

## **Threshold effect of globalization on democracy: The role of demography**

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### **Abstract**

The literature presents conflicting expectations about the effect of globalization on democracy. One view expects globalization to enhance democracy, a second argues that globalization obstructs democracy; a third argues that it does not necessarily affect democracy. In this paper, we consider the threshold effect approach (Hansen, 1999) to reconcile these different results. We study the role of demography in the determination of the relationship between globalization and democracy. Based on a panel of 97 countries for the period 1993-2013, we use a threshold fixed effect panel model to estimate the effect of globalization on democracy, taking into account the demographic structure of the country. We find evidence of threshold effect of demographic characteristics on globalization and democracy relationship and prove that the impact of globalization on democracy is regime specific. Our results show a positive impact of globalization associated with 'late demographic transition regime' and a negative impact for countries with 'early demographic transition regime'.

**Keywords:** Globalization, Democracy, Demographic Characteristics, Threshold Effects, Fixed Effect Panel.

**JEL Classification:** C24, D72, F6, J1

## 1. Introduction

The connections between globalization and democracy are a classic question in international political economy. In fact, the idea that globalization promotes democracy goes back to Kant (1795). Literature argued that free trade and capital flows, by enhancing the efficiency of resource allocation, raise incomes and lead to the economic development that fosters demands for democracy (Schumpeter, 1950; Lipset, 1959; Hayek, 1960). Using historical data starting in 1870, Lopez-Cordova and Meissner (2005) find also a positive impact of trade openness on democratization.

While number of studies finds evidence of a positive impact of globalization on democracy, this conclusion is not unanimous and questions can be raised about methodology and the robustness of findings. We can point to China case where economic and financial opening doesn't promote the diffusion of democratic ideas. Moreover, econometric literature finds either no impact of trade openness on democracy or even a negative impact (Bussmann, 2001; Li and Reuveny, 2003; Rigobon and Rodrik, 2004; Rudra, 2005). In fact, globalization influenced differently the speed of development, it fasters growth in some countries and retards growth in others. In Europe and North America, the increasing of factor, product, and capital-market integration has allowed their GDP to increase at a faster rate than it would have otherwise. In the long run, all groups gained from the market integration, but some groups gained more than others. In the short-to-medium run, some groups may have lost because of competition from other countries' imports (La Croix et al., 2002). Then, the pace of development influenced economic structure, urbanization, levels of literacy, mortality, opportunities for women, and other social and economic conditions that, in turn, may influence differently countries democratization process.

Recent literature tests a prediction that emerges from the model of Acemoglu and Robinson (2006), considering that the key democratizing forces associated with trade openness depend on each country's relative factor endowment. The objective is to show if relative factor abundance, in addition to influencing patterns of trade also conditions the political effects of trade (Doces and Magee, 2015; Ahlquist and Wibbels, 2012). In fact, Acemoglu and Robinson (2006) model of democracy is based on economic conflict between elites and citizens. The citizens constitute the large majority of the population in each country, thus in a democracy with one vote per person, the citizens are capable to enact the policies they favor. Generally, this involves larger transfers of wealth from high-income elites to the lower-income citizens. Elites prefer different policies, and the elites have better control over government policies in non-democracies than they do in democracies.

Doces and Magee (2015) examine Acemoglu and Robinson (2006) arguments, considering factor-based approach. They found that trade is positively associated with democracy among labor-abundant countries and a negative effect on democracy in capital-abundant countries. However, results are not robust, and evidence in support of their argument is relatively weak.

Under factor-based models, Ahlquist and Wibbels (2012), test also a forecast that arises from the model of Acemoglu and Robinson (2006) considering the openness of the global economy, as the aspect of globalization driving democracy and not the level of openness within the domestic economy. According to Ahlquist and Wibbels (2012), changes in the world trading system will have systematic impacts on regime dynamics. As world trade increases and diminishes, countries with similar labor endowments should experience similar regime pressure at the same time. Their conclusions cast doubt on the utility of factor-based models of democratization, despite their importance in driving renewed interest in the topic.

Acemoglu and Robinson (2006) approach appears to accord well with the 'Arab Spring', where in many countries across the Middle East and North Africa, the citizens gained *de facto*

political power that enforced democratic concessions from elites disinclined to give them. Then, oil producer countries don't experience a democratization process where labor intensive countries, Tunisia, Egypt, Yemen and Syria, know a citizens uprising.

However, countries democratization experiences are different. Although Arab spring countries began in roughly similar political conditions and initial conditions in term of factors endowment they move along three different paths after their regime change. The first one is the progressive and continuous democratic transition path in which Tunisia is engaged. In the second path, we find Egypt which known a back and forth between autocracy and more democratic rules. The third path results in the state collapse as in Libya and Yemen. It is then important to understand how democracies are established and to explain democratization process differences and to expect if it is possible to prevent collapse of new emerging democracies.

In the present paper, we consider countries initial conditions in term of demographic characteristics to explain democratization process. In fact, we consider that countries discriminations depend on each country initial escape from Malthusian constraints depends.<sup>1</sup> Then, countries which overlooked Malthusian constraints and with early and fast demographic transitions, by enhancing the efficiency of resource allocation raise incomes and lead to the economic development that fosters demands for democracy (Schumpeter, 1950; Lipset, 1959; Hayek, 1960), whereas countries with late demographic transitions or suffering yet of Malthusian constraints, suffering of famines and chronic undernutrition are unable to invest in children quality and human capital and then have inefficient resource allocation. Then, depending on demographic regime, globalization will influence differently the speed of development<sup>2</sup>, it fasters growth in the former countries and retards growth in later ones which may have lost because of competition from other countries' imports.<sup>3</sup>

Research on the impact of globalization on democracy has neglected demographic aspects which have been essentially developed independently with little or no crossovers. Globalization-democracy and demography-democracy relationships respectively have lived separately, but one obvious link is that demography might be affecting democracy through action on globalization. By combining different strands of literature, this paper aims to disentangle the relationship between globalization, democracy, and demography. We will challenge not only the view that globalization impact the transition to democratic politics but we maintain that there is another major societal phenomenon that plays at least as important role in democratization and particularly on globalization democracy nexus. It is the demographic transition, a phenomenon that has largely been neglected in previous research.

The standard argument about globalization and democracy is that increased openness raises per capita incomes and thus contributes to democratization. We agree with this story,

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<sup>1</sup>During the Malthusian epoch, technological progress permitted an increase in the size of the population, while population size affected the rate of technological progress. The size of the population determined the supply of, and demands for, ideas. It also influenced the diffusion of ideas, the degree of specialization in the production process that stimulated 'learning by doing', and then the level of international trade further fostered technological progress. At the same time, the rate of technological progress and its effect on the resource constraint, enabled population growth. For a discussion of Malthusian theory, see Galor and Weil (1999, 2000); Galor (2005).

<sup>2</sup>Helpman and Krugman (1985) argue that, in recent years, population has influenced globalization via two channels: by influencing relative factor endowments and by influencing the national distribution of global income.

<sup>3</sup>Voigtländer and Voth (2006) study why industrialization occurred much earlier in some parts of the world than in others and capture that one of the key features of the British Industrial Revolution is fertility limitation which vkskdis responsible for higher per capita incomes, and these in turn increase industrialization probabilities. They found that England's (and Europe's) chances of sustained growth were greater principally because the demographic regime.

but we further test the proposition that the key democratizing forces associated with trade openness depend on each country's demographic conditions and basically on each country initial escape from Malthusian constraints depends. To explain countries discrimination, the 'Unified Growth Theory' claims that development becomes inevitable once technological change starts back in prehistoric times, and human capital is being accumulated until a critical mass that allows the economy to take off from Malthusian stagnation to a modern growth. The rise in the demand for human capital in the second phase of industrialization induced the formation of human capital, and led to a substitution, by parents, between the quality and quantity of children, triggering the onset of the demographic transition regime (Galor and Weil, 2000; Galor and Moav, 2002). It is important to note that even if the broad outlines of the demographic transition are similar in countries around the world, nevertheless, the pace and timing of the transition have varied considerably between countries leading to divergence in age structure between the countries of the West and most of the rest of world during the demographic transition.

The present study tries to contribute to the literature on the relationship between globalization, democracy, and demography. For example, Welander et al. (2015) study the interaction effect between globalization and the quality of democracy on child health, and describe how the relationship between globalization and child health is affected by a country's quality of its democratic institutions.<sup>4</sup> However, to our knowledge, our paper is the first study of the role of demographic aspect in the relationship between globalization and democracy.

To study the impact of globalization on democracy based on countries demographic transition characteristics, we use the threshold methodology of Hansen (1999). This model determines the demographic thresholds through changes in the estimated relationship between globalization and democracy in a regression framework. Our results, obtained from a panel data of 97 countries between 1993 and 2013, confirm the existence of two regimes of demographic transition: 'late demographic transition regime' and 'early demographic transition regime', and that countries specific characteristic in each regime determine the impact of globalization on democracy.

The remainder of the paper is organized as follows; Section 2 describes the data and the empirical model to be used, Section 3 discusses our econometric results, Section 4 gives a supporting evidence of the obtained results, and Section 5 summarizes our findings and gives some concluding remarks.

## **2. Data and empirical model**

### **2.1 Variable definition and data**

The first democratization wave in the world began in 1974 with the fall of southern European military dictatorships which paved the way for successful democratization process in this region (Huntington, 1991). After Portugal, Spain and Greece, the democratization wave extended to Latin America, Asia, Central Europe and Africa. This last wave of democratization happened in different phases. After the first phase which begun with south Europe countries and some Latin American countries, the second phase of this wave occurred after the fall of the Berlin wall and the collapse of Soviet Union in 1989, several countries abandoned communism and joined the ranks of democratic regime like Estonia, Latvia,

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<sup>4</sup>In line with previous research, they suggest that globalization positively associates with child health in developing countries. Likewise, democracy generally promotes good health in this context. Furthermore, the conditional marginal effect of globalization suggests that the quality of democracy in a country is crucial for the magnitude of the connection between globalization and child health.

Lithuania, Slovenia, Ukraine, Armenia, Moldavia and Russia. This second phase of democratization has deeply affected Latin America. Brazil, Chile, Guatemala, Nicaragua, Panama, Paraguay and Uruguay have experienced a democratization process in this phase. The Latin America transition is considered as the longest and the deepest wave of democratization in the history. But, it was in Africa where this third phase of third democratization wave has the deepest impact. Several African countries acceded to democratic regime in 2000<sup>8</sup> such as Ghana, Kenya, Sierra Leone and Lesotho. A second group of African countries involved later in a democratization process such as Mali, Senegal, and Niger. Other additional African countries acceded later to democratic regime: Gabon, Ivory Coast, Republic Democratic of Congo, Liberia, Jamaica and Zimbabwe. Finally, the Arab spring happened in 2010: Tunisia, Egypt, Libya, Syria and Yemen, which experienced differently a democratization process.

Our paper tries to analyze these experiences by studying the relationship between globalization, democracy, and demography. For this, we use a large panel data set covering 97 countries between 1993 and 2013. We consider this long period to capture the most important countries democratization experiences. In addition, panel estimation allows us to exploit the time-series dimension of the data and control for possible endogeneity and omitted variables pertaining to cross-sectional estimation. In addition, the empirical method we use is designed for balanced panels, so we were constrained to restrict our sample to the subset of 97 countries for which data are observables from 1993 to 2013.

For each country of our sample, we have information on the level of democracy, trade openness and others variables that influence democracy. Our data are collected from various sources. To measure the level of democracy we use the data from the Polity IV database. We adopt 'Polity value' indicator as measure of the level of democracy which combines ratings of democratic freedoms and autocratic tendencies in each country into a net polity rating that ranges from -10 to 10, with higher numbers indicating that the country is closer to pure democracy.

Trade openness and GDP per capita are collected from the CNUCED database. We measure trade openness as imports plus exports divided by GDP. The level of GDP per capita accounts for Lipset's (1959) modernization argument that economic prosperity increases the likelihood of democracy (see also Epstein et al., 2006). In addition, we include in the model a set of explanatory variables which are the usual variables used in the literature as determinants of democracy. We refer to World Development Indicators (WDI) dataset to have data on the percent of population living in urban areas and the percent of the population that is female. The literature suggests a positive relationship between these demographic factors and democracy as they facilitate the organization of workers and produce other effects that prove to be beneficial to the democratization process (Rueschemeyer et al., 1992).

Education is also recognized among the main determinants of democracy. Education variable is measured by the average years of total schooling and collected from Barro-Lee Dataset. We also introduce in our model the female average years of total schooling; Empirical literature highlights in fact the positive effect of female education on democracy. Barro (2015) argue that countries' long-run positions are positively associated with higher female relative to male school attainment for persons aged 15 and over. A reasonable interpretation is that an expansion in female relative to male attainment signals an improvement more generally in political and social arrangements.

To take into account the role of demographic factors, we introduce median age, fertility, mortality and life expectancy variables which are collected from United Nation Database. Studies claim in fact that these demographic factors influence the level of democracy and affect the democratization process (see Rueschemeyer et al., 1992).

Table 1 lists the variables used in our paper, their definitions, and their sources.

**Table 1. Variables definition and source**

Variable	Definition	Source
Polity	Polity scale ranges from -10 (strongly autocratic) to +10 (strongly democratic)	Polity IV dataset
Trade openness	Exports + imports as a share of GDP	CnuCED database
GDP per capita	Real GDP per capita in constant 2005 US \$	CnuCED database
Urban population	Percent of population living in urban areas	WDI
Female	Percent of population that is female	WDI
Education	Average years of total schooling	Barro- Lee dataset
Female average schooling	Female average years of total schooling	Barro-Lee dataset
Median age	Age that divides the population in two parts of equal size	United Nation database
Mortality	Mortality rate, infant (per 1,000 live births)	United Nation database
Fertility	Fertility rate, total (births per woman)	United Nation database
Life expectancy	Life expectancy at birth, total (years)	United Nation database

## 2.2 The model

Our model considers the existence of threshold effects in the relationship between trade openness and democracy. For this, we use a panel threshold model, where the threshold variable is a demographic characteristic of the country. This threshold methodology was initially debated in the econometrics literature by Davies (1977, 1987) and further developed by Andrews and Ploberger (1994) and finally by Hansen (1996, 1999). However, there are a few papers on the analysis of threshold effects in panel data models.

In our specification, the globalization-democracy relationship is captured by a panel threshold model given below:

$$D_{it} = \mu_i + \beta'X_{it} + \theta_1 G_{it} I(d_{it} \leq \gamma) + \theta_2 G_{it} I(d_{it} > \gamma) + \varepsilon_{it} \quad (1)$$

Where  $D_{it}$  is the level of democracy in the country  $i$  for the period  $t$ ,  $G_{it}$  represents globalization which is measured by trade openness,  $d_{it}$  is a threshold variable which is an exogenous measure of the demographic characteristic of the country,  $X_{it}$  is the vector of the control variables known to affect democracy,  $\mu_i$  synthesizes the country specific fixed effects and  $\varepsilon_{it}$  is the term of error for each observation and is assumed to be independent and identically distributed (iid) with mean zero and finite variance  $\sigma^2$ .  $I(\cdot)$  is an indicator function which represents the regime defined by the threshold variable  $d_{it}$  and the threshold level  $\gamma$ . In fact, the key feature of the democracy model described in equation (1) is that it allows for distinct regimes. Once the threshold has been estimated from the data, demographic structure

( $d_{it}$ ) determines which of the possible regimes a particular country belongs to, depending on whether this variable is smaller or larger than the estimated threshold. Evidence of a threshold effect of demography on the relation between globalization and democracy would be associated with a difference in the effect of globalization on democracy above and below the critical value of demography, where  $\gamma$  identifies the break-point value of demographic characteristic.

Model (1) is estimated by ordinary least squares (OLS) and following the estimation procedure of Hansen (1999) in which two steps are needed. First, the optimal threshold must be estimated. The least squares estimator of  $\gamma$  is obtained by minimizing the sum of the residue squares ( $\hat{\gamma} = \arg \min_{\gamma} S(\gamma)$  where  $S(\gamma) = \hat{e}(\gamma)' \hat{e}(\gamma)$ ). After achieving the estimation of model 1, we test the significance of the threshold in order to confirm the existence of such threshold. This can be done by testing the null hypothesis  $H_0: \theta_1 = \theta_2$ . Rejection of the null hypothesis confirms the existence of a threshold effect of demography on the relationship between democracy and globalization. However, the nonlinear character of the model (1) requires the recourse to bootstrap method in order to simulate the asymptotic distribution of the likelihood ratio test.<sup>5</sup> Hansen (1996) demonstrates that this procedure leads to p-values which are asymptotically valid. When these p-values are below the conventional critical levels of significance, the null hypothesis of no threshold effect is automatically rejected.

Note finally that, model (1) has a single threshold but, in some applications there may be multiple thresholds. In the case of a double threshold model, we test for the presence of double thresholds against single threshold. For a triple threshold model the hypothesis of existence of triple thresholds against two is tested.<sup>6</sup>

### 3. Empirical results

In this section, we report the results from our examination of the empirical relationship between globalization and democracy. We investigate how the demographic transition shapes the relationship between globalization and democracy. To our knowledge, this is the first empirical study which highlights a statistically significant relationship between globalization and democracy based on countries demographic transition. As a benchmark, we estimate the econometric model specified in equation (1) without taking into account the possibility of thresholds.<sup>7</sup>

In this first stage of the analysis, we consider median age as a measure of demographic transition to estimate equation (1) using the threshold estimation technique. Literature proposes various demographic measures; mortality, life expectancy, fertility and median age. The median age is a particularly important variable in what follows. Median age is a straightforward tool to indicate to which extent a country has progressed through its demographic transition. This is not only because it reflects the extent of progress through the demographic transition, and the degree to which women are released from frequent childbearing, but also because a society's age structure is viewed as having direct implications for the chances of democracy in itself.

Note that, the validity of the estimation of our model is assessed by applying a set of tests. In order to check the relevance of the non-observed individual effects, the Hausman test was performed on our whole sample. This test<sup>8</sup> concludes in favor of fixed effect panel

<sup>5</sup>See Hansen (1996) for more details about the technique.

<sup>6</sup>For example, the double threshold model takes the form :  

$$D_{it} = \mu_i + \beta' X_{it} + \theta_1 G_{it} I(d_{it} \leq \gamma_1) + \theta_2 G_{it} I(\gamma_1 < d_{it} \leq \gamma_2) + \theta_3 G_{it} I(d_{it} > \gamma_2) + \varepsilon_{it}$$

<sup>7</sup>The benchmark model is a fixed panel model.

<sup>8</sup>See results in Appendix A.

estimation, which is in our data superior to the random effect model and has a higher probability of generating consistent and efficient estimates. In another hand, to determine the number of thresholds, model (1) was estimated by least square allowing for (sequentially) zero, one, two, and three thresholds. In fact, as mentioned in 2.2, our model can be a single, a double or a triple thresholds model. The test statistics  $F_1$ ,  $F_2$  and  $F_3$ , along with their bootstrap p-values<sup>9</sup> gives evidence that there is a single threshold in the regression relationship between globalization and democracy. We find that the test for a single threshold is significant with 5 percent level of significance. But the test for a double and a third threshold model is not statistically significant. The optimal single threshold estimator ( $\hat{\gamma}$ ), which is the least squares estimator of  $\gamma$ , is equal to 16.957 with significant F statistics. Consequently, this confirms the real existence of the threshold effect for our sample and the non linearity of the impact of globalization on democracy at the optimal threshold. For the remainder of our analysis we work with this single threshold model.

Table 2 presents the results from the estimation of model (1). The first column shows the results for the benchmark, whereas column two presents the results taking the possibility of a single threshold effect. As we can see, when thresholds are ignored (column (1)), we are unable to identify any relationship between globalization and democracy. The coefficient of trade openness is not significant. This falls within the theoretical debate on the link between the globalization of trade and democracy which is far from settled (see for example, Milner and Mukherjee, 2009).

Looking at the results of estimating a single threshold model (column (2)), we find a significant threshold effect of median age and identify two separate globalization/democracy regimes; an ‘early demographic transition regime’ with median age more than 16.957 and a ‘late demographic transition regime’ with median age less than 16.957. The estimated impact of globalization on democracy is different in the two regimes; the coefficient of trade openness is negative and statistically significant at the 1 percent level for regime 1 and positive and significant at 5 percent level for regime 2. In line with previous research, our results prove that globalization positively impact democracy when it is associated with mature countries. Likewise, mature population structure promotes democracy in this context. However, if the country prematurely opens its frontiers while the population is not yet mature, globalization will be harmful to democracy.

These results confirm that the demographic structure of a country is crucial for the magnitude of the connection between globalization and democracy. It highlights the existence of threshold effect of globalization on democracy depending on each country demographic transition stage. In the ‘early demographic transition regime’ countries, the estimate indicates an increase in the polity value by about 0.0064 due to an increase in trade openness of 1 point. Then, in this country group, globalization enhances democracy. The coefficient associated to trade openness in the regime with median age below the optimal threshold, is however, negative indicating that in the ‘late demographic transition regime’ countries, an increase in trade openness will decrease democracy level by 0.0033.

In fact, for the first group, globalization is conducive to economic development and then economic development fosters democracy. The proposition that economic development fosters democracy has been advanced by Lipset (1959).<sup>10</sup> Lipset’s modernization theory argues that a country that achieved an average income level is better prepared to establish a middle class which is by nature a political force of moderation. In fact, if the poor are forced by necessity to fight for immediate gains, the middle class is concerned by economic stability and prospects of gradual improvement. Then, the middle class is more likely to work within

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<sup>9</sup>See Appendix B.

<sup>10</sup>Barro (1999) and Boix and Stokes (2003) found econometric evidence in support of Lipset’s proposition.



the political system than against him and is more receptive to pragmatic politicians than to radical and hateful ones. Eichengreen and Leblang (2008) and Lopez-Cordova and Meissner (2008) find also positive effect of national trade volume on democratization.

**Table 2. Effect of trade openness on democracy :  
Threshold effect of median\_age**

Dependent variable : Polity_value		
Model : (1) without threshold effect		
: (2) with threshold effect		
	(1)	(2)
Threshold level		16.957**
Log (gdppc)	1.228*** (0.344)	1.410*** (0.338)
Urban_pop	0.0968*** (0.0216)	0.0930*** (0.0212)
Female	-0.116 (0.0905)	-0.129 (0.0888)
Education	-1.117** (0.493)	-0.965** (0.484)
Fem_av_schooling	1.433*** (0.445)	1.269*** (0.437)
Median_age	-0.179*** (0.0514)	-0.216*** (0.0506)
<i>Trade openness I(thresh ≤ γ)</i>		-0.0336*** (0.00530)
<i>Trade openness I(thresh &gt; γ)</i>		0.00644** (0.00328)
Trade openness	0.00328 (0.00333)	
Constant	-2.480 (4.758)	-2.173 (4.666)
Observations	2,037	2,037
Number of countries	97	97
Test for threshold effect (p-value)		0,04
F-Statistics (p-value)	0,000	0,000

Standard errors in brackets

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

However, the second group (regime 1), starting later it demographic transition, has high fertility and then low qualified labor factors as parents invest more in children quantities than in children qualities. These countries are less competitors and trade globalization influences differently the speed of development because of countries inefficiency of resources allocation.

Minority and privileged elite will then sustain autocracy. This inversed relation is also reported in the literature by Li and Reuveny (2003) and Rigobón and Rodrik (2004).<sup>11</sup>

As for the remaining variables, we find similar results for both models with expected signs with literature. The most important variables that enhance democracy in our model are female average year of schooling, GDP per capita, and urban population. They have significant and positive impact on democracy. Education and median age have negative and significant impact on democracy. Finally, female doesn't have any significant effect on democracy. GDP per Capita and urban population positive impact is an additional supporting evidence of the modernization theory (Lipset, 1959). Barro (1999) provided also an empirical confirmation of the Lipset hypothesis in a cross-country panel, using the Freedom-House measure of political rights. However, these results have been challenged by Acemoglu et al. (2005, 2008), who argue that GDP per Capita do not have statistically significant influences on democracy.

Female education has positive impact on democracy, which is evocative of Tocqueville (1835), that extended educational opportunity for females goes along with a social structure, that is generally more participatory and, hence, more open to democracy (Barro, 1999). Haffoudhi et al. (2015) argue that, in addition to population structure and globalization, women economic participation has an important impact on democratization process. Wyndow et al. (2013) show that improvements in female empowerment were associated with democratic development, with female education and female labor force participation having a significant positive and causal effect on these movements. Democracy is more expected to occur in countries with a history of educating girls and possibly a longer experience of the social and economic conditions that have followed this investment.

Concerning education, our results show a negative effect of education on democracy. One explanation of this is that an increase in the average years of schooling could be driven by an arise in the education attained by minority elite, which might not boost a democratic regime. In fact, in societies where the distribution of education is greatly unequal, the educated elite is more expected to perpetuate in power because a mass of low or uneducated individuals is easier to defeat, since they have less access to information and, thus, will be less critical of the abuse of power Castelló-Climent (2008).

The other main result of our analysis is the negative impact of median age on democracy, which implies that the youth cohort affects matters for the country democratization level. According to Urdal (2006), youth can destabilize politics. Weber (2013) notes also that in youthful countries, revolutions occur and replace authoritarians with other authoritarians. In addition, Kim and Sciubba (2015) also found that a higher youth ratio significantly increases the likelihood of irregular removal of leaders in a state. Youth tend to have more radical views, participate more in protests, and both experience and express more discontent than other age groups in society (Braungart and Braungart, 1986; Campante and Chor, 2012). Moreover, problems like government type, level of development, or historical period are magnified in countries where the youth cohort is particularly large, and chances of destabilization there are even higher (Urdal, 2006).

#### **4. Supporting evidence**

In this section we explore several robustness checks to determine if there is more empirical support for our results using alternative specifications of the model. We investigate a range of

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<sup>11</sup>Li and Reuveny (2003) reported an inverse relationship between trade openness and democracy but do not consider a number of important econometric specification problems. Rigobón and Rodrik (2004) studied the interplay between rule of law, openness, democracy and growth and found a negative relationship between trade openness and democracy.

other threshold variables including mortality, fertility and life expectancy that shed further light on the relationship between globalization, demography and democracy, studied in the previous section. In addition, we use a different measure of democracy which is Freedom-House measure to check the robustness of our findings. Table 3 and Table 4, give the results of these investigations.

**Table 3. Robustness check :  
Freedom\_House as a measure of democracy**

Dependent variable : Freedom_House		
Model : (1) without threshold effect		
: (2) with threshold effect		
	(1)	(2)
Threshold level		16.957*
Log (gdppc)	-0.208 (0.128)	-0.252** (0.127)
Urban_pop	-0.0330*** (0.00796)	-0.0321*** (0.00790)
Female	-0.100*** (0.0334)	-0.0973*** (0.0331)
Education	0.0243 (0.182)	-0.0127 (0.181)
Fem_av_schooling	0.00113 (0.164)	0.0414 (0.163)
Median_age	0.00897 (0.0190)	0.0180 (0.0189)
<i>Trade openness I(thresh ≤ γ)</i>		0.00401** (0.00198)
<i>Trade openness I(thresh &gt; γ)</i>		-0.00570*** (0.00123)
Trade openness	-0.00493*** (0.00124)	
Constant	11.69*** (1.757)	11.62*** (1.743)
Observations	2,016	2,016
Number of countries	96	96
Test for threshold effect (p-value)		0,095
F-Statistics (p-value)	0,000	0,000
Standard errors in brackets		
*** p<0.01, ** p<0.05, * p<0.1		

In Table 3, we report the estimation results of model (1) when we use Freedom-House indicator as a measure of the level of democracy instead of the polity value used in section 3. This indicator takes values from 0 to 6 with higher values associated to autocratic regimes. We note that when thresholds are ignored, we identify positive relationship between globalization and democracy with a very low impact of trade openness on democracy compared to remaining variables (-0.00493).

Next, with Freedom-House as a measure of democracy, we estimate equation (1) using the threshold estimation technique. We find the same significant threshold level of median age that with polity measure. In addition, we identify also two separates globalization/democracy regimes: an ‘early demographic transition regime’ with median age more than 16.957 and a ‘late demographic transition regime’ with median age less than 16.957. Our analysis confirms the robustness of our finding. In fact, the existence of threshold effect of globalization on democracy depending on each country demographic transition stage is confirmed. The results suggest that in the ‘early demographic transition regime’ a one point increase in trade openness will enhance democracy level by 0.0057. However, in the ‘late demographic transition regime’ a one point increase in trade openness will decrease democracy level by 0.004.

Regarding the remaining variables, we find globally similar results for both models. In fact, the most important variables that enhance democracy are GDP per capita, urban population and female. They have positive and significant impact on democracy. Education and median age doesn’t have, however, any significant effect on democracy.

Table 4 presents the results from the estimation of model (1), where column 1, 2 and 3 present the results taking the possibility of thresholds effects of fertility, mortality and life expectancy respectively.

As for life expectancy, the threshold regression involving life expectancy as an indicator of demographic transition (table 4 (3)) reports no evidence of any threshold effect of this indicator in the globalization and democracy relationship.

With fertility rate as a measure of demographic transition, we find a significant threshold level of fertility rate (Table 4 (2)) and identify two separates globalization and democracy regimes: an ‘early demographic transition regime’ with fertility rate low than 6.083 and a ‘late demographic transition regime’ with fertility rate more than 6.083. The point estimates from table 4 (2) suggest that in the ‘late demographic transition regime’ a one unit increase in trade openness will decrease democracy level by 0.0594 points. However, in the ‘early demographic transition regime’, an increase in trade openness doesn’t have a significant impact on democracy. Regarding the remaining variables we find the same results as in the benchmark model. In addition it is important to note that trade globalization has the lowest impact on democracy and that the female education remains the most important factor that may enhance country democracy level.

When we consider mortality rate as a measure of demographic transition (table 4 (1)), we find a significant threshold level of mortality. In addition, we identify two separates globalization and democracy regimes: an ‘early demographic transition regime’ with mortality low than 89.7 and a ‘late demographic transition regime’ with mortality more than 89.7. That is, a one unit increase in trade globalization will enhance democracy level by 0.0413 in the ‘late demographic transition regime’, and it doesn’t have a significant impact on democracy in the ‘early demographic transition regime’.

Specifically, ‘late demographic transition countries’ suffer of child malnutrition and ill health. This poor health in early childhood causes irreversible damage in terms of lower physical and mental health in adult life. In addition, early-life health is an important factor in the intergenerational transmission of education and economic status (Currie, 2009). In this group of countries, globalization, as suggested in the literature, represents a strong force that increases adult and child health (Owen and Wu, 2007; Bergh and Nilsson, 2010) through increasing income and better access to goods and services, including pharmaceuticals and vaccines. Good health is crucial for human and economic development; Several studies find significant and positive effects of health on productivity and earnings (Alderman et al., 2006; Maluccio et al., 2009; Thomas and Strauss, 1997) and then for the modernization process. Beside, mortality has a negative and significant impact on democracy.

**Table 4. Robustness check :  
Different measures of demography**

Dependent variable : Polity_value			
Threshold variables : (1) Mortality			
(2) Fertility			
(3) Life_expectancy			
	(1)	(2)	(3)
Threshold level	89.7*	6.083*	72.201
Log (gdppc)	-0.286 (0.316)	0.682** (0.306)	0.419 (0.326)
Urban_pop	0.0388* (0.0212)	0.0777*** (0.0221)	0.0809*** (0.0211)
Female	-0.0791 (0.0883)	-0.105 (0.0899)	-0.0742 (0.0898)
Education	-1.538*** (0.481)	-1.446*** (0.488)	-1.383*** (0.488)
Fem_av_schooling	1.360*** (0.430)	1.400*** (0.438)	1.399*** (0.438)
<i>Trade openness I(thresh ≤ γ)</i>	-0.00230 (0.00325)	0.00163 (0.00327)	0.00620* (0.00354)
<i>Trade openness I(thresh &gt; γ)</i>	0.0413*** (0.00699)	-0.0594*** (0.00880)	-0.00455 (0.00340)
Mortality	-0.0891*** (0.00804)		
Fertility		-0.291 (0.182)	
Life_expectancy			0.131*** (0.0257)
Constant	13.65*** (4.743)	1.604 (4.683)	-8.343* (4.786)
Observations	2,037	2,037	2,037
Number of countries	97	97	97
Test for threshold effect (p-value)	0,096	0,097	0,490
F-Statistics	0,000	0,000	0,000

Standard errors in brackets

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

In conclusion, we can say that globalization has generally a negative impact on democracy when we consider 'late demographic transition regime', except for the case of mortality as a demographic measure, where trade openness improves democracy. However, trade openness has a positive impact on democracy level in the 'early demographic transition countries'. This doesn't mean that these countries will make a political transition. In fact, trade openness has the least impact on democracy level compared to other variables, such as social ones. The most important variable that determines country democracy level remains women education. Haffoudhi et al. (2015) prove in this case, that women economic and political participation is among the most important determinants of democratization process.

Finally, we can conclude that our analysis confirm the robustness of our finding. In fact, the existence of threshold effect of globalization on democracy depending on each country demographic transition stage is confirmed when using different measures of democracy and demography.

## 5. Conclusion

This paper studies the relationship between globalization, democracy and demography by providing a theoretical and empirical investigation of the links between them. The empirical results conducted on a panel of 97 countries from 1993 to 2013, highlight the importance of the nonlinearity of the relationship between globalization and democracy based on a threshold effect of demography. Globally we find evidence of threshold effect of demographic characteristics on globalization and democracy relationship. When median age exceeds the threshold, globalization contributes to increase the level of democracy. However when median age is low, globalization seems to be harmful to democracy.

We tried to address our findings by using a range of different measures of democracy and demographic transition. Our results point in the same direction: positive impact of globalization on democracy associated with 'late demographic transition regime' and negative impact for countries with 'early demographic transition regime'.

In addition it is important to note that trade globalization has the lowest impact on democracy and that the female education remains the most important factor that may enhance country democracy level. This result remains robust considering different measure of demography and democracy. For future research, it would be useful to check the existence of threshold effect of demography on women empowerment and democracy nexus.

Several other extensions of our analysis would be also favorable; it is for example interesting to study the threshold effect of education on democracy. In another hand, trade openness measure of globalization doesn't take into account informal trade, which is substantial in some countries. It is then very important to consider the issue of informal trade when studying the relationship between globalization and democracy.

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## Appendix A: Hausman test

	(b)	(B)	Difference	S.E
Trade openness	0.0032846	0.0003066	0.002978	0.0012185
Log (gdppc)	1.228377	0.8296961	0.3986806	0.2108065
Urban_pop	0.096751	0.0277912	0.0689598	0.0135388
Female	-0.1162794	0.2442352	-0.3605146	0.0457964
Education	-1.11664	-0.9232059	-0.1934337	0.1768913
Fem_av_schooling	1.433406	1.397194	0.0362111	0.1616466
Median_age	-0.1785309	-0.0738162	-0.1047147	0.024329

b = consistent under Ho and Ha

B = inconsistent under Ha, efficient under Ho

Test: Ho: difference in coefficients not systematic

$\chi^2(7) = (b-B)'[(V_b - V_B)^{-1}](b-B)$

= 91.59

Prob>chi2 = 0.0000

## Appendix B : Tests for threshold effects

Test for single threshold	
F <sub>1</sub>	81.58
P-value	0.04
(10%, 5%, 1% critical values)	(66.761, 76.695, 101.927)
Test for double threshold	
F <sub>2</sub>	23.85
P-value	0.683
(10%, 5%, 1% critical values)	(64.706, 80.88, 110.286)
Test for triple threshold	
F <sub>3</sub>	19.99
P-value	0.646
(10%, 5%, 1% critical values)	(48.105, 59.235, 86.352)