIC), which takes into account the statistical goodness of fit but also imposes a penalty for the number of explanatory variables. We run the "best" specification (i.e., the specification with the minimum AIC value), which includes Patience, and we report its ranking score.

In Sections 4.1 and 4.2.2, we present our results for the empirical specifications selected by the BIC and AIC, which are based on estimating Eqs. (9) and (11).

When we analyze the long-run relationship between patience, current accounts and external wealth, we attempt to maximize the length of the sample period. However, we have the following two constraints: 1) data series measuring the quality of institutions begin in 1984, and 2) for some explanatory variables, we lack data for 2016 and thereafter. Thus, the sample period 1984–2015 in Section 4.1 results from a constrained optimization problem. For net foreign asset positions, the latest observation is from the end of 2014. Thus, in Sections 4.2.1–4.2.2, the sample period is 1984–2014.

With the exception of net foreign asset positions, the numbers that we use are averages for the whole sample period. Thus, the issue of time coverage must be addressed. We follow the rule that if a country lacks no more than one annual observation on current accounts within the 1984–2015 period, it is included; otherwise, it is excluded.[11] When we apply the BIC or the AIC to select empirical specifications, we include all countries for which we have at least 16 annual observations on every explanatory variable within the 1984–2015 period. If we lack more than half of the annual observations on any explanatory variable, we consider the data coverage inadequate, and we exclude the country.

The listing of countries in different samples is presented in Table A2 in the Appendix A. In total, there are 81 countries for which we have data on patience. For 60 of these 81 countries, we have comprehensive data on current accounts. This is the sample (n = 60) for which we estimate Eq. (10) in Section 4.2.1. The GPS covers 54 and Wang et al. (2016) 35 of these 60 countries. These are the two samples (n = 54 and n = 35) for which we estimate Eq. (9) in Section 4.1 and Eq. (11) in Section 4.2.2. If we do not follow the rule of current account coverage, we correspondingly have 70 countries (patience from the GPS) and 49 countries (patience from Wang et al. 2016). The results for these two samples, which cover 92% or 85% of the world GDP and 85% or 64% of the world population, are presented in the Appendix B. On the other hand, if we follow the 16/32 rule on all explanatory variables, we end up having 47 countries with the GPS and 32 countries with Wang et al. 2016. These are the two samples (n = 47 and n = 32) from which we calculate the BIC and AIC for all specifications of Eq. (9) in Section 4.1 and for all specifications of Eq. (11) in Section 4.2.2.

[8] Descriptive statistics of Patience (GPS) and Patience (Wang et al. 2016) are provided in Table 1 in Section 3.1.
[9] In order to save space, these are not provided for Patience (Wang et al. 2016).
[10] Ca' Zorzi et al. 2012 present a similar criterion on current accounts.
[11] However, as a robustness check, we provide results in the Appendix B (Tables A4-A5, A9) for when this rule is not followed.

4. Empirical results

4.1. Patience and current account imbalances

In Figs. 1–2, we utilize the Bayesian Model Averaging (BMA) method to assess the determinants of current account balances. In other words, the dependent variable is the average current account balance (ratio to GDP) during the 1984–2015 period in Figs. 1 and 2. The posterior inclusion probabilities of each explanatory variable is presented in Fig. 1. The high inclusion probability of patience (0.513) means that it significantly explains the cross-country variation in current accounts once the potential control variables have been taken into account. Posterior densities for the explanatory variables with the highest posterior inclusion probabilities are shown in Fig. 2. The posterior density of patience is centered on the positive side. This means that countries inhabited by patient individuals have a tendency to run current account surpluses, whereas countries inhabited by impatient individuals have a tendency to run current account deficits. The results of posterior inclusion probabilities and posterior densities (Figs. 1–2) are based on all possible specifications of the explanatory variables, that is, in this case 65,535 different specifications.

Table 2
Descriptive statistics based on annual observations for 81 countries over the 1984–2015 period.

Variable	Min	Max	Mean	St. dev.	# Obs.
Current account balance	−0.429	0.532	−0.011	0.072	2351
Net foreign asset position	−10.742	4.301	−0.229	0.727	2378
Macroeconomic factors					
Fuel exports	0.000	1.000	0.160	0.259	2218
GDP per capita	0.027	9.159	1.591	1.840	2469
GDP per capita growth	−64.996	53.944	2.000	5.228	2475
Government budget balance	−0.342	0.328	−0.019	0.046	1877
Trade openness	0.085	4.200	0.603	0.414	2435
Financial openness	0.000	1.000	0.551	0.380	2429
Institutional factors					
Financial development	0.000	2.332	0.560	0.460	2389
Bureaucracy quality	0.000	4.000	2.470	1.127	2452
Corruption	0.000	6.000	3.220	1.411	2452
Democratic accountability	0.000	6.000	4.200	1.583	2452
Investment profile	1.000	12.000	7.662	2.466	2452
Law and order	0.000	6.000	3.884	1.492	2452
Demographic factors					
Old dependency ratio	0.009	0.427	0.134	0.076	2592
Child dependency ratio	0.149	1.064	0.476	0.230	2592

Notes: The statistics are calculated from a sample that includes only the countries for which we have data on patience. See Table A2 in the Appendix A for a listing of countries.

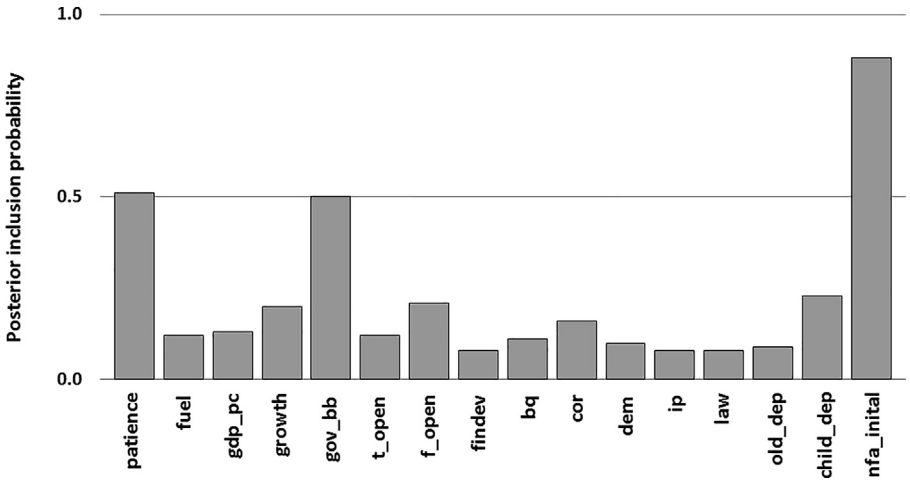

Fig. 1. Inclusion probabilities for each of the explanatory variable of current account balance, 47 countries in 1984–2015. The data on patience are taken from the Global Preferences Survey (GPS).

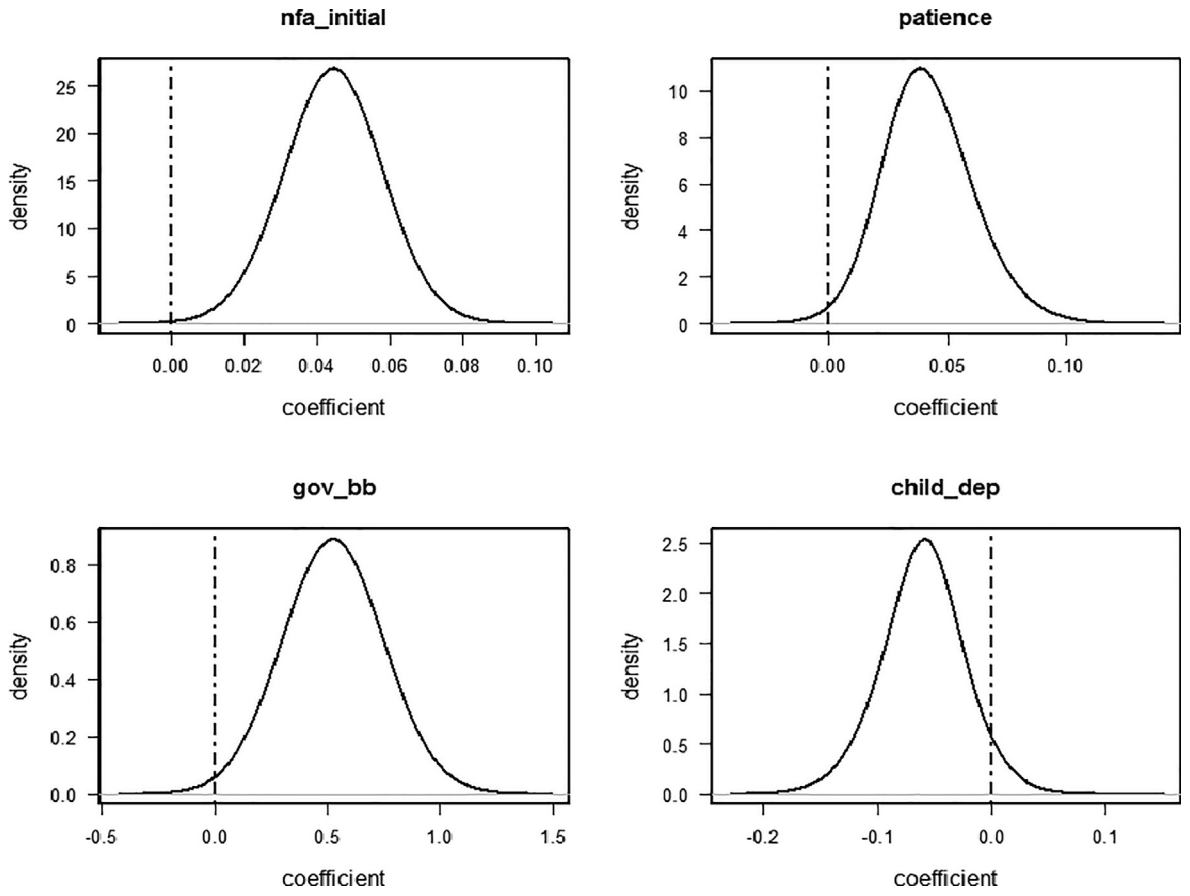

Fig. 2. Posterior densities for the most important explanatory variables of current accounts, 47 countries in 1984–2015. The data on patience are taken from the Global Preferences Survey (GPS).

In Tables 3–4, we present the results from estimating Eq. (9) for those countries for which we have comprehensive data for the 1984–2015 period.[12] Tables 3 and 4 differ with respect to the data source for patience. In Table 3, data on patience are taken from the GPS and in Table 4 from Wang et al. (2016). Our set of control variables is derived from the current account literature (see, e.g., Chinn and Prasad, 2003; Chinn and Ito, 2007; Gruber and Kamin, 2007; Ca' Zorzi et al., 2012).

In Table 3, we find that there is a strong positive linear relationship between current account balances and patience (specification (1)).[13] This result is not driven by an outlier (see Fig. A9 in the Appendix B).[14] In specifications (2)-(3), all countries with at least 16 annual observations on every explanatory variable within the 1984–2015 period are included.[15] The BIC does not include patience in the first best specification. Nevertheless, out of the 65,535 specifications, it is included in the second-best statistical model (specification (2)). Based on the AIC, patience should be included in the statistical model, even if all other typical determinants are controlled for (specification (3)). However, the statistical significance of Patience (GPS) is slightly weaker in specification (3). This is because the correlation between Patience (GPS) and GDP per capita is as high as 0.79 in this particular sample (see Table A3 in the Appendix B).

Falk et al. (2018) show that patience is the only preference measure that is robustly correlated with GDP per capita. The time preference factor is a deep determinant of both external balances and economic development. Hence, distinguishing the effect of patience on external balances from the effect of GDP per capita is econometrically challenging. Instead of fancy econometric identification, we follow the growth literature and categorize determinants as deep or proximate causes

[12] All countries with at least 31 annual observations on current accounts within the 1984–2015 period are included (see Table A2 in the Appendix A for a listing of countries). See Tables A4-A5 in the Appendix B for the results when this rule was not followed. The results are identical. See Table A6 in the Appendix B for the results for the EMU-12 countries during the first 10 years after the adoption of the euro preceding the crisis period. Again, the results are identical.

[13] The quadratic term of Patience is not statistically significant.

[14] If, for some reason, one wishes to exclude Nicaragua (NIC), the positive relation between the average current account balance and patience remains statistically significant at the 1 % level in specification (1).

[15] In addition to GDP per capita, government budget balance, trade openness, financial openness, corruption, child dependency ratio, and initial net foreign asset position, the set of control variables also included fuel exports, GDP per capita growth, old dependency ratio, financial development, bureaucracy quality, democratic accountability, law and order, and investment profile from the Political Risk Services' International Country Risk Guide.

Table 3
Determinants of current account balances, 1984–2015.

	(1)	(2)	(3)
Patience (GPS)	0.048***	0.041**	0.035*
	(0.016)	(0.018)	(0.019)
Macroeconomic factors			
GDP per capita			0.013*
			(0.008)
Government budget balance		0.538**	0.492**
		(0.251)	(0.226)
Trade openness			0.040*
			(0.020)
Financial openness			−0.049**
			(0.020)
Institutional factors			
Corruption		−0.016**	−0.021**
		(0.007)	(0.008)
Demographic factors			
Child dependency ratio		−0.080***	−0.053*
		(0.024)	(0.029)
Initial net foreign asset position		0.032**	0.028
		(0.015)	(0.019)
Constant	−0.014**	0.099***	0.089**
	(0.006)	(0.034)	(0.037)
R^2	0.186	0.551	0.608
IC Rank		2	1
# Countries	54	47	47

Notes: The dependent variable is the average current account balance (ratio to GDP) during the 1984–2015 period. Heteroscedasticity-robust standard errors are in parentheses. Specification (2) was selected by the Bayesian ranking criterion. Specification (3) was selected by the Akaike ranking criterion. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels. The data on patience are taken from the Global Preferences Survey (GPS).

(see, e.g., Acemoglu, 2009, Chapter 4; Spolaore and Wacziarg, 2013; Weil, 2009, Part 4). Deep determinants such as preferences affect economic outcomes via proximate determinants. In Section 4.3, we will explain our stand on the effects of time preferences and economic development on external imbalances more thoroughly.[16]

When the data on patience are taken from Wang et al. (2016), we find that there is a strong positive linear relationship between current account balances and patience if either Nigeria is excluded or the share of fuel exports, which is a standard control variable in the current account literature, is controlled for (specifications (5)-(6) in Table 4).[17] Based on both the BIC and AIC, patience should be included in the statistical model, even if all other typical determinants are controlled for (specifications (7)-(8)). With regard to the control variables, specifications (7)-(8) produce fairly standard results.[18]

As, for example, the GPS data were collected within the framework of the 2012 Gallup World Poll and because in Tables 3–4 the dependent variable is the average current account balance during the 1984–2015 period, we implicitly assume that the estimates of discount parameters are stable over time. According to Meier and Sprenger (2015), this is a reasonable assumption. Nevertheless, as a robustness check, we provide results in the Appendix B (Table A7) for current accounts in the most recent year in our sample which is 2015. Based on these results, the positive linear relationship between patience and current account balances is insensitive to the exact timing of current accounts.

Overall, we find evidence that the positive correlation between patience and long-run current account balances in the world economy is insensitive to whether the data on patience are taken from the GPS or from Wang et al. (2016) (see Tables 3–4). Based on specification (3), a one standard deviation[19] increase in Patience (GPS) is in the long run associated with a 1.5% of GDP larger (smaller) current account surplus (deficit). According to specification (8), a one standard deviation[20] increase in Patience (Wang et al. 2016) is in the long run associated with a 0.9% of GDP larger (smaller) current account surplus (deficit). Based on the Bayesian Model Averaging method (Figs. 1–2), this result is not prone to model uncertainty.

All in all, we conclude that Hypothesis 1, "There is a positive relationship between patience and long-run current account balances", holds true the in the world economy.

[16] By external imbalances we refer to both current account imbalances and the distribution of net foreign asset positions.
[17] Based on the scatter plot in Figure A10 in the Appendix B, Nigeria (NGA) seems to be an outlier. However, for example, our results on patience in specifications (7)-(8) are not sensitive to whether Nigeria is included. This robustness results from controlling for fuel exports or the determinants selected by the information criteria.
[18] Note that when other control variables are included, the sign of fuel exports changes.
[19] In this sample (n=47), the standard deviation of Patience (GPS) is 0.417.
[20] In this sample (n=32), the standard deviation of Patience (Wang et al. 2016) is 0.145.

Table 4
Determinants of current account balances, 1984–2015.

	(4)	(5)	(6)	(7)	(8)
Patience (Wang et al. 2016)	0.063	0.140***	0.100**	0.082***	0.064***
	(0.058)	(0.033)	(0.037)	(0.018)	(0.019)
Macroeconomic factors					
Fuel exports			0.065**	−0.069***	−0.054**
			(0.032)	(0.024)	(0.025)
GDP per capita				0.022***	0.014**
				(0.004)	(0.005)
Government budget balance				0.309**	0.483***
				(0.112)	(0.136)
Trade openness				0.042**	0.051***
				(0.017)	(0.014)
Institutional factors					
Financial development					0.013
					(0.013)
Democratic accountability				−0.021***	−0.020***
				(0.005)	(0.006)
Law and order				−0.022***	−0.015*
				(0.004)	(0.007)
Demographic factors					
Old dependency ratio					0.243*
					(0.121)
Child dependency ratio					0.152*
					(0.074)
Initial net foreign asset position					0.024*
					(0.014)
Constant	−0.040	−0.095***	−0.073***	0.088***	−0.022
	(0.040)	(0.021)	(0.024)	(0.029)	(0.059)
R^2	0.102	0.367	0.270	0.837	0.888
IC Rank				1	1
# Countries	35	34	35	32	32

Notes: The dependent variable is the average current account balance (ratio to GDP) during the 1984–2015 period. Heteroscedasticity-robust standard errors are in parentheses. In specification (5), Nigeria was excluded. Specification (7) was selected by the Bayesian ranking criterion. Specification (8) was selected by the Akaike ranking criterion. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels. The data on patience are taken from Wang et al. (2016).

4.2. Patience and the external wealth of nations

For Hypothesis 2 to consistently hold true throughout our step-by-step testing procedure, we should obtain a statistically significant positive coefficient for Patience in Eq. (9), a statistically significant positive coefficient for cumulative current account balances in Eq. (10) and a statistically significant positive coefficient for Patience in Eq. (11).

4.2.1. Cumulative current accounts and net foreign assets positions

In Section 4.1, we found robust evidence for the positive linear relationship between long-run current account balances and patience. However, current accounts are not our primary interest. We are more interested in the external wealth of nations. Consequently, in this section, we analyze whether cumulative current accounts track net foreign asset positions.

In Table 5, we present the results from estimating Eq. (10) for those countries for which we have comprehensive data on current accounts and data on patience from either the GPS or Wang et al. (2016). We find that there is a quadratic relationship between cumulative current account balances over the 1985–2014 period and net foreign asset positions at the end of 2014 (see also Fig. A11 in the Appendix B).[21] Overall, we find support for Auxiliary Hypothesis 2A because in a statistical sense, cumulative current accounts explain over 65% of the variation in net foreign asset positions.

4.2.2. Patience and net foreign assets positions

In Section 4.1, we examined the relationship between current accounts and patience, and in Section 4.2.1, we examined the relationship between net foreign asset positions and cumulative current accounts. In this section, we test the direct effect of patience on net foreign asset positions (Hypothesis 2).

[21] If, for some reason, one wishes to exclude Nicaragua (NIC), the quadratic term remains statistically significant in specification (9), but becomes statistically insignificant in specification (11).

Table 5
Current accounts and net foreign asset positions, 1985–2014.

	(9)	(10)	(11)
Cumulative current account	0.380***		0.329***
	(0.050)		(0.050)
Cumulative current account^2	0.040***		0.039***
	(0.011)		(0.008)
Initial net foreign asset position		0.691***	0.303*
		(0.180)	(0.158)
Constant	−0.125	0.062	−0.048
	(0.045)	(0.079)	(0.055)
R^2	0.655	0.310	0.701
# Countries	60	60	60

Notes: The dependent variable is the net foreign asset position (ratio to GDP) at the end of 2014. Heteroscedasticity-robust standard errors are in parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

In Figs. 3–4, we utilize the Bayesian Model Averaging (BMA) method to evaluate the relationship between net foreign asset positions and patience. In other words, the dependent variable is the net foreign asset position (ratio to GDP) at the end of 2014. The set of control variables is derived from the current account literature and is identical to the one in Section 4.1. The high inclusion probability of patience (0.600) means that it significantly explains the cross-country variation in net foreign asset positions once the potential control variables have been taken into account (Fig. 3). Again, the posterior density of patience is centered on the positive side (Fig. 4). This means that countries inhabited by patient individuals tend to have a positive net foreign asset position, whereas impatient populations tend to have a negative NFA position.

In Table 6, we present the results from estimating Eq. (11) for those countries for which we have comprehensive data for the 1984–2014 period.[22] Based on economic theory, the balance of payments and our estimations in Sections 4.1 and 4.2.1, we would expect a positive correlation between net foreign asset positions and patience.[23] Specifications (12)-(15) differ from specifications (16)-(17) with respect to the data source for patience. In specifications (12)-(15), data on patience are taken from the GPS and in specifications (16)-(17) from Wang et al. (2016).

When the data on patience are taken from the GPS, we find that there is a positive linear relationship between net foreign asset positions and patience (specification (12)). This result is not driven by an outlier (see Fig. A12 in the Appendix B). Based on the BIC, patience should be included in the statistical model (specification (13)). However, as the AIC prefers to include GDP per capita in the statistical model, it tends either to exclude Patience (GPS) from the model or to recommend a specification in which the statistical significance of Patience is low (see specification (14)). Again, this is because the correlation between Patience (GPS) and GDP per capita is as high as 0.79 in this particular sample (see Table A3 in the Appendix B). As already mentioned, we follow the growth literature by considering that deep determinants such as preferences affect economic outcomes via proximate determinants. In other words, patience is a more fundamental cause affecting external balances than GDP per capita. Consequently, we apply the AIC to the set of explanatory variables from which GDP per capita is excluded. We find that the first 398 specifications include patience, specification (15) being the one with the lowest AIC value. In specification (15), the p-value of Patience (GPS) is 0.051. Based on specifications (1) and (9), a one standard deviation increase in Patience (GPS) is, via the cumulative current account balance, associated with a 0.229 larger net foreign asset position (ratio to GDP).[24] This is comparable to specification (12), which predicts that a one standard deviation increase in Patience (GPS) is associated with a 0.213 larger net foreign asset position (ratio to GDP).

When the data on patience are taken from Wang et al. (2016), we find that there is a quadratic relationship between net foreign asset positions and patience (see Fig. A13 in the Appendix B and specification (16)). This is not surprising, as the relationship between cumulative current account balances and net foreign asset positions turned out to be quadratic in Section 4.2.1. However, when the number of countries decreases to 32 and we control for other variables, the quadratic term becomes statistically insignificant.[25] Based on both the BIC and AIC, patience should be included in the statistical model, even if all other typical determinants of current accounts are controlled for (specification (17)). Based on specifications (5) and (9), a one standard deviation increase in Patience (Wang et al. 2016) is, via cumulative current account balance, associated with a 0.297 larger net foreign asset position (ratio to GDP).[26] This is fairly comparable to specification (16), which predicts that at

[22] See Table A8 in the Appendix B for a full display of control variables. See Table A9 in the Appendix B for the results when the rule on current account coverage was not followed. The results are identical.

[23] As the relationship between cumulative current account balances and net foreign asset positions turned out to be quadratic in Section 4.2.1, the relationship between patience and net foreign asset positions could also be quadratic.

[24] Calculated as follows: [0.395 (the standard deviation of Patience (GPS) in the global country panel) · 0.048 (the coefficient of Patience in specification (1)) · 30 (the number of years in the 1985–2014 period) · 0.380 (the coefficient of Cumulative current account in specification (9))] + [$(0.395 \cdot 0.048 \cdot 30)^2$ · 0.040 (the coefficient of Cumulative current account^2 in specification (9))] = 0.229.

[25] When we apply the BIC or AIC to select statistical models, we include all countries for which we have at least 16 annual observations on every explanatory variable within the 1984–2015 period. Hence, the number of countries decreases from 35 in specification (16) to 32 in specification (17).

[26] Calculated as follows: [0.173 (the standard deviation of Patience (Wang et al. 2016) in the global country panel) · 0.140 (the coefficient of Patience in specification (5)) · 30 (the number of years in the 1985–2014 period) · 0.380 (the coefficient of Cumulative current account in specification (9))] + [$(0.173 \cdot 0.140 \cdot 30)^2$ · 0.040 (the coefficient of Cumulative current account^2 in specification (9))] = 0.297.

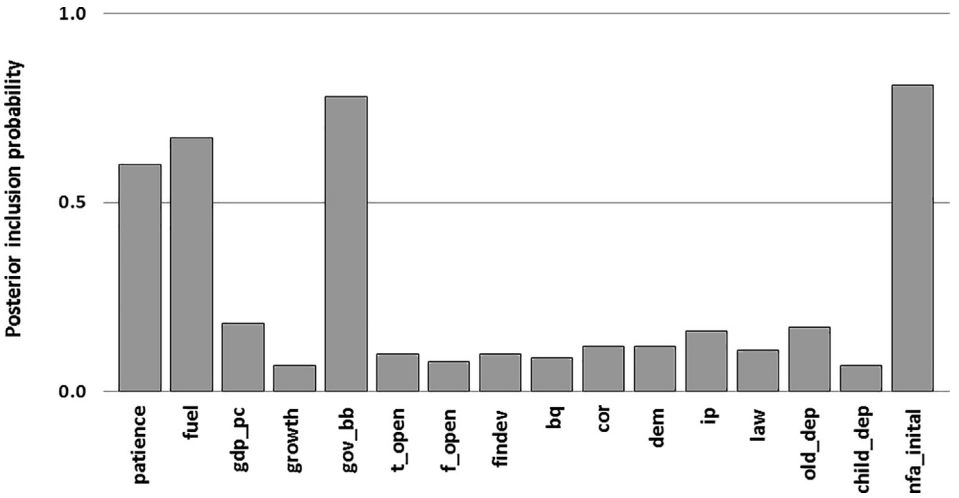

Fig. 3. Inclusion probabilities for each of the explanatory variable of NFA position in 2014, 47 countries in 1984–2014. The data on patience are taken from the GPS.

the median value of Patience (Wang et al. 2016), a one standard deviation increase in Patience is associated with a 0.397 larger net foreign asset position (ratio to GDP).[27]

Overall, we find evidence that the positive correlation between patience and net foreign asset positions in the world economy is largely insensitive to whether the data on patience are taken from the GPS or from Wang et al. (2016) (see Tables 6 and A9). Based on the consistent results throughout the step-by-step testing procedure, we conclude that the dispersion of external wealth of nations is explained, among other factors, by cross-country variation in economic preferences. Countries inhabited by patient individuals tend to have a positive net foreign asset position, whereas countries inhabited by impatient individuals tend to have a negative net foreign asset position. Based on the Bayesian Model Averaging method (Figs. 3–4), this result is not prone to model uncertainty and it is in line with experimental individual-level studies that show that patience is positively related to saving (Sutter et al., 2013; Falk et al., 2018) and negatively related to indebtedness (Meier and Sprenger, 2010).

All in all, we conclude that Hypothesis 2, "There is a positive relationship between patience and net foreign asset positions", holds true.

4.3. Is time preference a more fundamental determinant than economic development for external imbalances?

As already mentioned, distinguishing the effect of patience on external balances from the effect of GDP per capita is econometrically challenging. When the data on patience are taken from the GPS, the Bayesian Model Averaging (BMA) method indicates that the inclusion probabilities of patience are much higher than those of GDP per capita (see Figs. 1 and 3). When the data on patience are taken from Wang et al. (2016), the p-values of patience are at least as high as those of GDP per capita in the specifications selected by the BIC and AIC information criterion (see specifications (7)-(8) in Table 4 and specification (17) in Table A8 in the Appendix B). Hence, we conclude that in a statistical sense the association between patience and external imbalances is at least as strong as the one between GDP per capita and external imbalances.

According to economic theory, differences in time preferences are via autarky interest rates linked to external imbalances. On the contrary, from a theoretical perspective the relationship between differences in income levels and external imbalances is less clear. If one would assume that all countries share the same technological level, differences in income levels would reflect differences in capital intensity which under some assumptions would result in differences in the marginal product of capital. In addition to a closer connection to economic theory, it is also reasonable to assume that economic preferences lie deeper than economic development. Becker et al. (2018) utilize the GPS data and show that differences in preferences between populations are significantly increasing in the length of time elapsed since the ancestors of the respective groups drifted away from each other. In other words, ancient origins explain a large fraction of the global variation in economic preferences. Using different data on patience, Galor and Özak (2016) provide evidence for the historical agricultural origins of time preference. Consequently, it is reasonable to consider time preference as a deep determinant which

[27] Calculated as follows: {[-4.059 (the coefficient of Patience (Wang et al. 2016) in specification (16)) · (0.65 (the median value of Patience in the global country panel) + 0.5 · 0.173 (the standard deviation of Patience))] + [4.887 (the coefficient of Patience^2 in specification (16)) · $(0.65 + 0.5 \cdot 0.173)^2$]} − {[−4.059 · (0.65–0.5 · 0.173)] + [4.887 · $(0.65 - 0.5 \cdot 0.173)^2$]} = 0.397.

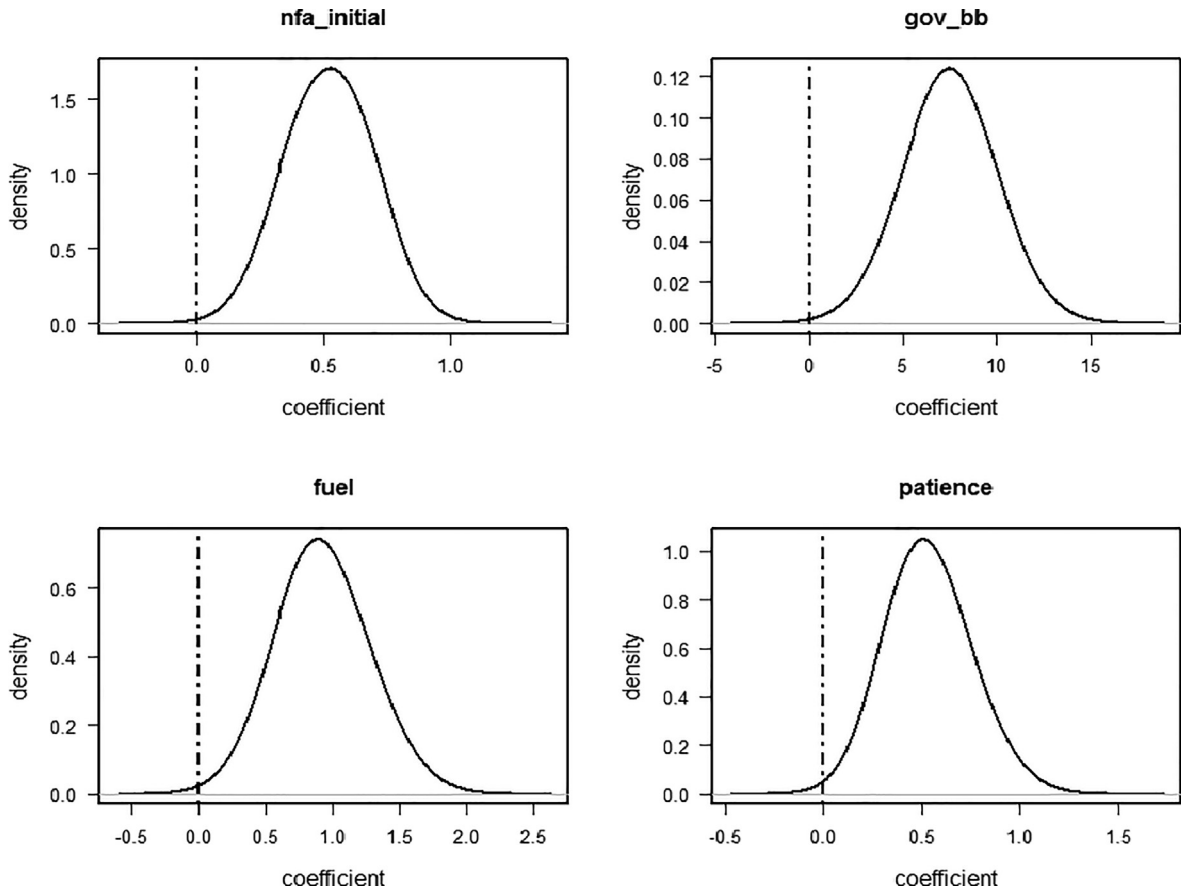

Fig. 4. Posterior densities for the most important explanatory variables of NFA position in 2014, 47 countries in 1984–2014. The data on patience are taken from the GPS.

affects external balances via proximate determinants such as GDP per capita. Based on this reasoning, we conclude that patience is a more fundamental cause behind external imbalances than GDP per capita.

5. Concluding remarks

Standard economic theory proposes that if two countries with different time preference factors integrate, the country with less patient individuals becomes a net debtor, while the country with more patient individuals becomes a net creditor. However, due to the lack of a global dataset on economic preferences, this proposition has not been empirically tested before our paper. We utilize the first two large-scale international surveys on economic preferences and an extensive global dataset to test the proposition. We find consistent evidence that the pattern of the global current account imbalances is explained, among other factors, by cross-country variation in economic preferences. Countries inhabited by patient individuals (e.g., Switzerland and the Netherlands) have a tendency to run current account surpluses, whereas countries inhabited by impatient individuals have a tendency to run current account deficits.

The main reason why current accounts matter is that they track net foreign asset positions. We find consistent evidence that the dispersion of external wealth of nations is explained, among other factors, by cross-country variation in economic preferences. Countries inhabited by patient individuals tend to have a positive net foreign asset position, whereas countries inhabited by impatient individuals tend to have a negative net foreign asset position. While the existing current account literature concentrates on proximate macroeconomic determinants, this paper's extension of inferences from deep determinants (i.e., preferences) to the distribution of external wealth of nations (i.e., net foreign asset positions) makes a unique contribution to the literature.

Proximate macroeconomic determinants of current accounts are endogenous to changes in current accounts. If we were to assume that preferences are stable and largely exogenous, this would lend support to a causal interpretation of the results. However, since Irving Fisher (1930, Chapter 4), time preference has been considered endogenous. Furthermore, Falk et al.

Table 6
Determinants of net foreign asset positions.

	(12)	(13)	(14)	(15)	(16)	(17)
Patience (GPS)	0.540***	0.372**	0.257	0.477*		
	(0.159)	(0.165)	(0.276)	(0.237)		
Patience					−4.059***	1.573***
(Wang et al. 2016)					(1.067)	(0.358)
Patience^2					4.887***	
(Wang et al. 2016)					(1.149)	
Selected by		BIC	AIC	AIC		AIC, BIC
Full set of control variables		Yes	Yes	No		Yes
Excluded control variables				GDP per capita		
R^2	0.146	0.621	0.700	0.669	0.390	0.847
IC Rank		1	2	1[a]		1
# Countries	54	47	47	47	35	32

Notes: The dependent variable is the net foreign asset position (ratio to GDP) at the end of 2014. Heteroscedasticity-robust standard errors are in parentheses. BIC refers to the Bayesian Information Criterion and AIC to the Akaike Information Criterion. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels. In specifications (12)-(15), the data on patience are taken from the Global Preferences Survey (GPS). In specifications (16)-(17), the data on patience are taken from Wang et al. (2016).

[a] Specification (15): Due to the high correlation between GDP per capita and Patience (GPS), GDP per capita was excluded from the set of explanatory variables.

(2018) and Wang et al. (2016) provide evidence that at the aggregate level, patience is strongly related to cultural and geographic conditions. Hence, although aggregate choice profiles and corresponding estimates of discount parameters are stable over time (Meier and Sprenger, 2015), it might be a fallacy to consider time preferences exogenous. To be on the safe side, we consider all our results to be novel correlations. As the time preference factor is a deep determinant of both external balances and economic development, distinguishing the effect of time preferences on external balances from the effect of GDP per capita on external balances is econometrically challenging. We hope that our findings will give rise to further contributions on this matter.

What do our results imply? Our findings suggest that the pattern of global current account imbalances as well as the distribution of external wealth of nations might be surprisingly persistent and less influenced by policy makers. This is because contrary to the previous understanding, these outcomes are partly determined by cross-country variation in time preferences, which cannot be manipulated by policy makers. As our findings also hold true for the EMU-12 countries, they suggest that when assessing a country's eligibility to join the EMU, similarities in time preferences across countries should be considered along with the Maastricht convergence criteria. Whether financial integration among countries with heterogeneous time preferences results in unsustainable divergence in external positions is an open question and calls for further efforts in both theory and empirics. More specifically, whether the positive relationship between patience and current accounts is driven by savings or investments and whether it results from the government, households or corporate sector needs to be addressed in the future.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Additional tables

See Table A1 and A2.

Table A1
Data sources and variable descriptions.

Variable	Description	Frequency	Source[a]
Current account balance	WDI: Current account balance (BoP, current US$) WDI: Current account balance (ratio to GDP) (global country panel) WEO: Current account balance (U.S. dollars)	Annual	WDI, WEO (United Arab E., Belgium until 2001)
Net foreign asset position / Initial net foreign asset position	'NFAY' as a ratio / 'NFAY' in 1984 as a ratio	Annual	EWNII
GDP	GDP (current US$)	Annual	WDI
Patience (GPS)	Difference to world mean in standard deviation of patience	Time-invariant	GPS
Patience (Wang et al. 2016)	Share of participants choosing the 'wait' option	Time-invariant	Wang et al. 2016
Fuel exports	Fuel exports (share of merchandise exports)	Annual	WDI
GDP per capita	GDP per capita (constant 2010 US$) in tens of thousands of dollars	Annual	WDI
GDP per capita growth	Percent change in GDP per capita (constant 2010 US$)	Annual	WDI
Government budget balance	Government budget balance (ratio to GDP) WDI: Net lending (+) / net borrowing (−) WEO: General government net lending/borrowing (CMR, CHN, HTI, HKG, SAU)	Annual	WDI, WEO
Trade openness	Merchandise trade as a ratio to GDP	Annual	WDI
Financial openness	Chinn-Ito index (ka_open). The index measures financial account openness. Scaled between 0 and 1.	Annual	CI
Financial development	Domestic credit to private sector (ratio to GDP)	Annual	WDI / GFD
Bureaucracy quality	Scaled between 0 and 4. Higher values imply better institutional quality.	Annual	PRS
Corruption / Law and order / Democratic accountability	Scaled between 0 and 6. Higher values imply better institutional quality.	Annual	PRS
Investment profile	Scaled between 0 and 12. Higher values imply better institutional quality.	Annual	PRS
Old dependency ratio	Number of people aged 65 or more divided by the number of people aged 15–64	Annual	WDI
Child dependency ratio	Number of people aged 0–14 divided by the number of people aged 15–64	Annual	WDI

[a] CI: Financial openness index by Chinn and Ito <(http://web.pdx.edu/~ito/kaopen_2015.xls>; EWNII: External Wealth of Nations Mark II database by Lane and Milesi-Ferretti <https://www.imf.org/external/pubs/ft/wp/2006/data/update/wp0669.zip>; GFD: Global Financial Development Database; GPS: Global Preferences Survey; PRS: Political Risk Services' International Country Risk Guide (Table 3B); Wang et al. 2016: Wang, M., Rieger, M. O., Hens, T. 2016. How time preferences differ: Evidence from 53 countries. Journal of Economic Psychology 52, 115–135, Table 2 (working paper for France); WDI: World Development Indicators (World Bank); WEO: World Economic Outlook Database, October 2017 (International Monetary Fund).

Table A2
Listing of countries in different samples.

Country	Abbr.	GPS	Wang et al. 2016	$CA_{1984-2015}$	Control variables
Algeria	DZA	X			X
Angola	AGO		X	X	
Argentina	ARG	X	X	X	X
Australia	AUS	X	X	X	X
Austria	AUT	X	X	X	X
Azerbaijan	AZE		X		
Bangladesh	BGD	X		X	
Belgium	BEL		X		X
Bolivia	BOL	X		X	X
Botswana	BWA	X		X	X
Brazil	BRA	X		X	X
Cameroon	CMR	X		X	X
Canada	CAN	X	X	X	X
Chile	CHL	X	X	X	X
China	CHN	X	X	X	X
Colombia	COL	X	X	X	
Costa Rica	CRI	X		X	X
Croatia	HRV	X	X		
Czech Rep.	CZE	X	X		
Denmark	DNK		X	X	X
Egypt	EGY	X		X	X
Estonia	EST	X	X		

(continued on next page)

Table A2 (*continued*)

Country	Abbr.	GPS	Wang et al. 2016	$CA_{1984-2015}$	Control variables
Finland	FIN	X	X	X	X
France	FRA	X	X	X	X
Germany	DEU	X	X	X	X
Ghana	GHA	X		X	
Greece	GRC	X	X	X	X
Guatemala	GTM	X		X	X
Haiti	HTI	X			
Hong Kong	HKG		X		X
Hungary	HUN	X	X	X	X
India	IND	X	X	X	X
Indonesia	IDN	X		X	X
Iran	IRN	X			
Iraq	IRQ	X			
Ireland	IRL		X	X	X
Israel	ISR	X	X	X	X
Italy	ITA	X	X	X	X
Japan	JPN	X	X	X	X
Jordan	JOR	X		X	X
Kazakhstan	KAZ	X			
Kenya	KEN	X		X	X
Korea	KOR	X	X	X	X
Lebanon	LBN		X		X
Lithuania	LTU	X	X		
Malawi	MWI	X		X	
Malaysia	MYS		X	X	X
Mexico	MEX	X	X	X	X
Moldova	MDA	X	X		
Morocco	MAR	X		X	X
Netherlands	NLD	X	X	X	X
New Zealand	NLZ		X	X	X
Nicaragua	NIC	X		X	X
Nigeria	NGA	X	X	X	
Norway	NOR		X	X	X
Pakistan	PAK	X		X	X
Peru	PER	X		X	X
Philippines	PHL	X		X	X
Poland	POL	X	X	X	X
Portugal	PRT	X	X	X	X
Romania	ROU	X	X		
Russia	RUS	X	X		
Saudi Arabia	SAU	X		X	X
Slovenia	SVN		X		
South Africa	ZAF	X		X	X
Spain	ESP	X	X	X	X
Sri Lanka	LKA	X		X	X
Suriname	SUR	X		X	
Sweden	SWE	X	X	X	X
Switzerland	CHE	X	X	X	X
Tanzania	TZA	X	X		
Thailand	THA	X	X	X	X
Turkey	TUR	X	X	X	X
Uganda	UGA	X		X	X
Ukraine	UKR	X			
United Arab E	ARE	X		X	
UK	GBR	X	X	X	X
US	USA	X	X	X	X
Venezuela	VEN	X		X	X
Vietnam	VNM	X	X		
Zimbabwe	ZWE	X			
# Countries		70	49	60	56

Appendix B. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jimonfin.2021.102517.

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