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Social Capital and Economic Freedom

Trust, Social Capital and the Success of Economic Reforms for  
Growth Accelerations, Conditional on Political Regimes

Omiros Kouvas, Fabian ten Kate

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**Abstract**

Social capital, commonly defined as generalized trust, is proven to be one of the factors driving economic growth along with traditional forms of capital. In the long-run, the formulation of social capital depends on formal institutions. In the short-run however, it is a fairly static variable that we hypothesize might affect the effectiveness of economic reforms. Thus we argue that in high social capital environments, economic reforms might have an increased probability of triggering growth accelerations vis-à-vis low social capital environments. Furthermore, due to its influence on the efficiency of governance in democratic regimes, we hypothesize that there will be clear difference in the success of economic reforms in terms of growth accelerations. Hence, economic reforms undertaken by a democratic regime, will underperform in comparison to reforms by an autocratic regime in a low social capital environment, and outperform in high social capital environment. Focusing our attention on the determinants of growth acceleration episodes, a newly established line of research that takes into account the short-run volatility of growth rates, we find that social capital per se, contrary to our priors, turns out to have a negative effect on the outcomes of reforms. However, when the interaction with political regimes is introduced, we find a robust positive influence of social capital in democratic regimes, and a negative effect for autocratic regimes.

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*Keywords:* Trust; Social Capital; Economic Freedom; Growth; Political Regimes;

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**1. Introduction**

“Trust is an important lubricant of a social system”  
(Arrow 1974)

During the past decades there has been an ongoing turn of attention from the traditional forms of capital, human and physical, to the notion of social capital as an important determinant of economic growth. The notion of social capital was introduced initially by Coleman (1988) and is now commonly defined as generalized trust (Beugelsdijk and Maseland 2011). In a detailed definition, social capital is described as the willingness to trust others, often strangers, without expectation of immediate reciprocity (Whiteley 2000). The relationship between growth paths and trust has been examined by several studies suggesting a favorable effect of social capital on economic growth (Putnam 1993, Fukuyama 1995,

Knack and Keefer 1997, La Porta, et al. 1997, Glaeser, et al. 2000, Knack and Zak 2002, Francois 2002, Beugelsdijk and van Schaik 2005). The literature on social capital and trust, however, is not unambiguous with respect to its suggested sources, which include modernization, democracy (Delhay and Newton 2005) and the quality of formal institutions (La Porta, et al. 1997, Knack and Zak 2002), thus creating serious endogeneity issues. Along these lines Berggren and Jordahl (2006) try to explain the level of the prevailing social capital as a result of economic freedom.

In the long run it may arguably be the quality of formal institutions and economic freedom that enhance trust and reciprocity. In the short run, however, social capital is a significantly slow adjusting variable, as it is rooted in culture, an argument supported both by the literature (Greif and Tabetini 2010, Algan and Cahuc 2010) and the available data on trust<sup>1</sup>. This feature of social capital, irrespective of the existence of a three way relationship between formal institutions, economic freedom and social capital, allows us to examine the success of economic reforms, in terms of growth accelerations, based on the prevailing level of social capital. Hence we hypothesize that there is an increased probability of a growth acceleration taking place as a result of economic reforms when the prevailing level of social capital is high.

The idea that a nation's regime has an influence on its economic performance is an old one, yet it is still as relevant as it has ever been. Friedman (1962) already argued that economic freedom and political freedom reinforce one another, leading to more economic growth. The links through which political freedom may affect economic outcomes are diverse and mainly indirect. In addition, many of these effects counteract one another, implying that the theoretical effect of political freedom in most of the literature is ambiguous (Przeworski and Limongi 1993).

In light of the ambiguous outcomes of the literature with respect to political regimes and economic growth we argue that the performance of political regimes in terms of growth outcomes, is conditional on the prevailing level of social capital. Thus, we hypothesize the existence of distinct differences in responses linked to different political regimes, especially with respect to a low prevailing level of social capital. In such a low social capital environment, we expect a higher effectiveness of autocratic regimes due to the weaker link between the effectiveness of law enforcement and social capital, which is a staunch link in democratic societies. Thus in essence, we hypothesize a conditional influence of social capital on growth accelerations, in which democratic regimes are expected to underperform only in the presence of low social capital, thus rejecting the misconception that democratic regimes unconditionally underperform autocratic ones, as supported by a part of the empirical literature.

To conclude, this paper will be structured as follows. First, we review the theoretical links between social capital and growth and the ways it might affect the success of economic reforms. Furthermore, we will rationalize the link between the expected differences in performance of economic reforms conditional on political regimes and the connection to social capital, linking it to the literature with respect to political regimes and growth. Second, we will review the empirical literature with respect to growth, social capital and political regimes and rationalize the ambiguity of the results as a consequence of the interlinked relationship of political regimes and social capital, as motivated by our hypothesis. Third we will present our hypothesized model along with the results and a robustness analysis. Finally, we will conclude this paper with a discussion, in an effort to clarify and disentangle the linkages between growth accelerations, economic reforms, and the conditionality introduced by the relationship of social capital and political regimes.

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<sup>1</sup> According to the data on trust of the world value survey there exists a correlation over 0.9 across the last twenty years in each countries that there are available data. (World Values Survey Association 2009)

## 2. Theoretical Background

The theoretical literature with respect to social capital rationalizes its expected effect on economic development and growth through direct and indirect channels (Beugelsdijk and Maseland 2011). The direct channel through which social capital affects economic growth is related to the reduction of transaction costs (Gulati 1995, Barney and Hansen 1994, Dyer 1997). Simultaneously, high social capital is expected to improve a government's performance, thus creating an indirect link between social capital and growth (Boix and Posner 1998). The relevance of the indirect channel is highly dependent on the prevailing political regime. Along these lines we will analyze both channels, focusing on their relevance to success of economic reforms conditional on political regimes.

### 2.1. Social Capital and Growth

#### 2.1.1 *The Direct Effect of Social Capital on Economic Growth and the Relevance for Economic Freedom.*

Social capital by definition coincides with the notion of generalized trust prevailing in society. The interlinked nature of trust and economic behavior was brought to the spotlight of research during the early 1970's. Based on Arrow's (1974) views, although the identification of trust was not formalized, it was categorized as a positive externality affecting daily microeconomic behavior. Coleman's (1990) definition of trust was that one party relies on the behavior of another, having no control over the actions of the second party, building a trusting relationship and engaging in economic transactions with agents based on the principle of reciprocity. Hence, a high level of generalized trust, and thus social capital, improves economic outcomes by reducing transaction cost without the need of complex and costly mechanisms of enforcement (Beugelsdijk and Maseland 2011). Thus social capital effectively plays the role of informal institutions, reducing the need of high regulation and leading to more efficient outcomes.

### 2.2 Political Regimes, Social Capital and Economic Growth

Tavares and Wacziarg (2001) provide a comprehensive overview of the channels through which democracy may affect growth. The only truly direct link among these is the effect of government spending on growth, which Barro (1991) notes is generally negative. However, it is unclear whether the type of political regime has a significant effect on the size of government, as some authors argue in favour of this proposition (e.g. Olson 1982; Niskanen 1971), yet others disagree (Pommerehne and Schneider 1982).

The stability and quality of governance is also considered as an important factor, since many researchers have demonstrated the importance of stability for growth (Alesina, et al. 1992). Tavares and Wacziarg (2001) argue that transitions of power tend to be more peaceful in a democracy and that democracies are thus inherently more stable than autocracies, where this usually involves violence. In addition, corruption may be expected to have a negative effect on growth (Mauro 1995), and may be expected to be better kept in check in a democracy, since the incentives of politicians to clamp down on corruption should be bigger in a democracy.

Glaeser et al. (2006) argue that there is a strong relationship between democracy and education which may be expected to run both ways. On the one hand, democratically elected governments must cater to their constituencies, which may be expected to contain a large amount of poor voters. This in turn would lead to a demand for income redistribution, partially in the form of state funded education. Alternatively, they note, more educated

individuals also tend to have a stronger preference for democracy. In any event, a higher level of education in a democracy would lead to increases in human capital, which in turn positively affects growth (Mankiw, Romer and Weil 1992).

Hence, several mechanisms have been considered in the literature through which a democracy might be beneficial for growth. However, we argue that in general democracy per se without the presence of a high level of social capital will fail to produce positive spillover effects on growth. Thus, in the next section we will try to rationalize the existence of an indirect link through which social capital affects the efficiency of democratic governments.

### *2.2.1 The Indirect Effects of Social Capital Rationalizing Expected Differences in Political Regimes Performance.*

On a parallel path to its direct effects on growth, social capital affects the performance and efficiency of governance. Boix and Posner (1998) argue that along with the between-agent-cooperation, social capital enhances the performance of governments and formal institutions. A series of models can be utilized to rationalize this argument.

Firstly, a high level of social capital leads to rational voters that punish underperforming governments. Secondly, Boix and Posner (1998) argue that high social capital reduces the cost of rule compliance mechanisms and hence reduces the transaction costs between citizens and the government. In addition to the first argument, a rational electorate will have preferences that will, as they argue, enforce civic virtue, which is described as a shift from particularized interest to common interest. Finally an increased level of social capital will enhance bureaucratic efficiency by increasing both the abilities of bureaucrats to cooperate with each other and manage governmental institutions (Boix and Posner 1998).

These explanations however, are applicable mainly to democratic regimes. Hence the performance of a democratic government and the possibility of growth accelerations through economic reforms, are expected to be linked with the prevailing degree of social capital. On the contrary, this link between social capital and government performance is almost irrelevant in authoritarian regimes where the performance depends mostly on the choices of the elite in power. An alternative way to explain the same concept is that in democratic regimes the efficiency of law choice (civic virtue), enforcement (rule compliance) and regulation (bureaucratic efficiency) is correlated with the social capital prevailing in the society, as a result of the assumption that the government's choices are a reflection of the choices of the constituency. In an authoritarian regime on the other hand, this link is non-existing.

To conclude, we expect that the negative effect of low social capital on the possibility of triggering growth accelerations to be more likely under a democratic regime, both due to the effects of social capital on the quality of governance and through their interaction with education.

## **3. The Empirical Literature on Growth, the Turn to Growth Accelerations and Social Capital**

The empirical literature on the determinants of economic growth is vast and diverse. Many empirical studies are aimed at uncovering the fundamental drivers of differences in growth between countries. However, until recently empirical studies focused on cross country regressions (Kormendi and Meguire 1985, R. J. Barro 1991, 1996, Barro and Sala-i-Martin 1992), which have been intensively criticized for a) being fragile to small changes in the conditioning information set (Levine and Renelt 1992), b) having a limited ability to address causality (Durlauf, Johnson and Temple 2005) and c) underestimating the importance of the variability of growth rates across time (Hausmann, Pritchett and Rodrik 2005). In response to these shortages, a new line of research has been developed addressing the short-run volatility of growth, by focusing on growth accelerations. Hausmann et al. (2005) in their seminal

paper, defined growth accelerations as turning points in growth experience or, in detail, as instances of sustained rapid acceleration in economic growth. Following up, Jong-a-Pin and De Haan (2011), improved Hausmann et al.'s method for identifying growth acceleration focusing on improving the preciseness and realisticness of the identification of growth acceleration episodes. Along these lines, in this section we will focus our attention on the findings of the growth acceleration literature and subsequently on our indented contribution.

The growth accelerations literature, although promising, is still limited. In their influential paper Hausmann et al. (2005) were the first to introduce a specific filter to identify growth accelerations. Their findings are unsupportive of the hypothesis that growth acceleration are preceded, or accompanied, by major changes in economic policies or institutional arrangements. However they find a significant impact of political regime's change on the possibility of a growth acceleration episode. Co-aligned with Hausmann's findings, Jones and Olken (2005) find that the deaths of national leader have a significant effect, and additionally the growth experience is also conditional to the nature of the death cause, predictable or unpredictable. Timmer and de Vries (2009) examine the impact of productivity increases on growth accelerations and they find that within sector productivity increases matter, in contrast to reallocation between sectors; Doern and Nunnenkamp (2007) examine the impact of developing aid and found a significant effect. Finally, Jong-a-Pin and de Haan (2011) use an improved version of the filter of Hausmann and they find that economic liberalizations have a significant impact on the possibility of a growth acceleration episode. Additionally they find that a move towards more democracy decreases the chance of growth to be triggered.

In light of the growth accelerations literature, our intended contribution is twofold. First, we aim to examine the impact of social capital on the possibility of growth accelerations. Second, we introduce the conditional impact of regimes and social capital, both through reforms and explicitly on growth, in an effort to disentangle the effects of regimes which has been ambiguous in the literature. With respect to our first objective, although social capital's impact has been previously examined in cross section settings and found to have a significant correlation with growth, it has not yet been tested in the literature of growth accelerations. Additionally, despite the fact that both in the conventional growth literature and in the growth acceleration literature the effect of regimes has been examined, the results are ambiguous. Hence, by introducing the conditionality with social capital we are trying to clarify the effects of regimes to growth accelerations. To conclude, our indented contribution to the literature is a) the inclusion of social capital in the literature of growth accelerations and b) the diffusion of the effects of regimes on growth, either directly or through reforms, based on the conditionality introduced by social capital.

## 4. Empirical Analysis

### 4.1. Econometric Models

Based on the theoretical interrelation of social capital and growth, we argue that the expected effect of social capital through the direct channel will have an impact on the effectiveness of economic reforms, in terms of growth triggering capability. Thus we expect that if the prevailing level of social capital is high, the probability that a reform triggers economic growth will be increased. To test this hypothesis we use a logit regression model in a panel specification. The corresponding econometric model is:

$$GA_{i,t} = \beta_1 ER_{i,t} + \beta_2 ER_{i,t} SC_i + \beta_3 Trnd_t + \xi_i + \varepsilon_{i,t} \quad (1)$$

where the dependent variable is the incidents of growth accelerations ( $GA$ ) across time and countries. Furthermore, the explanatory variables are the incidents of economic reforms ( $ER$ ) and a variable representing the level of social capital ( $SC$ )<sup>2</sup>. Finally  $\xi_{i,t}$  is the country fixed effect and  $Trnd_t$  is a time trend control used in the literature. The model will be tested both defining all variables as dummies in order to have a clearer interpretation of the coefficients and sequentially in levels.

In the dummy specification, when social capital is low the social capital variable equals zero ( $SC=0$ ). Thus  $\beta_1$  represents the probability of an economic reform triggering a growth acceleration in a low social capital environment<sup>3</sup> and  $\beta_2$  the additional probability if the social capital is high. The expected signs of the coefficients are reported in table 1 in the end of the section along with the interpretations of the coefficients. The first model will be tested in a fixed effects panel. The  $SC$  variable as an independent term is omitted, due to lack of intra group variance, as  $SC$  is assumed to be constant over time. In a similar way, the model will be tested using the level of social capital.

Additionally to the direct influence of social capital, we expect a difference in performance of democratic and autocratic regimes through the indirect channels, as described above. Thus we expect a lower probability of economic reforms triggering a growth acceleration in democracies vis-à-vis autocracies, when social capital is low. Moreover, we expect that when social capital is high, the odds will be turned in favor of the democratic regime in terms of growth accelerations realized. The appropriate econometric model to test our hypothesis is the following:

$$\begin{aligned}
 GA_{i,t} = & \gamma_0 + \gamma_1 ER_{i,t} + \gamma_2 ER_{i,t} SC_{i,t} + \gamma_3 D_{i,t} + \gamma_4 SC_{i,t} D_{i,t} & (2) \\
 & + \gamma_5 ER_{i,t} D_{i,t} + \gamma_6 ER_{i,t} SC_{i,t} D_{i,t} \\
 & + \gamma_7 Trnd_t + \xi_i + \varepsilon_{i,t}
 \end{aligned}$$

Thus we effectively introduce a specification to test the conditionality enticed by political regimes and the interactions with the level of social capital. Similarly to the previous case the model is tested both in a dummy and a level specification. In the dummy specification democracy equals 1 in the presence a democratic regime and equals 0 in the presence of an autocratic regime. Thus the coefficient  $\gamma_1$  captures probability that in a low social capital environment with an autocratic regime a growth acceleration will be triggered by the an economic reform<sup>4</sup>,  $\gamma_2$  captures the additional probability when social capital is high and the regime is still an autocracy,  $\gamma_3$  plus  $\gamma_5$  captures the additional effect of a democratic regime in a low social capital environment in comparison with the autocratic low social capital. Finally  $\gamma_2$  plus  $\gamma_4$  plus  $\gamma_6$  captures the additional probability in a high social capital environment and democracy of an economic reform triggering growth. For methodological issues we included all the constitutive terms<sup>5</sup> with the exception of the independent term of  $SC$  which a we already explained is omitted due to lack of intra group variance in our fixed effects model. The coefficients of the constitutive terms included have the following interpretations. The coefficients  $\gamma_3$  and  $\gamma_4$  capture the probabilities of a growth acceleration incident to occur in a democracy with low and high social capital respectively, without the pre-occurrence of a reform.

Finally in order to use the levels specification we utilize a slightly different model. The rationalization is that the three-way interaction in level variables does not add any informa-

<sup>2</sup> For a detailed explanation of the data please refer to the Appendix.

<sup>3</sup> In practice due to the presence of the time trend  $\beta_1$  captures the additional probability and the actual effect is  $\beta_1 + \beta_3$ . However for simplicity we will refer to the effect without the coefficient of the time trend.

<sup>4</sup> As in model (1), due to the presence of the time trend  $\gamma_1$  captures the additional probability and the actual effect is  $\gamma_1 + \gamma_7$ . Similarly, for simplicity, we will refer to the effect without the coefficient of the time trend.

<sup>5</sup> See Brambor et al. (2006)

**Table 1** Expected Coefficient Signs

Dependent variable incidents of growth accelerations				
Fixed Effects Panel				
	[1]		[2]	
	$\beta_i$	Case	$\gamma_i$	Case
Econ Reform	>0	Low Social Capital and Economic Reform	>0	Low Social Capital Autocracy and Economic Reform
Econ Reform*Social Cap	>0	High Social Capital and Economic Reform	~0	High Social Capital Autocracy and Economic Reform
Democracy			<0	Low Social Capital Democracy independent of Reform
Democracy*Social Cap.			>0	High Social Capital Democracy independent of Reform
Econ Reform*Democ.			<0	Low Social Capital Democracy and Economic Reform
Econ Reform*Social Cap.*Democ.			>0	High Social Capital Democracy and Economic Reform

<sup>a</sup> Notes: Under case are the combinations of low and high social capital and democracy- autocracy.

<sup>b</sup> The reported expected signs refer to the additional effects in comparison with the base case of low social capital for the first model and low social capital and autocracy for the second

tion that cannot be inferred from the three two way interactions, on the contrary complicates the analysis. However note that in the dummy model omitting the three-way interaction will effectively exclude on case<sup>6</sup>. The model for the level specification is:

$$GA_{i,t} = \gamma_0 + \gamma_1 ER_{i,t} + \gamma_2 ER_{i,t} SC_i + \gamma_3 D_{i,t} + \gamma_4 SC_i D_{i,t} + \gamma_5 ER_{i,t} D_{i,t} + \gamma_6 Trnd_t + \xi_i + \varepsilon_{i,t} \quad (3)$$

The interpretations of the coefficients in level specification are more complicated and thus we will use a graphical analysis to illustrate the estimated marginal effects, following the methodology of Brambor et al. (2006). The rationale is very similar to the dummy specification, however interaction captures continuous effects as we increase the levels of each variable. Hence, graphing the effects gives a more clear and accurate picture. Finally in the last robustness section we will control for all the variables that have been found to have a significant impact in the literature of growth accelerations.

## 4.2 Estimation

The models, as specified in the previous section, are estimated sequentially. For the estimations we are using a logistic regression under fixed effects panel data specification. The dependent variable of economic reforms equals 1 for the first five years after a growth accelerations occurs and 0 otherwise. Initially, we estimate the models using the dummy specification. The motivation behind this is a twofold; a) the coefficients are readily interpretable and b) we create two distinct levels of social capital and democracy or autocracy, resulting to a clear interpretation of the outcomes. Subsequently we estimate the model using the levels of the two variables of interest, to give more flexibility to the model to incorporate more inter and intra country differences. The levels estimation is followed by a graphical analysis of the marginal effects. Following the previous estimation of Jong-a-Pin

<sup>6</sup> The case of reforms in high social capital democracies.

and de Haan (2011) we included a time trend variable to capture the trend and avoid spurious results, as the number of growth accelerations tends to decline with time.

#### 4.2.1 Dummy Variable Specification

The results of the estimated models are reported in table 2. The signs of the estimated coefficients in model (2) are the expected ones. However in the first simplified model, the interaction term, capturing the additional probability of a reform in a high social capital environment to trigger a growth acceleration, turns out to be significant and negative. This result contradicts our priors, as we hypothesized a positive effect of the social capital on the possibility of reforms to trigger a growth acceleration. Nonetheless, this result is rationalizable when the decomposition of the second model is taken into account. More specifically the effect of social capital turns out to be negative for autocratic regimes and positive for democratic. Hence the results of the first model should be interpreted with great caution as it represents the mixed effect, driven by the negative effect on autocracies, and as such the model is incomplete and difficult to interpret. In any case, contrary to the existing literature on social capital that finds an unconditional positive effect on growth, we find that the unconditional effect through reforms is negative<sup>7</sup>.

In line with the previous literature we find an increased likelihood of an economic reform triggering a growth acceleration episode. However, in this particular case the coefficient represents the pre-described probability only on a low social capital environment and the fact that the subsequent term is negative demonstrates that there is a significant difference between low and high social capital environments, we will come back to this effect when we analyze the full model.

The estimations of the full model specification, including the conditionality on regimes and social capital along with all the constitutive terms are reported in the second column of the table. The signs of the significant coefficients are in line with the hypothesized ones, furthermore this time the results are considerably more insightful. Initially, we can conclude that the occurrences of economic reforms have only a conditional effect on growth accelerations. A more detailed way to explain the same conclusion involves the stepwise addition of the coefficients of all significant terms that include the variable of economic reforms.

Innitially with respect to autocratic regimes the effect of economic reforms on growth acceleration is diminished as the level of social capital increases. As we can initially observe the effect of reforms on low social capital autocracies is significant and positive. On the contrary the effect of high social capital autocracies is insignificantly different than zero. This can be deduced from the fact the second coefficient is negative and similar magnitude with the first. Furthermore the difference between the effectiveness of reforms is significant and decreases as the level of social capital increases. The conditional results on the autocratic regimes are different from our theoretical hypothesis, as we expected the effect of social capital to be only detectable in democracies and not in autocracies. Ex-post the effect can be rationalized through divide and rule arguments, as the lower the level of social capital the more divided the society the easier to rule in an autocracy, we will come back to this during our discussion.

Turning our focus to the effect of democracies and social capital on growth, either directly or in combination with the occurrence of economic reforms, we derive the following conclusions. First, democracies per se are neither bad nor good for growth, at least that is demonstrated by the fact that the coefficient of democracy alone, representing the probability

<sup>7</sup> Although the comparison might be ill-suited as we are comparing direct with indirect effects. However in the Appendix we have included a version of the model in pooled panel where the level of social capital is included and social capital turn out to be insignificant.



**Table 2** Growth Acceleration Episodes, Regimes and Social Capital

Dependent variable incidents of Growth Accelerations						
Panel Fixed Effects – Dummies Specification						
	[1]			[2]		
	$\beta_i$	$\sigma_\beta$	Case <sup>b</sup>	$\gamma_i$	$\sigma_\beta$	Case <sup>b</sup>
Econ. Reform <sup>c</sup>	0.848***	(0.306)	ER=1, SC=0	1.798***	(0.412)	ER=1, SC=D=0
Econ. Reform*Social Cap.	-0.839*	(0.473)	ER=1, SC=1	-1.664***	(0.591)	ER=SC=1, D=0
Democracy <sup>d</sup>				-0.209	(0.438)	ER=SC=0, D=1
Democracy*Social Cap.				0.799*	(0.484)	ER=0, SC=D=1
Econ. Reform*Democracy				-2.667**	(0.865)	ER=D=1, SC=0
Econ. Reform*Social Cap.*Dem.				2.386***	(0.989)	ER=D=SC=1
Time Trend <sup>e</sup>	-0.039***	(0.007)		-0.040***	(0.007)	
Countries		51			50	
Observations		1744			1677	
Pseudo R <sup>2</sup>		-			-	

<sup>a</sup> Notes: The model is estimated using a fixed effects panel logistic regression with growth accelerations as a dependent variable. \* denotes significance at the 10 percent level. \*\* at the 5 percent level. \*\*\* at the 1 percent level.  $\beta$ 's are the coefficients and  $\sigma_\beta$  are the standard errors.

<sup>b</sup> Detailed explanations of the cases in table 1.

<sup>c</sup> Dummy variable taking value 1 for the 5 years after an economic liberalization took place, else 0.

<sup>d</sup> Social capital dummy 0 for low, 1 for how derived using the trust value of WVS.

<sup>e</sup> Dummy variable taking a value 1 for democratic regimes and 0 for autocratic.

<sup>f</sup> Time trend of growth acceleration as specified by De Haan and Jong-a-Pin (2011)

triggered by low social capital democracies in absence of reforms, is negative and insignificant and in the case of high social capital is positive and significant. Thus, we observe that indeed the data points to a non-linear relationship between democracy and growth, conditional on the level of social capital. Furthermore, we observe that economic reforms in low social capital democracies have a lower likelihood than the case of low social capital autocracies to trigger growth, as the coefficient is negative and significant. On the contrary, the coefficient of reforms on high social capital democracies is positive and significant pointing to the fact the effectiveness of reforms on high social democracies is higher than in the base case of low social capital autocracies. Thus given the results we observe that reforms in high social capital democracies are the most possible to trigger a growth acceleration, followed by low social capital autocracies. To put it another way democracy is only good for growth either directly or indirectly only conditional on the level of social capital. As such the effect of social capital is the distinctively different for democracies and autocracies.

To sum up, the estimated coefficients point to a conditional behavior of the efficiency of democracy and autocracy, in terms of triggering growth accelerations, both in the presence of economic reforms and otherwise. The results with respect to democracies are in line with our hypotheses, however the results for autocracies are somehow surprising albeit rationalizable.

#### 4.2.2 Level Specification

In this section the results of the estimation using the levels of the social capital and democracy are reported and explained. Given the fact that the interpretation of the coefficients of a level interaction model is cumbersome and sometimes might lead to misinterpretation, the presentation will consist of two parts. First, we will only report the

**Table 3** Growth Acceleration Episodes, Regimes and Social Capital

Dependent variable incidents of Growth Accelerations				
Panel Fixed Effects – Levels Specification				
	[1]		[2]	
	$\beta_i$	$\sigma_\beta$	$\gamma_i$	$\sigma_\beta$
Econ. Reform <sup>c</sup>	1.263***	(0.477)	1.216**	(0.501)
Econ. Reform*Social Cap. <sup>d</sup>	-2.930*	(1.586)	-2.521	(1.680)
Level of Democracy <sup>e</sup>			-0.093**	(0.045)
Level of Democracy*Social Cap.			0.447**	(0.192)
Econ. Reform*Level of Democracy			-0.066**	(0.032)
Time Trend <sup>e</sup>	-0.038***	(0.007)	-0.039***	(0.007)
Countries		51		50
Observations		1744		1694
Pseudo R <sup>2</sup>				

<sup>a</sup> Notes: The model is estimated using a fixed effects panel logistic regression with growth accelerations as a dependent variable. \* denotes significance at the 10 percent level. \*\* at the 5 percent level. \*\*\* at the 1 percent level.  $\beta$ 's are the coefficients and  $\sigma_\beta$  are the standard errors.

<sup>b</sup> Detailed explanations of the cases in table 1.

<sup>c</sup> Dummy variable taking value 1 for the 5 years after an economic liberalization took place, else 0.

<sup>d</sup> Social capital level using the trust value of WVS.

<sup>e</sup> Using the Polity index.

<sup>f</sup> Time trend of growth acceleration as specified by De Haan and Jong-a-Pin (2011)

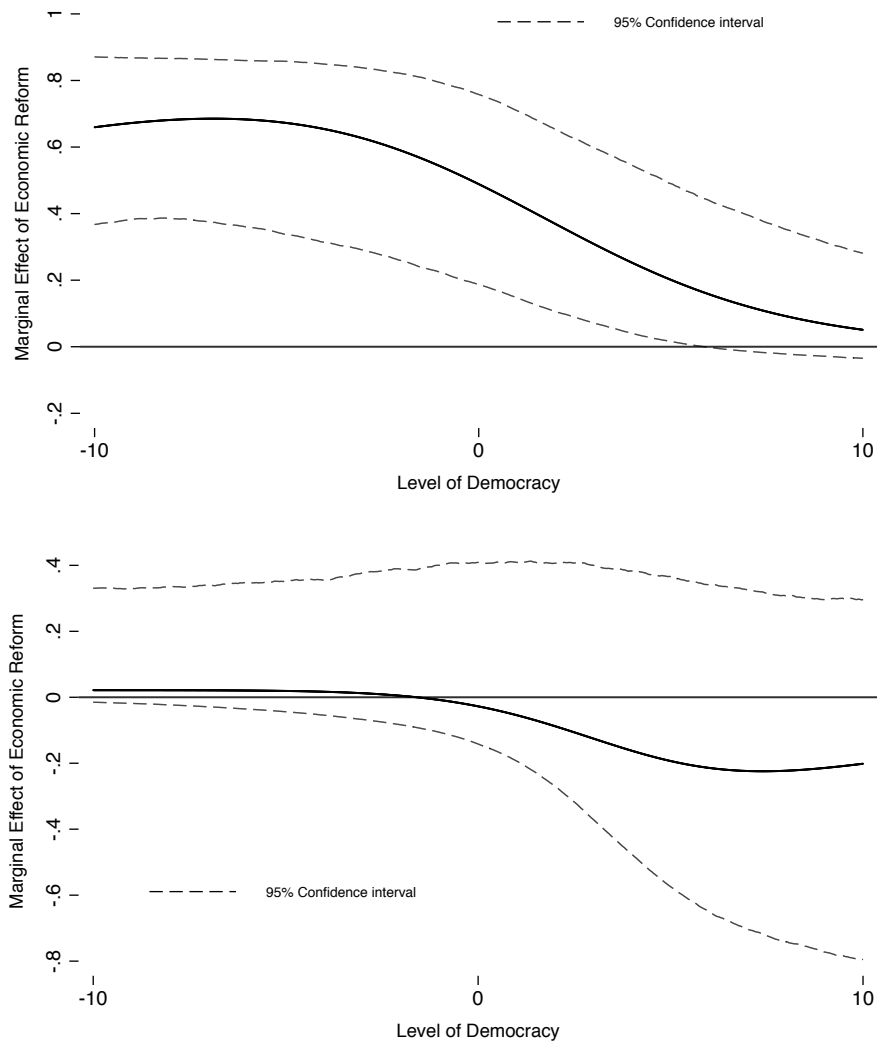
results and which variables turn out to be significant; and second, we will present a graphical analysis of the marginal effects for the second model focusing on the interaction terms and their implications. The results of the first model do not differ qualitatively from the dummy specification, economic reforms have generally a positive but conditional effect and social capital turns out have a significant impact which can be to a marginally negative effect for autocracies and a positive for democracies. The results are reported in table 3.

Again in both models we include a time trend to avoid spurious results<sup>8</sup>. Most of the terms and their interactions in the second model turn out to be significant. Contrary to our expectations we might conclude at a first glance that there is a negative influence of high social capital in comparison with low with respect to reforms, however the coefficients should be interpreted as additional effects and thus the graphical analysis that will follow will demonstrate the marginal effect of economic reforms on growth acceleration, both conditional on regimes and social capital. Furthermore, as it is readily observable on the results there is distinct difference of the possibility of triggering a growth acceleration of democracy as an autonomous term and its interaction with social capital, since both terms are highly significant and their coefficients are of opposite signs.

The first figure (fig. 1, a and b) graphs the conditional marginal possibility of economic reforms triggering an incident of growth acceleration as the level of democracy changes, from full autocracy (-10) to full democracy (10). The two sub-figures, graph the effect for a low and high social capital environment respectively. The solid line, represent how the marginal effect changes as we move from an autocratic to a democratic regime, for the case of low (fig. 1a) and high social capital (fig. 1b). The dotted line, represents a 95% confidence interval,

<sup>8</sup> Methodologically the inclusion of time trend can be termed wrong, as it entails the assumption that a deterministic trend exists. The existence of a deterministic trend would point to no growth acceleration occurring at a future point: a contradiction with reality. However, we are following a previous publication and include the time trend.

allowing us to observe when the marginal effect we are interested in is significant. It is clear from figure 1 that there is a significant positive marginal effect for autocracies that reforms will trigger growth, which declines as we move to high levels of democracy. The effect remains significant until we increase the level of democracy approximately over five. The result coincides with the findings of the previous literature, however in our case it represents

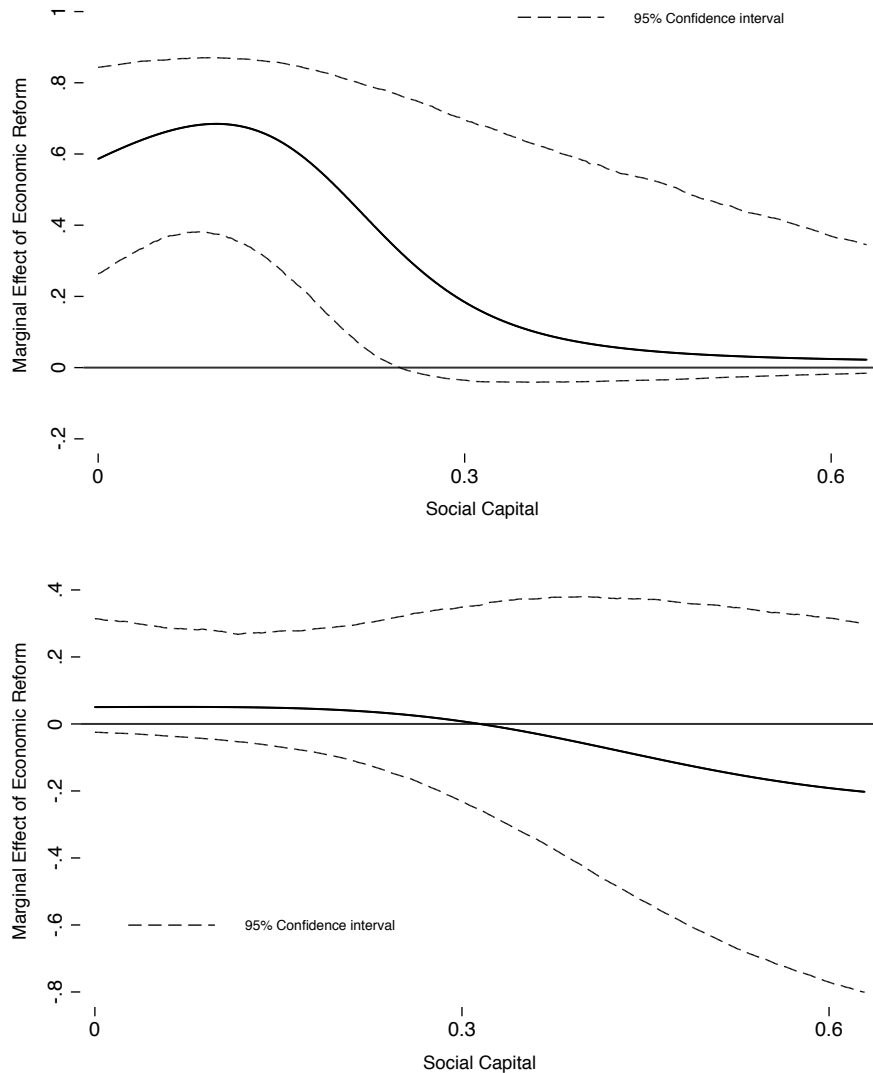


**Figure 1** Marginal effect of economic reforms on growth accelerations as the level of democracy changes for (a) low and (b) high social capital

only the case for low social capital. On the contrary in figure 1a we can observe that there is no significant effect when we make the same graph for a high social capital environment. To sum up, we observe that in the case of low social capital there is a distinction between the marginal effects generated by autocracies and democracies; a distinction that is non existing in high social capital environments.

In the next figure we graph the same marginal effect but this time for continuous changes in the level of social capital and a distinct change from autocracy to a democracy. Thus, in figure 2a we graph how the marginal effect changes as we change the level of social capital for an autocracy and in figure 2b for a democracy. The results of this graph are to some extent qualitatively different from the ones we previously had, as we observe that all the significance in terms of growth triggering with respect to reforms comes from low social

capital autocracies. It seems that high social capital has a negative effect on the growth acceleration of autocracies as triggered by economic reforms. We will elaborate more on this finding on the discussion. In figure 2b we observe that the marginal effect of reforms in triggering growth accelerations remains insignificant for democracies. Thus we again observe that there is a different response between autocracies and democracies, though from the combination of figures 1 and 2 the story becomes somewhat more complicated. The last part

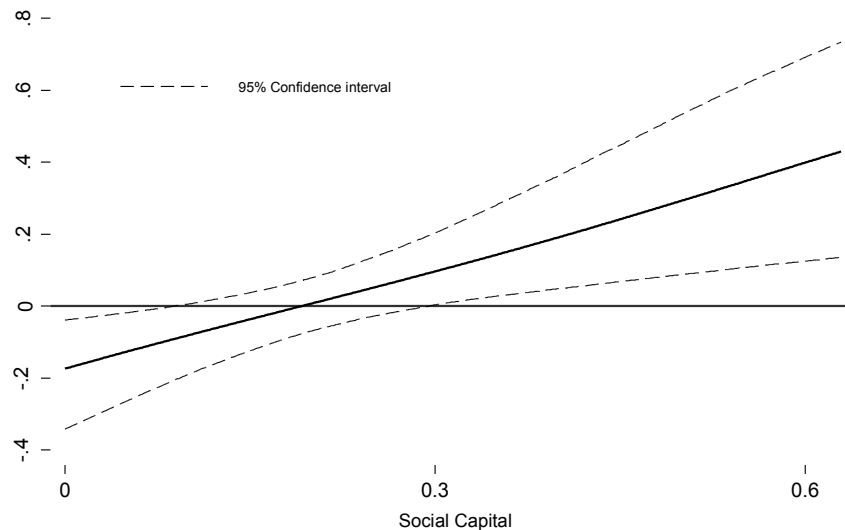


**Figure 2** Marginal effect of economic reforms on growth accelerations as the level of social capital changes for (a) autocratic regimes and (b) for democratic regimes

of the graphical analysis will be focused around the move from autocracy to democracy with respect to triggering growth, for a changing level of social capital.

The previous part of the analysis focused on graphing the effect of the three-way interaction term, or the combined effect of economic reform, social capital and regimes. Now we will turn our focus to the two-way interaction between regimes and social capital in terms of their effect on growth accelerations. Observing table 3 and the significance of the term gives as already an expectation of the importance of this interaction. In figure 3 we graph the marginal effect for a move from autocracy to democracy, for a different level of social capital.

In essence we graph the expected changes of the coefficient when we move from a negative score of democracy to a positive. Note that this graph depicts the marginal effect in the absence of economic reform. As we can observe, for low levels of social capital the marginal effect is negative and significant. Au contraire, it is positive and significant for high levels of social capital. Hence, as we move from an autocracy to a democracy, we observe that the effect on growth accelerations is negative for low values of social capital and positive for high ones.



**Figure 3** Marginal effect of a move from autocracy to democracy on growth accelerations as the level of social capital changes

## 5. Robustness Analysis

In order to confirm the robustness of our results, we will tested the sensitivity of our results with respect to changes in the specification of our models. In the first section we will estimate our basic model with the dummy specification with an alternative indicator for democracy. In addition, in the second section, we will test our basic model in levels with the addition of various alternative indicators, proven significant in the growth accelerations literature. In the last section then, we will specify two alternative time trends and analyze the effect of their inclusion in our model.

### 5.1 Sensitivity of the Dummy Model Specification

In addition to the sensitivity analysis of our model in levels in section 2, we will initially conduct a robustness analysis of our dummy specification model, in which we use an alternative measure of democracy. This measure of democracy is provided by Cheibub et al. (2010). It is important to note however, that this dummy variable equals 1 when the country qualifies as a democracy, yet it does not imply that the country is an autocracy when the dummy equals 0, making comparison to our initial results somewhat complicated. Having said that, we will refer to them as autocracies to avoid confusion. The results are reported in table 7, where the first model denotes the results of our initial dummy specification and the second model denotes the model with the inclusion of the alternative democracy dummy.

The only difference between the two models is that the democracy dummy on its own has become highly significant whereas the interaction between economic reform and democracy no longer is significant. In essence though, the interpretation of the results remains the same

as the democracy variable is a base case of the coefficient that loses significance. In addition we see that the interaction between democracy and social capital has become considerably stronger and more significant.

**Table 7** Sensitivity Analysis Dummy Specification Using an Alternative Measure of Democracy

Dependent variable incidents of Growth Accelerations					
Panel Fixed Effects – Dummies Specification					
	[1]		[2]		
	$\beta_i$	$\sigma_\beta$	$\gamma_i$	$\sigma_\beta$	Case <sup>b</sup>
Econ. Reform <sup>c</sup>	1.695***	(0.443)	1.089***	(0.393)	ER=1, SC=D=0
Econ. Reform*Social Cap.	-1.273	(1.075)	-0.489	(1.059)	ER=SC=1, D=0
Democracy <sup>d</sup>	-0.048	(0.315)	-1.505***	(0.395)	ER=SC=0, D=1
Democracy*Social Cap.	1.216**	(0.579)	3.463***	(0.692)	ER=0, SC=D=1
Econ. Reform*Democracy	-1.327**	(0.664)	-0.513	(0.836)	ER=D=1, SC=0
Econ. Reform*Social Cap.*Dem.	1.272	(1.350)	0.288	(1.446)	ER=D=SC=1
Time Trend <sup>e</sup>	-0.068***	(0.009)	-0.071***	(0.010)	
Countries	47		43		
Observations	1280		1161		
Pseudo R <sup>2</sup>	0.084		0.112		

<sup>a</sup> Notes: The model is estimated using a fixed effects panel logistic regression with growth accelerations as a dependent variable. \* denotes significance at the 10 percent level. \*\* at the 5 percent level. \*\*\* at the 1 percent level.  $\beta$ 's are the coefficients and  $\sigma_\beta$  are the standard errors.

<sup>b</sup> Detailed explanations of the cases in table 1.

<sup>c</sup> Dummy variable taking value 1 for the 5 years after an economic liberalization took place, else 0.

<sup>d</sup> Social capital dummy 0 for low, 1 for how derived using the trust value of WVS.

<sup>e</sup> Dummy variable taking a value 1 for democratic regimes and 0 for autocratic.

<sup>f</sup> Time trend of growth acceleration as specified by Jong-a-Pin and de Haan (2011)

A more detailed explanation is there exists a difference in performance between low and high social capital democracies, which is positive, i.e. a high social capital democracy has a higher probability of triggering a growth acceleration than a low social capital democracy as the coefficient of the interaction term democracy and social capital is positive and significant. In addition we still see that there is no difference in performance between low and high social capital autocracies as the coefficient is insignificant. Similarly, we may see a difference in performance between low social capital democracies and autocracies, which is negative, implying that in low social capital countries autocracies outperform democracies.

Most importantly, with our alternative democracy dummy we find that there is a positive difference between the performance of democracies and non-democracies in high social capital environments as the addition of the significant coefficients of the third and fourth term is positive. This last result was not observable in our initial specification, where we found the difference to be insignificantly different from zero.

We may thus conclude that our dummy specification is highly robust to the use of an alternative measure of democracy.

## 5.2 Sensitivity of the Level Model Specification

In this section, we follow the example of Jong-A-Pin and De Haan (2011) in order to establish the robustness of the results of the level specification of our model. The results of this analysis are reported in table 7.

In the first step, we add three dummy variables that are a measure of regime change. The first variable is based on the Polity IV dataset, in which a regime change is defined as a change of at least three points in the Polity score. The other two variables that were

**Table 7** Sensitivity Analysis

Dependent variable incidents of Growth Accelerations								
Panel Fixed Effects – Levels Specification								
	[1]		[2]		[3]		[4] <sup>b</sup>	
	$\beta$	$\sigma_\beta$	$\beta$	$\sigma_\beta$	$\beta$	$\sigma_\beta$	$\beta$	$\sigma_\beta$
Econ. Reform <sup>c</sup>	1.357***	(0.491)	1.350***	(0.492)	1.467***	(0.498)	1.081**	(0.531)
E Ref*Soc. Cap. <sup>d</sup>	-2.367	(2.357)	-2.434	(2.361)	-3.038	(2.390)	-1.891	(2.469)
Level of Dem. <sup>e</sup>	-0.111***	(0.042)	-0.130***	(0.043)	-0.132***	(0.043)	-0.141***	(0.049)
Dem.*S. Cap.	0.562***	(0.177)	0.587***	(4.550)	0.596***	(0.179)	0.654***	(0.198)
E Ref*S. Cap*Dem.	-0.192	(0.174)	-0.182	(0.174)	-0.160	(0.175)	-0.151	(0.178)
Time Trend	-0.067***	(0.009)	-0.068***	(0.009)	-0.066***	(0.009)	0.069***	(0.010)
Reg. Change			0.126	(0.353)	0.194	(0.358)	0.009	(0.421)
Reg. Ch. Pos.			-0.249	(0.453)	-0.288	(0.456)	-0.147	(0.515)
Reg. Ch. Neg.			-1.086**	(0.498)	-1.197**	(0.500)	-0.829	(0.542)
Death of P.L.					0.292	(0.612)	0.235	(0.608)
Ten. Death P.L.					-0.168**	(0.100)	-0.132	(0.099)
Civil War							0.620	(0.640)
War End							-0.132	(0.328)
Financial Lib.							0.208	(0.456)
Countries		45		45		45		42
Observations		1208		1208		1201		1113
Pseudo R <sup>2</sup>		0.085		0.091		0.100		0.099

<sup>a</sup> Notes: The model is estimated using a fixed effects panel logistic regression with growth accelerations as a dependent variable. \* denotes significance at the 10 percent level. \*\* at the 5 percent level. \*\*\* at the 1 percent level.  $\beta$ 's are the coefficients and  $\sigma_\beta$  are the standard errors.

<sup>b</sup> Detailed explanations of the cases in table 1.

<sup>c</sup> Dummy variable taking value 1 for the 5 years after an economic liberalization took place, else 0.

<sup>d</sup> Social capital level using the trust value of WVS.

<sup>e</sup> Using the Polity index.

<sup>f</sup> Time trend of growth acceleration as specified by De Haan and Jong-a-Pin (2011)

developed by Przeworski et al. (2000), measure respectively a change in a country's regime from autocracy to democracy and vice versa. Similar to the results of Jong-A-Pin and De Haan (2011), we find that a negative regime change is significant, yet the sign of the variable is reversed. This implies that a move to less democracy in our specification leads to a lower probability of a growth acceleration.

Next we add two variables that are related to the death of a country's political leader. The first variable is a dummy that equals 1 when the political leader has died and the second variable is the interaction of this term with the leader's tenure as in the paper of Jones and Olken (2005). While the first variable is insignificant, we do find that the interaction term is significant, implying that when a political leader who has been in power for a long time dies, this has a negative effect on the incidence of growth accelerations.

In the final step we add three more variables. The first is a dummy that equals 1 when a country is involved in a civil war, whereas the second is a dummy that equals 1 when this war has ended. The third is a measure of financial liberalization. The results show that with the addition of these last variables, none of the control variables are significant. As also noted by Jong-A-Ping and De Haan (2011), we find that the inclusion of the financial liberalization term reduces the significance of our economic reform dummy.

**Table 8** Sensitivity Analysis Alternative Time Trend

Dependent variable incidents of Growth Accelerations						
Panel Fixed Effects – Levels Specification						
	[1]		[2]		[3]	
	$\beta$	$\sigma_\beta$	$\beta$	$\sigma_\beta$	$\beta$	$\sigma_\beta$
Econ. Reform <sup>a</sup>	1.793***	(0.519)	1.079**	(0.489)	1.490***	(0.502)
E Ref*Soc. Cap. <sup>b</sup>	-4.560*	(2.560)	-1.783	(2.485)	-3.488	(2.512)
Level of Dem. <sup>c</sup>	-0.102***	(0.040)	-0.127***	(0.038)	-0.128***	(0.040)
Dem.*S. Cap.	0.535***	(0.173)	0.504***	(0.167)	0.594***	(0.174)
E Ref * Dem	-0.132*	(0.702)	-0.063	(0.066)	-0.096	(0.068)
E Ref*S. Cap*Dem.	0.280	(0.303)	0.065	(0.296)	0.182	(0.299)
Time Trend <sup>d</sup>	-0.069***	(0.009)				
Inv. Time Trend <sup>e</sup>			2.587***	(0.406)		
Log Time Trend <sup>f</sup>					-0.797***	(0.097)
Countries		45		45		45
Observations		1211		1211		1211
Pseudo R <sup>2</sup>		0.089		0.064		0.098

<sup>a</sup> Notes: The model is estimated using a fixed effects panel logistic regression with growth accelerations as a dependent variable. \* denotes significance at the 10 percent level. \*\* at the 5 percent level. \*\*\* at the 1 percent level.  $\beta$ 's are the coefficients and  $\sigma_\beta$  are the standard errors.

<sup>b</sup> Dummy variable taking value 1 for the 5 years after an economic liberalization took place, else 0.

<sup>c</sup> Social capital level using the trust value of WVS.

<sup>d</sup> Using the Polity index.

<sup>e</sup> Time trend of growth acceleration as specified by De Haan and Jong-a-Pin (2011)

<sup>f</sup> Inverse of the Time variable

<sup>g</sup> Natural logarithm of the Time variable

To conclude the most important observation, based on our robustness analysis, is that our variables of interest are all robust to the inclusion of alternative indicators. The only variable that loses any significance in the final specification is economic reform, due to its expected relationship to financial liberalization, however it still remains significant at a 5% level.

### 5.3 Sensitivity of the Time Trend

In this section we will consider the effects on our results of an alternative specification of the time trend in our model. The results may be observed in table 8, where the first section shows the initial specification of our model in levels whereas the other two utilize alternative time trend specifications.

Our initial time trend, as specified by De Haan and Jong-A-Pin (2011), is a simple linear time variable, which implies that at some point in the fairly near future our model would predict that growth accelerations no longer occur. This may very well be a reasonable assumption, since we may expect growth accelerations to become less and less likely the more developed the world becomes. Nonetheless, and based on our earlier critique we specify



two alternative time trends that allow for a higher probability of a growth acceleration occurring in the future.

The first alternative measure is simply the inverse of the initial time trend, which has as a main advantage that it converges towards zero while it will never touch it. We observe a positive and very significant coefficient on this time trend<sup>9</sup>, although it is slightly less significant than the initial specification. While we lose some significance in our model due to this alternative trend, we do still find that all our variables of interest are still highly significant.

Our other specification includes the natural logarithm of the time variable. While this does mean that the same concerns that applied to the initial time trend still apply, they are largely alleviated because the logarithm of the time variable grows at a considerably slower rate than the linear time trend. As a result, this model allows for the observations of growth accelerations for many years into the future. It should be noted that this time trend is even more significant than the linear trend, while only marginally worsening our results.

We conclude that our results are robust to alternative specifications of the time trend, allows for more leeway in the interpretation of our results, in that future growth accelerations need not be assumed to stop occurring at some point in the near foreseeable future.

## 6. Discussion

The previous sections of this paper presented the results of our empirical analysis with respect to the influence of social capital and economic reforms on growth accelerations, conditional on political regimes. In light of the presented results we will now focus on the general conclusions that may be drawn with respect to social capital and its direct and indirect influence on growth. Hence, this section is aiming to derive and clarify possible conclusions. Additionally, we will devote a considerable part of the discussion on the limitations posed by the data and inference issues.

The empirical economic literature with respect to social capital points to the existence of a strong positive relationship between social capital and growth. Given the interrelation of social capital with economic development, which creates serious endogeneity issues, many researchers used heuristic ways to prove social capital's effect on growth. However, our results point to the fact that the influence of social capital, at least in the short run, is only conditional on political regimes. On the one hand there seems to exist a positive effect of social capital on growth outcomes linked with democratic regimes. On the other hand it seems that there exists a neutral, if not negative, influence of social capital on the performance with respect to growth of autocratic regimes. Along these lines we can draw the conclusion that social capital per se does not seem to increase the likelihood of a growth acceleration incident, both as interacted with economic reforms and as an independent term. This conclusion contradicts a part of the literature with respect to social capital, as it suggests that the influence of social capital is not unconditional. To sum up, the evidence points to the rejection of the hypothesis of the unconditional effect of social capital on growth, pointing to the fact the conclusions of the literature might be due to the endogenous nature of social capital.

On a parallel vein, the literature on the effect of political regimes on growth finds contradictory results<sup>10</sup>. In this context our results can point to possible reasons for the

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<sup>9</sup> Note that the initial time trend was upwards sloping, hence the negative coefficient, while the inverse of this time trend is downwards sloping, hence the positive coefficient.

<sup>10</sup> Prezworski and Limongi (1993), who analysed the findings of 18 different studies, found that in just over half the studies the result was a positive effect of democracy on growth, whereas most of the remainder reached the exact opposite conclusion. A more recent study by Doucouliagos and Ulubasoglu (2006) performs a similar exercise, in which they use meta-analytical techniques on a total of 45 separate studies. While their focus was on economic freedom, their results show that democracy tends to have a slightly negative effect on growth. In

diversity of the outcomes as it is evident that social capital seems to have a distinct and positive effect on the growth outcomes of democratic regimes and a neutral or negative effect on the outcome of autocratic regimes. Furthermore, the conclusion that as the level of democracy increases, the probability of the occurrence of a growth acceleration decreases is only true for low social capital democracies. Thus, it seems that the general approach to model the outcomes of regimes with regards to growth is questionable, due to the importance of the interaction of political regimes with the degree of social capital in each society being highly relevant for these outcomes.

## 6.1 Limitations

The concept of social capital on a theoretical level is easily interpretable. When it comes to measurement and inference methods, however, it is generally more complicated. Thus it is important to focus our attention on the possible limitations that are posed by the nature of social capital, possible patterns observed and our data. Thus, we will devote the next few paragraphs on these possible limitations and their consequences with respect to our results.

### 6.1.1 *The Nature of Social Capital*

The nature of social capital due to its interrelation with culture might lead to an endogeneity problem. Although, as we argued, social capital is a slow changing variable and we also keep it constant along the sample years, it still might reflect past institutional and governmental efficiency along with past economic outcomes. In essence, social capital might be a reflection of historical economic and social outcomes of a society and if we hypothesize a persistence of these outcomes in the future, then social capital might be simply be a proxy for the assumption of continuity. Thus, although we argue that social capital changes slowly and there will be no endogeneity with present economic outcomes, this may be different with respect to past outcomes, assuming there is a certain persistence in economic outcomes. As such, this increases the difficulty of establishing a causal relationship.

Additionally, general economic development issues might be the driving force behind part of our results. The fact that we find the most significant effect of reforms on low social capital autocracies might depend on the stage of economic development and the interrelations with regimes and in turn social capital. Thus it might be the case that autocracies tend to be in an earlier stage of economic development and hence a growth acceleration might be more easily trigger by an economic reform. Furthermore, in autocracies we generally may expect the level of social capital to be low. These facts, however, do not explain the observed differences between low and high social capital democracies, which even under these assumptions remain significant and relevant.

### 6.1.2 *Data Limitations*

In addition to the issues noted above, we find ourselves to some extent limited by the time period, which has been chosen to allow for comparison with the paper by Jong-A-Pin and De Haan (2011). The main difficulty with this window of time is that it forces us to use a measurement of social capital which is first measured near the end of our time period. Ideally, we would have opted to measure social capital at the beginning of our period of analysis, even though we would still argue to keep it fixed over time.

Related to the above problem is that of the choice of the proxy for economic reform. While the index developed by Sachs and Warner (1995) certainly is useful, we would have preferred to use a measure of economic liberalization that includes more factors than only

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addition, they argue that it is important to include both economic and political freedom in analyses of economic growth.

trade liberalizations. The (change in the) Economic Freedom of the World index, as developed by the Fraser Institute, would in our opinion have been a more accurate measure of economic reform. Alas, the years in which this index is first measured only shows some slight overlap with our period of time as well.

In conclusion, we would argue that while our model captures some interesting and significant interactions, it is important to note that our approach has its limits. We have noted that there may be some mild endogeneity between social capital and growth, which nonetheless should be nearly non-existent in the short run. More problematic is the observation that low social capital autocracies generally also tend to be poor nations, whereas high social capital democracies tend to be rich nations. By implication, this means that the first may generally be expected to have more potential for growth than the latter. Finally we have noted the limitations of the particular time period of our research, which limits us in the availability of indicators.

## 7. Conclusion

In our paper we have followed the approach first suggested by Hausmann et al. (2005), meaning that we have focused our attention on the incidence of a growth acceleration rather than on growth per se. The approach was further improved upon by Jong-A-Pin and De Haan (2011), who have added to the filter and provided a clear argumentation for the model specification.

Our main addition to the literature is that we have shown clearly the importance of social capital in growth analyses, which we have found not to be unconditional. Rather, we have found that social capital is only significant through its interaction with a country's political regime. Generally speaking, we have found some evidence that for a democracy more social capital is beneficial, whereas for an autocracy it may do more harm than good.

One possibility is that the explanation lies with education. We have argued that democracies tend to have positive effects on education and that education in turn may create more demand for democracy. In addition, we have noted that there is some evidence that social capital may also have a positive effect on education, which may help to explain the differences in performance of autocracies and democracies under different levels of social capital.

Additionally, we have shown that the effects of regime change on the probability of a growth acceleration is highly conditional on the prevailing level of social capital. When social capital is very low, we find that a move to more democracy has negative effects on growth, whereas if it is high, the results indicate a strong and significant positive effect. One interpretation of this result is that a nation's citizens do not hold much faith in democratic reforms when social capital is low.

Our results are different from the existing literature, which has generally argued that social capital has positive effects on growth, whereas the results on the performance of different regimes has been highly ambiguous. We have shown that social capital on its own does not lead to more growth accelerations, and that differences in performance between autocracies and democracies can be largely explained by the prevailing level of social capital.

Finally, we would strongly suggest there to be more research done in this area, specifically because of the limitations of our approach. Future research should focus on a later time period, which would allow the inclusion of various alternative indicators. Ideally, social capital should also be unambiguously measured directly before the period of interest.

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## 8. Appendix

### 8.1 Data

Our data covers the period 1957-1993 and a total of 126 countries, although the separate variables are not always available for every country over every period. The choice for this particular window of time partially depends on the availability of data and it allows for easy comparison between our results and those of Jong-A-Pin and de Haan (2011).

#### 8.1.1 Growth accelerations.

The data on growth accelerations is the same as the one employed by Jong-A-Pin and de Haan (2011). This means that we make use of the Penn World Table Data (Heston, Summers and Aten 2002) to identify periods in which a growth acceleration takes place. To do this, we will use the filter developed by Hausmann et al. (2005), which has been improved by Jong-A-Pin and de Haan. This filter consists of four criteria, which have to be satisfied before a year  $t$  may be considered to be the start of a growth acceleration:

$$\begin{aligned} g_{t+1} &> g_t \\ g_{t,n+7} &> 3.5 \text{ ppa} \\ g_{t,n+7} - g_{t-7,t} &> 2.0 \text{ ppa} \\ y_{t+7} &> \max\{y\}, \quad i \leq t \end{aligned}$$

Thus, for a year to qualify as a growth acceleration, the economic growth ( $g$ ) of that year must exceed the previous year's growth rate. In addition, the average growth rate over a period of 8 years must exceed 3.5% per annum (ppa), which must also exceed the growth rate of the preceding 8 years by at least 2%. The last requirement ensures that periods of full economic recovery are excluded, as the level of real GDP ( $y$ ) must be higher than that of all previous years.

In total, the above filter identifies 242 years across 57 different countries in which a growth acceleration takes place. Based on these observations, we create our dependent variable, which is a dummy that equals 1 in years in which there is a growth acceleration and 0 otherwise.

#### 8.1.2 Economic reform.

For the economic reform variable, we again follow Jong-A-Pin and de Haan by using the index created by Sachs and Warner (1995), which was updated by Wacziarg and Welch (2008). The resulting dummy variable has the value of 1 in the first 5 years after a country has liberalized its markets and 0 otherwise. The main advantage of this index vis-à-vis alternatives, such as the index from the Fraser Institute (Gwartney and Lawson 2008), is that it is provided on an annual basis and that it goes further back in time.

All in all, this dummy is available for a total of 106 countries and covers our entire sample period. It identifies 334 years across 75 countries in which there has recently been a liberalization of markets.

#### 8.1.3 Democracy

As a proxy for democracy, we will make use of the Polity IV data set (Marshall and Jaggers 2002), which provides a value between -10 (autocracy) and 10 (democracy). The Polity variable is available for all the countries in our data set, and covers the entire period. The Polity score is computed annually, which implies that it is possible for a country to be considered a democracy in some point of our time series, while it is an autocracy at another point in time.

Additionally, for our dummy model specification we utilize a democracy dummy which equals 1 if the country has a positive Polity score, and 0 if is negative.

#### 8.1.4 Social capital.

Our main addition to the framework of Jong-A-Pin and de Haan (2011) is that of social capital, here defined as generalized trust. As a measure of trust we use the World Values Survey (2009), which is a commonly used indicator (see e.g. (Knack and Keefer 1997, Dearmon and Grier 2011, Gorodnichenko and Roland 2011, Bjørnskov 2012).

Specifically, we look at the following survey question: “Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?”, where respondents are offered the choice between answering with “1. Most people can be trusted” or “2. You can never be too careful when dealing with others”. The WVS measurement of trust may thus be considered to be the percentage of people who answered this question with the first answer.

In total, there have been five separate waves of the WVS: in 1981, 1990-1991, 1995-1996, 1999-2001 and 2005-2007. Between the waves there are differences in the countries that have been polled: a country polled in one wave need not be also included in a later wave. Generally speaking, the later waves included considerably more countries.

As we have argued above, trust is a variable that changes but very slowly through time. This assertion is backed up by the correlation between the various waves, which can be seen in table A1. As such, we opt to maximize our sample size by combining the combine various waves of the WVS as follows: for every country in the data set, we use the oldest (and thereby closest to our time period) value available. This means that if a country has participated in all five waves of the WVS, we will use the value of the first wave. If a country however has only participated in wave 2 and 4, we will use the value of wave 2.

Finally, for our dummy specification we utilize a dummy for social capital which equals 1 if the WVS score is above the median level for our sample and 0 if it is not.

**Table A1** Correlation Matrix Different World Values Surveys

		1	2	3	4	5
1	WVS1	1,000				
2	WVS2	0,903	1,000			
3	WVS3	0,941	0,923	1,000		
4	WVS4	0,765	0,867	0,850	1,000	
5	WVS5	0,914	0,913	0,930	0,875	1,000

## 8.2 Social Capital as an Independent Term

In this section we are estimating our models in a dummy specification and using a panel with random effects. The reasoning we are using random effects is in essence to be able to estimate the model without omitting the social capital as independent term even though there is no variation with each group. The result are similar to our main analysis, however less significant. We can observe in table A2 than in both models specifications the independent social capital term is insignificant, hinting the fact that its effect on growth is not



unconditional as a part of the literature suggests. Note, however that the random effect models is rejected from the Hausman test. Thus our result should be perceived and interpreted with caution.

**Table A2** Growth Acceleration Episodes, Regimes and Social Capital

Dependent variable incidents of Growth Accelerations

	Panel Random Effects – Dummies Specification					
	[1]			[2]		
	$\beta_i$	$\sigma_\beta$	Case <sup>b</sup>	$\gamma_i$	$\sigma_\beta$	Case <sup>b</sup>
Constant	-2.459***	(0.336)	ER=SC=0	-2.472***	(0.356)	ER=SC=D=0
Econ. Reform <sup>c</sup>	1.011***	(0.317)	ER=1, SC=0	1.793***	(0.440)	ER=1, SC=D=0
Social Capital <sup>d</sup>	0.506	(0.480)	ER=0, SC=1	-0.086	(0.592)	ER=D=0, SC=1
Econ. Reform*Social Cap.	-0.794	(0.626)	ER=1, SC=1	-1.349	(1.073)	ER=SC=1, D=0
Democracy <sup>e</sup>				0.067	(0.298)	ER=SC=0, D=1
Democracy*Social Cap.				0.891*	(0.551)	ER=0, SC=D=1
Econ. Reform*Democracy				-1.495**	(0.656)	ER=D=1, SC=0
Econ. Reform*Social Cap.*Dem.				1.143	(1.337)	ER=D=SC=1
Time Trend <sup>f</sup>	-0.065***	(0.008)		-0.068***	(0.008)	
Countries		91			91	
Observations		2662			2662	
Pseudo R <sup>2</sup>		0.053			0.062	

<sup>a</sup> Notes: The model is estimated using a fixed effects panel logistic regression with growth accelerations as a dependent variable. \* denotes significance at the 10 percent level. \*\* at the 5 percent level. \*\*\* at the 1 percent level.  $\beta$ 's are the coefficients and  $\sigma_\beta$  are the standard errors.

<sup>b</sup> Detailed explanations of the cases in table 1.

<sup>c</sup> Dummy variable taking value 1 for the 5 years after an economic liberalization took place, else 0.

<sup>d</sup> Social capital dummy 0 for low, 1 for high derived using the trust value of WVS.

<sup>e</sup> Dummy variable taking a value 1 for democratic regimes and 0 for autocratic.

<sup>f</sup> Time trend of growth acceleration as specified by De Haan and Jong-a-Pin (2011)