The Inter-linkages between Democracy and Per Capita GDP Growth: A Cross Country Analysis

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ABSTRACT

The empirical growth literature gives no clear indication as to how democracy impacts growth; there is evidence of both positive and negative effects and also of no direct link in democracy and growth nexus. In this study an attempt has been made to resolve this controversy by putting this question in a dynamic simultaneous equation framework that combines in a system the regression in differences with regression in levels applied on a cross county data set over the period 1987-2002. This type of modelling not only controls for the endogeneity of the explanatory variables and the unobserved country-specific effects but also allows us to analyse the impact of democracy on per capita GDP growth and the reverse causation from per capita GDP growth on political and civil freedom simultaneously. Our result shows evidence in support of a quadratic impact of the democracy on per capita GDP growth (an inverted U relationship) that is per capita GDP is found to be increasing in democracies at low levels but after a certain moderate level of democracy this relation turns negative. The support of reverse causation from per capita GDP growth to political and civil freedom is found only in countries grouped as partially free and free democracies. However we do not find any evidence in support of Lipset Hypothesis that prosperity leads to increase in propensity to experience political freedom taking all countries into consideration.

1. INTRODUCTION

Democracy occupies the moral high ground and as a system of governance is much superior to an authoritarian regime. It has, an intrinsic value if the objective of governance is development and the general well being of the population in an environment of basic civil liberties and political freedom. By providing these conditions democracy plays a conducive role in promoting human development that autocracy is deemed to constrict. Economists who take a narrow view of development in terms of sustained increase in per capita income and try to compare democracy and dictatorship in respect of economic growth through better property rights leave many connected issues to debate and need for research.

The existing scholarly work on democracy as a proxy for development of political institutions and economic growth as a proxy of economic outcomes has generated contradicting theoretical and empirical findings. On the theoretical front Wittman (1989) and Olson (1993) support growth-enhancing impact of democracies relative to authoritarian regimes while Huntington and Dominguez (1975), Buchnan and Wagner (1977), and Keech (1995) argue otherwise. On the empirical front too we have evidence of both positive and negative effect of democracy on economic growth as well as absence of any effect.

Sirowy and Inkeles (1990) provide a survey of thirteen studies, three of the thirteen studies provide support for negative impact of democracy on growth, six studies show no significant relationship and four studies indicate conditional relationship between democracy and output growth. Similar inconclusive findings are found in reviews done in Przeworski and Limongi (1993), Borner, *et al.* (1995) and Brunetti (1997).[1] A review of empirical studies estimating the relationship between democracy and output growth is presented in Appendix A.1, which has also revealed mixed findings. Hence there is no consensus in theoretical and empirical literature on how the democratic form of government affects economic growth.

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[1]Przeworski and Limongi (1993) reviews eighteen studies that generates twenty one findings of which eight are in favour of democracies in promoting output growth, eight in favour of dictatorships as enhancer of economic growth and five discovered indifference to regime type. Borner, *et al.* (1995) reviews sixteen empirical studies, three of which suggest a positive relationship between democracy and economic growth, another three provides evidence of negative relationship and the other 10 show inconclusive findings on democracy and growth nexus. Brunetti (1997) provide a survey of seventeen studies, nine of which reveals support for no significant relationship, four in favour of positive impact and remaining four provides support for negative impact of democratic form of government on economic growth.

With the above perspective in mind, an attempt has been made to model the democracy and economic growth nexus by taking the following two objectives into consideration. First to capture the endogenous relationship between economic and political outcomes explicitly through a simultaneous equation framework so as to analyse the impact of economic growth on the propensity to experience democracy and vice versa. This has been done using a dynamic simultaneous model applied on a data set over the period 1987-2002 for 73 developed and developing countries. This allows controls for endogeneity of the regressors and the country-specific effects using the Generalised Method of Moments (GMM) estimation technique that combines the regression in differences with regression in levels. Second, to have control for any specification bias that may arise in modelling the impact of democracy on per capita GDP growth linearly, we analyse this relation at two levels: one by testing linear vs. quadratic specification in the whole sample and then in the sub-groups divided by the democracy index. This has been done keeping in mind that the relation between democracy and per capita GDP growth may vary across countries at different levels of democratic process and if political regimes could be placed in some order from a pure autocracy to a pure democracy the impact may move along this order in a non-linear fashion.

Hence this study has been able to control the simultaneity bias that might arise due to endogeneity of economic and political outcome and the possible non-linearity that exists in the democracy and growth paradigm. It is further able to have control for bias in estimates by eliminating the unobservable country specific effects through taking the first difference arising from their impact on both per capita GDP level (log form) and participation in democratic process. For example certain cultural attributes may lead to low participation of females in the political process and also in to the labour force in some countries (vice versa), which may reduce the productive capacity of economy than its potential and hence lower growth and much lower level of democracy leading to biased estimates.

The paper is organised as follows. Section 2 gives theoretical and empirical background of the effect of democracy on growth and vice visa. Endogeneity of political and economic institutions is discussed in Section 3. Model specification is presented in Section 4. Section 5 describes the construction of variable, data sources, categorisation of data and selection criterion for countries under analysis and the estimation technique. Estimation results are discussed in Section 6. Section 7 concludes the study.

2. LITERATURE REVIEW

2.1. Channels Through which Democracy Effects Economic Growth

Empirical and theoretical research have yielded ambiguous results with regard to the effects of democracy on economic growth. These contradictory empirical findings are discussed below from three perspectives: the conflict

view, the compatibility view and the skeptical view [Sirowy and Inkeles (1990)].

According to the *conflict view* there exists a tradeoff between democracy and rapid economic growth. The first argument that advocates a negative relationship between democracy and growth has theoretical grounds in the redistributive effects of democracy. It is believed that the policies in democratic regimes are relatively more redistributive and pro-poor than in autocracies [Keech (1995) and Comeau (2003)]. Income distribution is often more equal in democracies than in non-democracies and it actually improves when a society switches from dictatorship to democracy. This emphasises the redistributive effect of democracy [Acemoglu and Robinson (2006a)]. Also democratic institutions tend to be friendlier to labour as they are associated with higher wages and larger factor share for labour in manufacturing [Rodrik (1997)]. Hence the redistributive effect of democracy leads to policies that reallocate national income from investment to consumption—thereby slowing down economic growth [Huntington and Dominguez (1975) and Prezsworski and Limongi (1993)].

The second argument in favour of the conflict view is that democratic governments make myopic decisions designed to increase their vote shares which make the democratic form of governance more susceptible to demands of interest groups [Comeau (2003)]. Such 'special interests' approach will use political activity to gain rents [Krueger (1974)] or to form a policy which may preserve the interest of some group, say the wage interest of a labour union by cutting into entrepreneur's profits but such strategies may not be growth enhancing [Gupta, *et al.* (1998)]. Hence the inefficiencies created by the lobbying of interest groups consequently reduce national income in democracies while dictatorship insulates the state from such particularistic pressures [Olson (1982) and Prezsworski and Limongi (1993)]. Also dictators have an interest in furthering growth to increase their own share in the national income [McGuire and Olson (1996)].

Democracy is also believed to undermine growth because of its inability to take tough unpopular growth-oriented policy actions. For example slashing current consumption to promote investment would be an unpopular policy for the lower classes in a developing country; only a dictator can make such tough but necessary decisions. Similarly there will be an unending growth of government in a democratic regime which will adversely affect the economy [Buchnan and Wagner (1977)]. On the other hand, an authoritarian regime can carry out the liberalisation reforms more effectively at least in the initial stages when massive layoffs and cuts in entitlements follow liberalisation [Fidrmuc (2000)].

Democracy can also lead to poor economic outcomes through producing political instability and ethnic conflict [Zakaria (2003)]. The tendency of majority voting system to legislate for redistribution through land reforms might

adversely affect stability [World Bank (1991), pp. 131–132]. The empowerment of the impoverished majorities unleashes ethnic conflict, confiscation and sometimes genocide in market dominant minorities [Chua (2002)]. Therefore a fractious society can only be kept intact under a strong hold of an autocratic leadership. Also, political pluralism and competition in democracy can sharpen parochial and primordial loyalties such as strengthening of the caste system in India; this can create difficulties in adopting growth-oriented policies [Bardhan (1993)].

Those who advocate the *compatibility view* do not take democracy as a threat to economic growth; rather for them it acts as an enhancer of growth. According to them the policies are restricted by the preference of the median voter in democracies. Therefore a democratic leader has the incentive to improve the well being of the majority to ensure his re-election in contrast to a dictator who relies on narrow-clan and patronage-based support for sustainability of his power [Siegal, *et al.* (2004)]. Also the competition between the interest groups leads to adoption of policies with positive net social benefits [Wittman (1989)] or the inefficiencies will at least be less than autocracies [Olson (1993)]. This evidence negates the conflict hypothesis that rent seeking in democracies through interest groups leads to inefficient outcomes and hence is an impediment to growth.

Democratic governments are marked by greater transparency of policy and policy-making processes [Wittman (1989)]. The sharing of information provides the public a chance to monitor the behaviour of their elected representatives; openness and free media reduces the scope of corruption among the government officials in adopting policies that are based on purely rent seeking objectives [Siegal, *et al*. (2004)]. Also the free flow of information in and out of government creates awareness among the masses about the undertaken developmental policies. For example the active public-education campaign in democratic Uganda dramatically reduced HIV/AIDS and suppression of information about SARS epidemic in authoritarian China allowed the epidemic to spread (*ibid*).

The compatibility theorists argue against dictatorship that the authoritarian rulers have no interest in maximising total output [Prezsworski and Limongi (1993)]. An authoritarian ruler often turns political monopoly into economic monopoly; preferential treatment to individuals and businesses that provide support to the autocrat reduces economic efficiency in a dictatorship [Siegal, *et al*. (2004)]. In contrast to predatory behaviour of the autocratic ruler, democracies have greater property rights security because the long-term survival of democracy depends on the provision and protection of civil liberty including economic freedom [Olson (1993)]. Also civil and political liberties are necessary to protect citizens from the predatory behaviour of government and provision of secure property rights [North (1993)]. Finally, democratisation may limit rent seeking due to its system of checks and balances [de Haan and Sturm

(2003)]. Empirical evidence of strong correlation between higher rates of investment and democratic government as observed in the work of Pastor and Sung (1995) supports the above mentioned arguments as private investment is only boosted in an environment in which property rights are secure.

Democracies with free press and active opposition parties outperform autocracies as they are less likely to produce extreme results; for example calamities such as famines and starvation are better avoided in democracies. Similarly severe economic contractions are twice as often experienced in poor autocracies in comparison to poor democracies which underlines the point that democracies are better equipped to prevent a catastrophe [Siegal, *et al.* (2004). Also, democracies render political stability by providing a clear cut mechanism of succession without the use of any extralegal or coercive measure to attain power while the use of such extralegal destabilising methods to gain power is prevalent in autocracies [Siegal, *et al.* (2004)]. The development momentum is thus not disturbed in a democratic succession apart from some specific policies. Political stability is further enhanced by better conflict management as differences among social groups are resolved in a predictable, inclusive and participatory manner through the institutions for debate such as free elections with active opposition parties and freedom of speech [Rodrik (2000)]. An autocratic government may suppress conflict in the short run but provide no mechanism for its solution [Lundstrom (2002)]. Evidence from sub-Saharan Africa where many civil conflicts have occurred recently shows that countries undergoing democratic reform have experienced armed conflicts but half as often as autocracies [Siegal, *et al.* (2004)].

Finally, democracies outperform autocratic form of government as they yield long-run growth rates that are more predictable, they produce greater stability in economic performance and they handle adverse shocks better [Rodrik (1997)]. On the other hand, Sah (1991) observes that autocratic polities exhibit a larger variance in economic performance as compared to democracies. This could be attributed to the hypothesis that democratic structures adjust well to changing circumstances in the sense that democracies institutionalise the right to change leaders or policies that go wrong, hence there is always pressure to amend, drop or replace initiatives that do not work [Siegal, *et al.* (2004)].

The third perspective about the relationship between democracy and growth is that democracy has no significant effect on economic growth. Those who argue in favour of this skeptical view stress that economic growth is primarily due to economic production inputs such as investment and it is the pro-growth governmental policies that matter more than the regime type that prevails in a country [Kurzman, *et al.* (2002) and Comeau (2003)]. Though secure property rights lead to environment more conducive to investment and hence growth but here the question as to which regime type—a democratic or an autocratic—better secures these rights is a miss-specified question according to followers of the skeptical view. They stress on the fact that large variations

are observed within democratic or autocratic regimes; in the autocratic it is the time horizon of the individual autocrat that determines property and contract rights whereas in democracies it is the durability of the regime that determines these rights [Clague, *et al.* (1996), Pettersson (2004)]. Similarly it is the uncertainty and instability that deter investments and growth rather than the type of polity that prevails in a country [Alesina and Perotti (1994)].

Another aspect that may be considered is the source of impact that may be some indirect channel, for example autocracies may outperform democracies due to less corruption in the former form of governance [Cheung (1998)]. This could be due to the much lower cost of corruption in a democracy compared to an autocratic government since democracies may not be very durable which. distorts the incentives of elected people towards corruption who may be induced to make the most of their uncertain tenure. On the other hand a dictator may find it useful to curb corrupt practices to maintain his strong hold on power. However we can find support of both positive and negative channels of impact of corruption on growth in the literature. While corruption may increase efficiency of the economy by increasing the ease of transactions and hence become a positive source for growth [Acemoglu and Verdier (1998)] on the other hand corruption may significantly reduce growth due to the presence of a large shadow economy and less prudent macroeconomic policies [Mauro (1995); Mo (2001)]. It is therefore difficult to know how corruption affects growth. Also the situation with regard to rule of law may differ giving rise to different levels of corruption within and across democratic and autocratic regimes [Polterovich and Popov (2010)].

Hence theoretical and empirical literature gives us no clear-cut support of any of the above three views and there is empirical evidence of all the above views as discussed in the introduction.

2.2. Channels Through which Economic Growth Affects Democracy

The theoretical basis in the reverse causation from economic growth to country's propensity to experience democracy lies in the seminal paper of Lipset (1959), who advocates the idea that prosperity stimulates democracy. This phenomenon has been termed as Lipset hypothesis in Barro (1996). The idea that economic growth can spur demands for political freedom is also found in the works of Bollen (1979), Bollen and Jackman (1985) and Burkhart and Lewis-Beck (1994). According to this view, countries are likely to become more democratic if economic growth succeeds in raising their average incomes to high enough levels and such countries with greater economic freedom, which is with freer markets and more secure private property, produce faster growth and prosperity. Moreover, this strong positive relationship between economic freedom and growth is independent of political freedom. Also, the wealth of a nation has implications for the sustainability of democracy [Lipset (1959)].

According to Lipset (1959) as countries develop economically, their societies also developed the strengths and skills to sustain liberal democratic governance.

Hence according to this view rather than political freedom leading to prosperity, it is the other way round; that is as a country achieves greater development, there develops a widespread desire for more political freedom. Lipset (1959) emphasises that with development there is an increase in the size of educated middle class, which promotes receptivity to democratic process. This has implications on the power division between the elite and the lower class. An increase in the size of the middle class can cause more awareness about their rights and more organisation among the masses which can provide the masses the power to act in their own interest. Therefore, increased ability to organise in the middle and working class can act as a threat to the elite class – the industrialist and the landlord class. This threat of revolt by the masses, in which there can be loss of both physical capital and human capital essential for running of industries, will be a loss to the industrialist class [Acemoglu and Robinson (2006)]. To avoid such a destabilising situation and loss of its power, it is in the interest of the industrialist class that some power is transferred to the masses in the form of a democratic process (*ibid*). Similarly, capitalist development lowers the power of the landlord class and raises the power and ability to organise of the working and middle classes [Huber (1993)].

In growing capitalist societies apart from the rise in literacy rates and per capita income, there develops a differentiated urban sector including labour, a professional middle class and a business entrepreneurial class. The business entrepreneurial class includes small and unorganised individual enterprises that are beyond the capture of the state. Therefore in bargaining with these elements the state tends to become less predatory and more rule-oriented and responsive to society's needs. The expansion of an educated middle class and an independent business entrepreneurial class produces a pluralistic infrastructure and active civil society which are more difficult to monitor and control from the perspective of an autocrat.

Therefore economic development by producing the two crucial elements for development and sustainability of democracy—private businesses and broader middle class—can augment the propensity to experience democracy in a country.

3. ENDOGENEITY OF POLITICAL AND ECONOMIC INSTITUTIONS

Institutions can be regarded as man-devised constraints that shape human interaction in social, political and economic spheres [North (1990)]. How do these institutions evolve in a society and across societies is a question which has captivated the imagination of economists, sociologists and historians alike. The prevailing institutions have consequences not only for the present outcomes but

also for future evolution too due to persistence of the underlying structure. Hence a deep understanding of what type of institutions exist, what kind of incentives they generate and how they are inter-linked is needed to have an idea of the process of development. How do economic institutions come about in society? Is it something that is imposed on society or do the societal preferences and values determine such economic outcome? This is essentially a political economy question and another way of asking the same question is that, are economic and political institutions endogenous?

According to Acemoglu (2004) economic institutions are endogenous and result from the collective choices of the society, in large part because of their economic consequences, that is the incentives they provide for investment in physical capital, human capital and technology and the distribution of wealth that occurs as a result. However, the type of institutions that a society will adopt will depend on the outcome of the social conflict that exists with regard to their different distributional consequences; the ones which are in line with the vested interest of the most powerful political group will be the ones that will prevail.

Similarly political institutions are also endogenously determined in the framework of Acemeglu (2004) as economic institutions through their distributional consequences can empower the groups that may challenge the existing political set-up through revolt or threat of revolt resulting in political reforms. However established political institutions possess much resilience as the ones in power will try to maintain their status quo in the present and future by strengthening the existing political order. Also the political power that results from mass organisation for revolt or protest arises when such groups are able to unite on one platform which is a difficult and slow process and is generally of a transient nature [Tarrow (1991); Hardin (1995)]. Political change depends on the relative bargaining power of the political groups: the ones that are empowered through the established political institutions and the other through the strength and resolve of the masses who have organised a revolt or have the means to stage a revolution. Hence if the latter group is stronger it will try to change the established political order in its favour to gain control over tangible political hold on power that is not dependent on any future collective action to secure the distribution of political and hence economic power in their favour. Part of the reason for this lies in the inherent commitment problem as the people in power will have scant incentive to honour their commitment once the pressure to do so disappears. For example those in power, say a dictator, may promise to give a distribution in favour of those staging a revolution to counter the opposition but may turn back on his promises once the forces uniting the revolutionaries disintegrate. Similarly a dictator will oppose political regime change as much as possible even if he is offered a safe passage against threat of execution or accountability because the offer may not hold once he is out of power.

The idea that a select few in a society may foster economic policies that strengthen their hold at the expense of some other class is the essence of *Karl Marx's theory of capitalist development* which states that the rate of profit on capital eventually declines with growth and to keep the profit rate up, the stronger capitalist will drive the weaker out of the market leading to unemployment and further decline in wages. As development proceeds, the capitalist class in order to keep their profits up may squeeze the working class to the extent that it results in revolution. Similarly, a close evaluation of the pioneering work on institutions by Douglas North also shows that agents who controlled the state should be modelled as maximising their own payoff rather than that of the society due to the presence of positive transaction cost [North (1981)]. Also the change in current political order due to revolution or threat of revolt by the masses comes due to preservation of self interest of those in power and the industrialist class to transfer some power to the masses to avoid the loss of all power, that may mean the loss of both physical capital and human capital essential for functioning of industries [Acemoglu and Robinson (2006)].

4. MODEL SPECIFICATION

The objective of this study is to capture the effect of democracy, as measured by a subjective index of political freedom and civil liberty on economic growth and also the reverse effect of improvements in standard of living through economic growth on democratic form of government. To model these effects econometrically, we start with a standard production function with constant returns to scale as given below:

$$Y_t = A \, K_t^{\alpha} \, L_t^{\beta} \, H_t^{\gamma} \qquad \dots \qquad \dots \qquad \dots \qquad \dots \qquad \dots \quad (4.1)$$

where Y_t represents aggregate output, A is the level of total factor productivity (TFP), K_t and L_t are capital stock and labour respectively and H_t represents human capital. Converting Equation 4.1 in per capita terms

$$Y_t/L_t = A \, (K_t/L_t)^{\theta} \, (H_t/L_t)^{\varphi} \qquad \dots \qquad \dots \qquad \dots \qquad \dots \quad (4.2)$$

$$y_t = A \, (k_t)^{\theta} \, (h_t)^{\varphi} \quad \dots \qquad \dots \qquad \dots \qquad \dots \qquad \dots \quad (4.3)$$

where y_t represents per capita output and k_t and h_t represent per capita capital stock and per capita human capital stock respectively. Taking natural logarithm on both sides of Equation 4.3 yields

$$log(y_t) = log(A) + \theta \, log(k_t) + \varphi \, log(h_t) \qquad \dots \qquad \dots \qquad \dots \quad (4.4)$$

$$log(y_t) = \psi + \theta \, log(k_t) + \varphi \, log(h_t) \qquad \dots \qquad \dots \qquad \dots \quad (4.5)$$

As the objective of this study is to empirically analyse the effect of democracy indicator on economic growth and vice versa, we empirically analyse this effect on economic growth through total factor productivity ($\psi = log(A)$)

and determine democracy within the model. The theoretical argument of both negative and positive channel of impact on democracy through total factor productivity has been put forward in literature. At one level theoretical evidence reveals that democratic institutions and political rights enhance growth of more advanced sectors that is in sectors close to the technological frontier through much lower entry barriers than autocracies [Aghion (2007); Acemoglu and Robinson (2006)] and on the other hand we have evidence indicating the negative effect of democracies on innovation through much higher tax rates in equilibrium compared to autocratic regimes suggesting the redistributive attributes of democracies. Hence the positive or negative impact on total factor productivity and hence on per capita GDP growth is largely an empirical question and is open to debate as was discussed in Section 2 above. The analysis is based on the dynamic simultaneous equation model in order to capture the endogeneity of political and economic outcomes explicitly. For convenience in empirical analysis we specify the following linear relationships for democracy and total factor productivity:

$$\psi = \psi_0 + \psi_1 DEM + \psi_2 OP + \varepsilon_1 \qquad \dots \qquad \dots \qquad \dots \qquad \dots \quad (4.6)$$

Substituting Equation 4.6 in Equation 4.5 and adding two proxies of human capital, secondary enrolment rate and life expectancy linearly ($\log(h_t) = \beta_0 SE_t + \beta_1 LE_t$) we have:

$$log(y_t) = \psi_0 + \theta\, log(k_t) + \psi_1 DEM_t + \psi_2 OP_t + \varphi\, \beta_0 SE_t + \varphi\, \beta_1 LE_t + \varepsilon_t \quad (4.7)$$

where

y_t = Per capita output
k_t = Per capita capital stock
DEM_t = Democracy index
OP_t = Ratio of sum of exports and imports to GDP (%)
SE_t = Gross secondary enrolment ratio (%)
LE_t = Life expectancy at birth (years)

Taking first difference of Equation 4.7

$$log(y_t) - log(y_{t-1}) = \theta\, (log(k_t) - log(k_{t-1})) + \psi_1 (DEM_t - DEM_{t-1}) + \psi_2 (OP_t - OP_{t-1})$$
$$+ \varphi\, \beta_0\, (SE_t - SE_{t-1}) + \varphi\, \beta_1\, (LE_t - LE_{t-1}) + (\varepsilon_t - \varepsilon_{t-1})\ \dots \qquad \dots\ (4.8)$$

Equations 4.7 and 4.8 are the level and the difference equations. Controlling the effect of certain control variables, Equation 4.7 estimates the effect of change in democracy index on the level of per capita output (taken in log form) that is on per capita GDP growth and Equation 4.8 estimates the effect of first difference change in democracy index on change in per capita output growth.

Equation 4.7 estimates the effect of democracy on per capita output including certain control variables so that the independent link between democracy and growth can be assessed. These control variables include the following:

Per Capita Capital Stock

Per capita capital stock is a key input in production function hence per capita capital stock will directly affect output [Solow (1956)]. Therefore inclusion of this variable controls for the effect on per capita output through increase in per capita physical capital stock.

Sum of Exports and Imports to GDP Ratio (%)

Integration in the world through trade openness can have influence on economic growth. Evidence of unconditional convergence in incomes of the world's rich and world's poor through trade integration is reported in Sachs and Warner (1995). The inclusion of this variable captures the degree of openness of the economy and controls for the possible effect on per capita output through trade.

Gross Secondary Enrolment Ratio (%) and Life Expectancy at Birth (Years)

These are indicators of human capital stock which are among the key elements of endogenous growth theory [Romer (1986) and Lucas (1989)]. The endogenous growth models explain the growth in output that can go on indefinitely, through increasing returns to investment in a broad class of capital including human capital. Therefore the inclusion of gross secondary enrolment ratio as an indicator of education levels and life expectancy at birth as an indicator of public health account for the plausible effect on per capita GDP through investments in human capital.

Now to specify the determinants of democracy we propose the following econometric equation:

$$DEM_t = \alpha_0 + \alpha_1 \, log(y_t) + \alpha_2 \, OP_t + \alpha_3 \, SE_t + \alpha_4 \, LE_t + \alpha_5 \, UR_t + \alpha_6 \, Gmf_t + \mu_t \quad (4.9)$$

where

DEM = Democracy index
y_t = Per capita output
OP = Ratio of sum of exports and imports to GDP (%)
SE = Gross secondary enrolment ratio (%)
LE = Life expectancy at birth (years)
UR = Ratio of urban population to total population
Gmf = Male gross secondary enrolment (%)—Female gross secondary enrolment (%)

Taking first difference of Equation 4.9

$$\begin{aligned}(DEM_t - DEM_{t-1}) &= \alpha_1 \, (log(y_t) - log(y_{t-1})) + \alpha_2 \, (OP_t - OP_{t-1}) \\ &\quad + \alpha_3 \, (SE_t - SE_{t-1}) + \alpha_4 \, (LE_t - LE_{t-1}) + \alpha_5 (UR_t - UR_{t-1}) \\ &\quad + \alpha_6 \, (Gmf_t - Gmf_{t-1}) + (\mu_t - \mu_{t-1}) \qquad ... \qquad ... \qquad ... \, (4.10)\end{aligned}$$

Equations 4.9 and 4.10 are the level and difference equations. Controlling the effect of certain control variables, Equation 4.9 estimates the effect of change in per capita GDP (taken in log form) on the level of democracy index and Equation 4.10 estimates the effect of per capita output growth on first difference change in democracy index.

Equation 4.9 estimates the effect of increase in per capita GDP on democracy index including certain control variables so that the independent link between democracy and per capita GDP can be assessed. The selection of the determinants of democracy in Equation 4.9 is based on the model proposed in Barro (1999). The control variables used in Equation 4.9 include the following:

Sum of Exports and Imports to GDP Ratio (%)

Trade can foster higher-quality institutions; the empirical evidence of this channel of effect is reported in Wei (2000). Thus the inclusion of the ratio of the sum of exports and imports to GDP indicates the degree of openness of the economy and controls the plausible impact of openness on propensity to experience democracy.

Gross Secondary Enrolment Ratio (%)

Education can raise public awareness and help develop social structures that enhance ability of people to organise. Hence this variable controls the influence of education on democracy.

Life Expectancy at Birth (Years)

This variable adds a measure of health status as another indicator of standard of living.

Urban Population to Total Population Ratio

There exists a theoretical ambiguity on the effect of urbanisation rate on democracy. One hypothesis is that rural population has limited ability to organise and therefore it can be easy for a dictator to suppress. Also increase in urbanisation makes it easier for people to meet and communicate and urbanisation implies that the poor are much more concentrated both in their work place and in their living quarters. It is likely therefore that urbanisation contributes to organisation of working-class, which presumably implies that urban population is harder to suppress. On the other hand, it can also be argued that a less dense rural population or more dense urban population are easier for a centralised government to monitor and control. The ratio of urban population to total population controls for the effect on democracy through urbanisation.

Gap between Male and Female Gross Secondary Enrolment Ratio (%)

The inclusion of this variable controls the effect of more equal educational opportunities across sexes on democracy. The idea is that expanded educational opportunity for females can develop developing countries; social structures that are generally more participatory and hence more receptive to democracy.

5. STRUCTURE OF DATA AND ESTIMATION TECHNIQUE

5.1. Construction of Variables and Data Sources

Democracy Index

To measure the strength of democratic institutions a democracy index (DEM) is constructed using the Freedom House indices of political rights (PR) and civil liberties (CL). Freedom house defines political rights (PR) as rights that enable people to participate freely in political process, including the right to vote, compete for the public office and elect representatives who have decisive impact on public policies and are accountable to the electorate. According to Freedom House civil liberties (CL) allow for the freedom of expression and organisational rights, rule of law, and personal autonomy without interference from the state. Both political rights and civil liberties indices range from 1 to 7, with higher values indicating more authoritarian regimes and lower values reflecting stronger democratic institutions. A combined index of political rights and civil liberties that *ranges from 0 to 1* is constructed by the following computation methodology taken from Gastil, *et al.* (1990):

$$DEMOC = (14 - (PR + CL))/12 \quad = 0 \quad \text{for pure dictatorship (no PR and CL freedoms)}$$
$$= 1 \quad \text{for pure democracy (full PR and CL freedoms)}$$

The two components of combined democracy index, political rights and civil rights, are highly correlated with one another with correlation coefficient equal to 0.91. Also they give indistinguishable results if used separately in the regressions [Helliwell (1994)].

Real Per Capita GDP

Gross domestic product is taken as a proxy for output. To convert real gross domestic product in per capita terms, it is divided by population instead of labour force since data on labour force for some countries was missing. Data for both real gross domestic product and population is obtained from *World Development Indicator*.

Per Capita Capital

The per capita capital stock is computed from real gross fixed capital by assuming a depreciation rate of 5 percent and dividing by population. Data on labour force for some countries was missing; therefore, to convert capital stock in per capita terms, capital stock computed from real gross fixed capital formation is divided by population instead of labour force. Data for both real gross fixed capital formation and population is obtained from *World Development Indicators*.

Other Variables

Data on all other variables, that is trade as percent of GDP defined as sum of exports and imports to GDP ratio (%), gross secondary enrolment ratio (%), life expectancy at birth (years), urban population to total population ratio and gap between male and female gross secondary enrolment ratio (%) are obtained from *World Development Indicators*.

5.2. Categorisation of Data

The study is based on a data set over the period 1987–2002 for 73 developed and developing countries. Data is categorised according to Freedom House indices of political rights and civil liberties into three categories: 'not free', 'partially free' and 'free' countries. Freedom House classifies countries on the basis of indices of political rights and civil liberties (each index ranging from 1–7 according to Freedom House). It classifies countries in range 6–7 as 'not free', those in range 3–5 as 'partially free' and others in range 1–2 as 'free' countries. According to proportions of Freedom House classification, the ranges of 'not free', 'partially free' and 'free' democracies are calculated to be 0–0.2856, 0.2857 –0.71427 and 0.71428 –1 respectively in the total range 0–1 of the combined democracy index of political rights and civil liberties. This categorisation according to democracy index results in three sub-groups: 'not free' countries comprising 13 countries, 'partially free' countries comprising 29 countries and 'free' countries comprising 31 countries.

5.3. Selection of Countries

The countries are selected on the basis of data availability and for which the capital-output ratio was in the range of 1.5–5 so that the countries where a spurious inverse relationship between capital and output exists can be omitted. For example moderate output levels with too little capital in developed countries can yield too little capital-output ratio, suggesting a negative relationship between capital and output growth in such countries. However the growth in output could be due to other factors like technological advances rather than capital growth alone. This selection criterion provides quite a heterogeneous mix of cross-sectional data set with total 73 countries including countries from all four income groups as categorised by *World Development Indicators* and at various levels of the democratic process.

5.4. Estimation Technique

We use the Generalised-Method-of-Moments (GMM) estimators developed for dynamic panel data that were introduced by Holtz-Eakin, *et al.* (1990), and Arellano and Bover (1995). GMM removes unobserved country-specific effects, and controls for endogeneity of all the explanatory variables. The regression equation can be specified in the following form:

$$y_{it} = \beta' X_{it} + \eta_i + \varepsilon_{it}, \qquad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4.1)$$

where y represents dependent variable, X represents the set of explanatory variables, η is an unobserved country-specific effect, ε_{it} is the error term, and the subscripts i and t represent country and time period, respectively. Now to eliminate country-specific effect, take first differences of Equation (4.1), to yield

$$y_{it} - y_{it-1} = \beta'\left(X_{it} - X_{it-1}\right) + \left(\varepsilon_{it} - \varepsilon_{it-1}\right) \qquad \ldots \quad \ldots \quad \ldots \quad (4.2)$$

The use of instruments is required to deal with (1) the likely endogeneity of the explanatory variables, and, (2) the problem by construction the new error term, $\varepsilon_{it} - \varepsilon_{it-1}$, which is correlated with the lagged dependent variable, $y_{it-1} - y_{t-2}$. Under the assumption that (a) the error term, ε, is not serially correlated, and (b) the explanatory variables, X, are weakly exogenous (i.e., the explanatory variables are assumed to be uncorrelated with future realisations of the error term), the GMM dynamic panel estimator uses the following moment conditions:

$$E\left[\, y_{it-s}\left(\varepsilon_{it} - \varepsilon_{it-1}\right)\right] = 0 \text{ for } s \geq 2;\, t = 3, \ldots, T, \qquad \ldots \quad \ldots \quad (4.3)$$

$$E\left[\, X_{it-s}\left(\varepsilon_{it} - \varepsilon_{it-1}\right)\right] = 0 \text{ for } s \geq 2;\, t = 3, \ldots, T, \qquad \ldots \quad \ldots \quad (4.4)$$

We refer to the GMM estimator based on these conditions as the difference estimator. There are, however, conceptual and statistical shortcomings with this difference estimator. Conceptually, we would also like to study the cross-country relationship between dependent and independent variables, which is eliminated in the difference estimator.

Statistically, Alonso-Borrego and Arellano (1996) show that when the explanatory variables are persistent over time, lagged levels of these variables are weak instruments for the regression equation in differences. Instrument weakness influences the asymptotic and small-sample performance of the difference estimator. Asymptotically, the variance of the coefficients rises. In small samples, Monte Carlo experiments show that the weakness of the instruments can produce biased coefficients.[2]

To reduce the potential biases and imprecision associated with the usual difference estimator, we use a new estimator that combines in a system the

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[2]An additional problem with the simple difference estimator relates to measurement error: differencing may exacerbate the bias due to errors in variables by decreasing the signal-to-noise ratio [see Griliches and Hausman (1986)].

regression in differences with the regression in levels [Arellano and Bover (1995)]. The instruments for the regression in differences are the same as above. The instruments for the regression in levels are the lagged differences of the corresponding variables. These are appropriate instruments under the following additional assumption: although there may be correlation between the levels of the right-hand side variables and the country-specific effect in Equation (4.1), there is no correlation between the differences of these variables and the country-specific effect. This assumption results from the following stationarity property,

$$E\,[\,y_{it+p}\eta_i\,] = \quad E[\,y_{it+q}\eta_i\,]\text{ and }E[\,X_{it+p}\eta_i\,] = \quad E[\,X_{it+p}\eta_i\,] \qquad \dots \ (4.5)$$

for all p and q.

The additional moment conditions for the second part of the system (the regression in levels) are

$$E\,[(\,y_{it-s} - y_{it-s-1}\,)(\eta_i + \varepsilon_{it}\,)] = 0 \ \text{ for s = 1,} \qquad \dots \qquad \dots \qquad \dots \ (4.6)$$

$$E\,[(\,X_{it-s} - X_{it-s-1}\,)(\eta_i + \varepsilon_{it}\,)] = 0 \ \text{ for s = 1.} \qquad \dots \qquad \dots \qquad \dots \ (4.7)$$

Thus, we use the moment conditions presented in Equations (4.3), (4.4), (4.6), and (4.7) and employ a GMM procedure to generate consistent and efficient parameter estimates.

6. ESTIMATION RESULTS

The results of dynamic simultaneous equations model, which determines per capita GDP and democracy index simultaneously are presented in Tables 1 and 2. Table 1 reports the impact of one unit change in democracy index on per capita GDP (taken in log form) controlling for the effect of per capita physical capital, ratio of sum of exports and imports to GDP, gross secondary enrolment and life expectancy at birth in the all countries group (linear specification), in all countries group (quadratic specification), and sub- grouping according to democracy that is 'not free' countries, 'partially free' countries and 'free' countries.

The indicator for physical capital formation that is growth in per capita capital stock positively and significantly affects per capita GDP growth in all categories, which is in line with the theory. The coefficients of this indicator in all countries' case with and without quadratic term, 'not free' countries, 'partially free' countries and 'free' countries categories indicate that one percent growth in per capita capital stock results in 0.98, 0.996, 0.99, 1.01 and 0.972 percent growth in per capita GDP in the respective categories and all these coefficients are significant at one percent level of significance. This is in accordance with the traditional growth theory and indicates per capita physical capital as a crucial input in the per capita GDP growth process.

Table 1

Regression Results for Log (Per Capita GDP Equation)

	Dependent Variable: Log(Per Capita GDP)				
	All Countries (No Quadratic Term)	Not Free Countries	Partially Free Countries	Free Countries	All Countries (Quadratic Term)
Constant	–0.12044**	0.206673**	–0.40295*	0.672188*	–0.27576*
	(0.0411)	(0.0178)	(0.0000)	(0.0009)	(0.0001)
Per Capita Capital	0.981972*	0.992952*	1.01013*	0.971837*	0.996141*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Dem. Index	0.003608	–0.02915	0.220191*	–1.70221*	0.662903*
	(0.9366)	(0.5462)	(0.0000)	(0.0000)	(0.0000)
Square (Dem. Index)	–	–	–	–	–0.52755*
					(0.0000)
Trade Openness Indicator	0.001956*	-0.00047	0.000437	0.000716	0.000781**
	(0.0000)	(0.3759)	(0.261)	(0.1574)	(0.0263)
Secondary Enrolment	–0.00015	0.002516*	–0.00145*	0.000221	0.000066*
	(0.1943)	(0.0001)	(0.0000)	(0.427)	(0.0000)
Life Expectancy	–0.00471*	–0.01175*	–.00136	0.00788**	–0.00484
	(0.0000)	(0.0000)	(0.0585)	(0.01)	(0.0000)
Wald Test	20022.38*	15045.34*	19560.22*	9174.402*	19350.7*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
No. of Countries	73	13	29	31	73
Included No. of Obs.	1160	205	465	495	1160

Note: The p-values significant at 1 percent and 5 percent are indicated by *, **. GMM is used that combines in a system the regression in differences with regression in levels to control for endogeneity of the regressors and the country-specific effects. For the regression equation in differences, lagged levels of the variable that can be endogenous are used as instrument while the instruments for the regression in levels are the lagged differences of the corresponding variables that can be endogenous. For the other explanatory variables that are not suspect to be endogenous according to theory, they themselves and their lags are used as instruments [Arellano and Bover (1995)].

The indicator of openness that is the ratio of the sum of exports and imports to GDP positively and significantly affects per capita GDP in the all countries group both when democracy enters linearly and quadratically and the impact is positive though insignificant in the 'partially free' and 'free' categories and negative though insignificant in the 'not free' category, however in our results the magnitude is near zero and hence the indicator of openness does not have much relevance in our analysis. One possible explanation could be that the impact of openness might be working through some other channel, which needs to be explored in further extension of this work. What we need to see is whether the sign, magnitude and significance of the openness indicator change once we take the democracy variable out of the regression and if so, then in what direction. The rationale for this exercise is to analyse the dynamic of trade effect on growth through the institutional channel especially through changing cultural norms as a result of global integration.

Similarly the human capital indicators that are gross secondary enrolment ratio (indicator for education) and life expectancy (indicator for health) should impact positively on per capita GDP growth according to theory. Again these indicators do not have much relevance in our results since the magnitude of impact is tending towards zero. The positive and significant impact of gross secondary enrolment ratio is found in the 'not free' and 'all countries' cluster (with quadratic term for democracy) and positive though insignificant coefficient in 'free' countries category. But the puzzling negative though insignificant impact of education is found in 'all countries' case with linear specification for democracy and negative and significant impact in 'partially free' countries grouping. One plausible explanation for the negative effect could be that in our estimations gross secondary enrolment ratio includes both male and female enrolments; there is evidence of negative and significant impact of female secondary and higher education on per capita GDP as reported in [Barro (1996)]. Therefore it could be the negative and significant effect of female education which is dominating in partially democratic countries leading to negative overall impact.

Though these estimates of secondary enrolment are tending towards zero but the wrong direction of impact of education proxy on per capita GDP growth needs to be investigated and understood. One reason for marginal impact of secondary enrolment as proxy for education could be that results are sensitive to use as proxy. We should in our further extension look in to other proxies, for example adult literacy rate, primary enrolment and see how our results change by the variation in proxy. Also we should include primary, secondary and tertiary level enrolment in our model to check for the level impact on per capita GDP growth. By doing this we can have an idea of the behavioural shifts as one moves from one category of education to the other to have an idea of presence of any non-linearity in education and per capita growth relationship and if so, try to capture these in our model explicitly.

Similarly, another proxy of human capital that has been included in the model is life expectancy at birth. Again we find estimates are close to zero, except in the 'not free' category where increase in life expectancy at birth by a year leads to decrease in per capita growth by 0.011 percent. This decrease could be due to increase in dependency ratio to earning members of the household and of society as a whole, which may translate into burden on the household's working age population affecting their productivity negatively. Hence the negative relationship between life expectancy at birth and per capita GDP is possible in 'not-free' countries. Also the impact tends to be positive in the 'free' countries category and there is significant increase of 0.007 percent in growth in this group. One reason could be that in our data the countries, which are falling into 'free' category, are the ones that belong to higher side of income distribution. Therefore the trade-off faced in households due to increased dependency ratio may not be as strong in 'free' countries categories because of

much higher resources availability on average than those in the 'not free' category. Also the provision of social security in these freer and high income societies may provide for old age benefits, hence the increase in life expectancy may not be translated into a burden on the household in such societies.[3]

Overall, the impact of secondary enrolment and life expectancy at birth is a marginal factor in our various regressions and significance and signs are also not in accordance with the positive and crucial role of human capital as explained in the endogenous growth models. However this negative or insignificant effect of human capital on growth has been observed and reported in many of the empirical work relating to growth regressions [Benhabib and Spiegel (1994); Islam (1995) and Pritchett (2001)]. The explanation in literature boils down to limitation of data availability in its scope in capturing all conceptual facets of human capital, mis-specification of human capital proxies in empirical growth models and finally misallocation of produced human capital towards monetarily rewarding but socially non-productive activities due to unsatisfactory institutional environment in certain developing countries [Krueger and Lindahl (2001); Kalaitzidakis, *et al.* (2001) and Pritchett (2001)].

Overall the impact of democracy index in 'all countries' case is positive though insignificant when it is added linearly but is positive and significant when we control for non-linearity in democracy-growth nexus through quadratic specification. Also there is sizable and significant increase of 0.66 percent in per capita GDP growth with one unit increase in democracy level. Positive and significant impact of democracy index (0.66) with a negative and significant quadratic term (–0.53) provides evidence in support of a quadratic relationship (inverted U) between democracy and per capita GDP. This means that per capita GDP is increasing in democracies at low levels but after a certain moderate level of democracy this relation turns negative. These findings on the relationship between democracy and per capita GDP are similar to findings in Barro (1996), Comeau (2003) and Plumper and Martin (2003). Non-linear relation is also indicated in our sub groupings' estimates as we find negative though insignificant estimate in the not free group, However we do get positive and sizable significant impact of unit change in democracy index on growth (0.22), which turns negative in countries that are grouped into 'free' category (–1.7, significant a 1 percent level of significance). Hence at the moderate level of political and civil freedom, the positive impact of democracy on per capita growth dominates but, after a certain level when countries reach a level of political liberalisation that have been classified as 'free' democracies by Freedom House, the rent seeking activities of interest groups and the redistributive pressures in democratic regimes dominate, resulting in a much lower level of growth [Wu (2004)].

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[3]This argument is debatable as one need to assess the burden of social security system in societies as a whole too whether they are efficient and optimal.

We should finally indicate that the constant in per capita GDP equations in Table 1 is significant and sizable in magnitude in all regressions, hence there is needed to capture more information so that the impact of these omitted influences could be taken into account. Among them could be the proxy of education at all levels, size of government to GDP ratio, inflation indicator, indicator of governance if data can be found, much improved proxy for trade openness and trade liberalisation etc.

Table 2 reports the impact of one unit change in per capita GDP (taken in log form) on democracy controlling the effect of various control variables in the 'all countries' group and sub- grouping according to democracy that is 'not free' countries, 'partially free' countries and 'free' countries. Among the control variables we have the indicator of openness, education and health as both indicators of public awareness to their rights and standard of living, ratio of urban population to total population and gap between male and female enrolment rates at secondary level of education.

Table 2

Regression Results for Democracy Index Equation

	Dependent Variable: Democracy Index				
	All countries (No Quadratic Term)	Not Free Countries	Partially Free Countries	Free Countries	All Countries (Quadratic Term)
Constant	–0.43155***	0.590256*	–0.79946**	0.374975*	–0.52755*
	(0.0662)	(0.0000)	(0.01)	(0.0000)	(0.0000)
Log (Per Capita GDP)	–0.01082	–0.01504	0.211929*	0.086639*	–0.38372*
	(0.8248)	(0.5191)	0.0001	(0.0000)	(0.0000)
Trade Openness Variable	0.000534*	–0.00141*	0.000809*	–0.00013	–0.01109
	(0.0066)	(0.0000)	(0.0034)	(0.2727)	(0.8199)
Gross Secondary Enrolment	0.000172	0.000874	0.000595	0.000146	0.000319
	(0.4484)	(0.2286)	(0.3885)	(0.4007)	(0.1086)
Life Expectancy at Birth	0.013409*	–0.00572*	0.004116***	0.001818	0.000226
	(0.0000)	(0.0007)	(0.0507)	(0.2264)	(0.3183)
Urban Population to Total Population	0.375647*	0.03664	0.226341**	0.048468	0.012923
	(0.0000)	(0.7868)	(0.0491)	(0.4269)	(0.0000)
Gap bet. Male and Female Enrolment	0.000303	0.002617**	0.000005	–0.00053	0.377016*
	(0.2226)	(0.0267)	(0.9628)	(0.1924)	(0.0000)
Wald Test	535.3857*	63.31172*	21.15196*	49.46815*	515.4921*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Number of Countries	73	13	29	31	73
Included No. of Obs.	1160	205	465	495	1160

Note: The p-values significant at 1 percent, 5 percent and 10 percent are indicated by *, **, ***. GMM is used that combines in a system the regression in differences with regression in levels to control for endogeneity of the regressors and the country-specific effects. For the regression equation in differences, lagged levels of the variable that can be endogenous are used as instrument while the instruments for the regression in levels are the lagged differences of the corresponding variables that can be endogenous. For the other explanatory variables that are not suspect to be endogenous according to theory they themselves and their lags are used as instruments [Arellano and Bover (1995)].

The expected sign of impact of trade openness variable on propensity to experience political and civil freedom is positive. The rationale for this is that trade of goods and services will open the countries to the flow of ideas and ideology from one country to another. As the world gets more and more integrated the flow of democratic thought to non-democratic countries would also increase. Students of some not so politically free countries studying in democratic countries carry back their experiences of political and civil freedom which contributes to increase in political awareness in their home country. The impact of openness in terms of magnitude in our estimates is tending towards zero and is irrelevant so we will focus only on signs and significance for this variable. The positive and significant impact of openness on democracy index is found in the 'all countries' category (linear specification), and the 'partially free' countries grouping while the significant negative effect is reported in the 'not free' category and negative, though insignificant impact, in 'free' countries category, and the 'all countries' category (quadratic specification). So at a moderate level of democratic openness and global integration help in transmitting the norm of freedom from free economies, but in case of economies that are operating under very limited freedom in terms of political and civil rights and are categorised as 'not free', even integration has no impact. Part of the reason could be that people have become so restricted in their vision and their desire for freedom that even global culture has no influence in helping them change their course and fight for their own rights. This behaviour of acceptance of being ruled under an autocratic regime is in accordance with the path dependence notion as hypothesised by North (1990) as it makes it difficult for institutional changes to come about.

Education can raise public awareness and help develop social structures that enhance the ability of the people to organise and also increase the receptivity to democratic political tolerance norms; hence its expected sign according to theory is positive. Marginal increase in democracy of 0.00017, 0.000874, 0.000595 and 0.000146, 0.00032 units it is insignificant in the 'all countries' case (linear specification); 'not free' countries, 'partially free' countries, 'free' countries and 'all countries' (quadratic specification) due to one percentage point increase in secondary enrolment ratio.

There exists a theoretical ambiguity on the effect of urbanisation rate on democracy. At one level it has been hypothesised that rural population has limited ability to organise and therefore it can be easy for a dictator to suppress it while rise in urbanisation makes it easier for people to meet and communicate which, presumably, makes them harder to suppress. But it can also be argued that a less dense rural population or more dense urban population is easier for a centralised government to monitor and control. The results show that one percentage point increase in urban population to total population ratio causes a significant increase in democracy index of the magnitude of 0.376, and 0.226 units in the 'all countries' group and partial democracies respectively and

insignificant increase of the magnitude of 0.037, 0.048 and 0.013 units in 'not free' countries, 'free countries' groups and 'all countries' with quadratic specification respectively. It means greater urban density has positive impact at all levels of analysis underlining the role of awareness and organisation in an urban population.

The gap between male and female enrolment exerts controls on the effect of more equal educational opportunity across sexes on democracy. The idea is that expanded educational opportunity for females can develop social structures that are generally more participatory and hence more receptive to democracy. Hence the increase in the gap between male and female education should undermine democracy on theoretical grounds. The positive impact of one percentage point increase in the gap between male and female gross secondary enrolment ratio causes increase in democracy index of 0.0003, and 0.000005 in the 'all countries' group, and partially democratic countries respectively, though this increase is insignificant. The positive and significant impact is observed in the 'not free' countries group, that is one percentage point increase in the gap between male and female gross secondary ratio increases the democracy index by 0.002617 units. Negative but insignificant effect on the democracy index of the magnitude of 0.00053 due to one percentage point increase in the gap between male and female gross secondary enrolment ratio is obtained in 'free' democracies case. All the above-discussed coefficients tend towards zero, an evidence of weak association. However in the 'all countries' case where we have control for non-linear relationship in democracy and growth nexus, we find evidence of positive and significant sizable increment in democracy index of the magnitude of 0.38 due to one unit increase in the gap between male and female educational proxy.

Life expectancy at birth is a measure of health status and is another indicator of increase in standard of living apart from per capita GDP and it controls for the effect of standard of living through the health sector so that an independent link between per capita GDP and democracy can be analysed. The impact in the 'all countries' case (linear specification) is positive and significant of the magnitude of 0.0134—that is life expectancy by a year leads to increase of 0.0134 units in democracy. Negative and significant effect of a unit increase in life expectancy on the democracy index is found to be of the magnitude of 0.00572 units in the 'not free' countries category, however this impact tends towards zero, showing a weak negative association. Life expectancy affects democracy positively though insignificantly with the magnitude of 0.002 and 0.0002 units in 'free' democracies and 'all countries' case with quadratic specification respectively and significantly with the magnitude of 0.004 units at 10 per cent level of significance in 'partially free' democracies. But all these effects are close to zero, again showing evidence of weak impact. Thus by taking life expectancy as measure of standard of living evidence for Lipset hypothesis that prosperity leads to democracy is confirmed only in the 'all

countries' case with linear specification but once we turn to quadratic specification and analysis at different level of democracies we do not find any evidence of increase in living standard as proxy for improved health status leading to higher propensity to experience democracy.

The results show that the positive and significant impact of increase in per capita GDP on democracy index is observed in 'partially free' countries and 'free' countries groups, that is one percentage point increase per capita GDP growth causes an increase in democracy index of 0.212 and 0.087 units in these respective categories. In the 'not free' countries category the effect of per capita GDP on democracy index is negative and insignificant (–0.015). The overall impact of increase in per capita GDP on the democracy index is negative but insignificant in the 'all countries' category (linear specification) and negative and significant in the 'all countries' category (quadratic specification) with magnitude of 0.01 and 0.38 respectively. Thus taking per capita GDP as a measure of standard of living, the evidence for Lipset hypothesis that prosperity leads to democracy is confirmed only in 'partially free' democracies where not only the impact is positive and significant but also of sizable magnitude and in 'free' democracies where the impact is positive and significant but of lesser magnitude compared to democracies at moderate level. Hence increase in per capita GDP growth has much more consequence for countries at moderate level of political and civil freedom than those which have already achieved much higher levels of freedom. But in the 'not free' category the impact of increase in per capita GDP growth on propensity to experience democracy is estimated to be insignificant and negative. But in our estimates of impact of per capita GDP growth on the democracy index in 'all countries' case for both linear and quadratic specification, the trend reflected in the estimates of 'not free' category dominates. One reason could be that countries that are under pure or close to pure autocratic set up are either largely developing countries or countries like China that have done well under authoritarian system in terms of growth. So increase in growth actually validates the autocratic rule in these countries and provides legitimacy in the minds of the public for continuation of autocratic rule.

7. CONCLUSION

This study has tried to answer the question that captivates the minds of all political economists, "Is it polity with more political rights and civil liberties that leads to economic growth or is it the reverse phenomenon of economic growth leading to democracy that holds empirically?" There exist many theoretical and empirical ambiguities relating to these effects. This study has tried to resolve the controversy that exists in literature on the relationship between democratic form of governance and economic growth empirically.

The empirical divide as to evidence of both positive, negative and no impact of democracy on per capita GDP growth can come if the appropriate step to control simultaneity bias and possible non-linearity of the growth are not taken into account. In this paper we control for the endogenous relationship between economic and political outcomes explicitly through a dynamic simultaneous model applied on a data set over the period 1987-2002 for 73 developed and developing countries. This allows us to have controls for endogeneity of the regressors and the country-specific effects using the Generalised-Method-of-Moments (GMM) estimation technique that combines in a system the regression in differences with regression in levels.

By removing unobserved country-specific effects through the GMM estimation technique, we are able to have control for institutional elements e.g. culture and religion which may vary across countries and are hard to measure and control otherwise. Also by modelling democracy and per capita GDP growth nexus in a simultaneous equation framework, we are able not only to analyse the impact of changes in democracy level on per capita GDP growth but also the reverse causation from per capita GDP growth as an indicator of prosperity on democracy, a phenomenon that has been termed as Lipset hypothesis in literature. Finally, to have control for any specification bias that may arise by modelling the impact of democracy on per capita GDP growth linearly, we analyse this relation at two levels: one by testing linear vs. quadratic specification in the entire sample and then in the sub-groups divided by democracy index. This has been done keeping in mind that the relation between democracy and per capita GDP growth may vary across countries at different levels of democratic process and may shift along this ordering in a non-linear fashion.

Our result shows evidence in support of a quadratic relationship (inverted U) between democracy and per capita GDP. This means that per capita GDP is increasing in democracies at low levels but after a certain moderate level of democracy, this relation turns negative. Non linear relationship is also indicated in our sub groupings' estimates. Hence at a moderate level of political and civil freedom, the positive impact of democracy on per capita growth dominates but after a certain level the rent seeking activities of interest groups and the redistributive pressures in democratic regimes dominate, depressing growth levels.

Taking per capita GDP as a measure of standard of living, evidence for the Lipset hypothesis is confirmed only in 'partially free' democracies where not only the impact is positive and significant but also it is of sizable magnitude and in 'free' democracies where the impact is positive and significant but of lesser magnitude compared to democracies at moderate level. Hence increase in per capita GDP growth has greater consequence for countries at moderate level of political and civil freedom than those which have already achieved much higher

levels of freedom. But in the 'not free' category the impact of increase in per capita GDP growth on propensity to experience democracy is estimated to be insignificant and negative. Even though we find this weak negative and insignificant effect of per capita GDP on the democracy index in the 'not free' grouping but in our estimates of impact of per capita GDP growth on democracy index in all countries case for both linear and quadratic specification, the behaviour reflected in estimates of 'not free' category dominates. One reason could be that countries that are under pure or close to pure autocratic set up are either largely developing countries or countries like China that have done well under authoritarian system in terms of growth, so the increase in growth actually validates the autocratic rule in these countries and provides legitimacy in the minds of public in these countries for continuation of autocratic rule.

Appendix Table A.1

Recent Empirical Studies on Democracy Growth Linkages

Author	Sample	Time Frame	Finding
Helliwell (1994)	125 Countries	1960–1985	▪ Negative and insignificant direct effect of democracy on growth ▪ Positive effect of income on democracy.
Baun and Lake (2003)	128 Countries	30 years	▪ No statistically direct effect of democracy on growth ▪ Positive indirect effect of democracy on growth through life expectancy and secondary education
Quinn and Woolley (1999)	108 Countries	1974-1989	▪ Democracies are characterised compared to autocracies by stable growth rates
Barro (1996)	100 Countries	1960-1990	▪ Output growth is increasing in democracy at low levels of democracy but the relation turns negative once a moderate amount of democracy has been achieved
Barro (1999)	100 Countries	1960-1995	▪ Propensity for democracy rises with per capita GDP, primary schooling and a smaller gap between male and female primary attainment ▪ Propensity for democracy decreases with urbanisation and greater reliance on natural resources
Rodrik (1997)	90 Countries	1970-1989	▪ Democracies yield predictable long-run growth rates than autocracies ▪ Democracies provide greater stability as compared to autocracies ▪ Democracies handle adverse shocks better than autocracies ▪ Democracies pay higher wages as compared to autocracies
Tavares and Wacziarg (2000)	65 Countries	1970-89	▪ Overall moderately negative effect of democracy on growth ▪ Indirect positive effect via human capital accumulation and reduction in income inequality ▪ Indirect negative via reduction in physical capital accumulation and rise in ratio of government consumption to GDP
Rivera-Batiz (1999)	Cross County	1960-90	▪ Indirect positive impact of democracy through governance on growth
Kurzman, *et al.* (2002)	106 Countries	1951-1980	▪ No direct effect of democracy on growth ▪ Positive indirect effect via investment and government expenditure. ▪ A robust nonlinear effect via social unrest
Gerring, *et al.* (2004)	All Countries in the World	1950-2000	Positive robust effect of democracy on growth
Rigobon and Rodrik (2004)	83 Countries	–	Positive effect of democracy on growth
Narayan, *et al.* (2007)	30 Sub-Saharan African Countries	1972-2001	Mixed evidence across different countries
Cuberes and Jerzmanowski (2009)	181 Countries and 29 Manufact. Categories.	1963-2003	Indirect positive impact of democracy through industrial diversification
Zakaria and Fida (2009)	Pakistan	1947-2006	Weak negative impact of democracy on per capita GDP growth

Table A.2

Countries List by Democracy Level

Sr. No.	Not Free	Partially Free	Free
1.	Cameroon	Benin	Bolivia
2.	Côte d'Ivoire	Comoros	Cape Verde
3.	China	Madagascar	Dominican Rep.
4.	Guinea	Mali	Hungary
5.	Ethiopia	Mozambique	Chile
6.	Haiti	Pakistan	Argentina
7.	Kenya	Senegal	Ecuador
8.	Mauritania	Indonesia	Costa Rica
9.	Rwanda	Zimbabwe	Korea,Rep
10.	Togo	The Gambia	Greece
11.	Algeria	Nicaragua	New Zealand
12.	Egypt	Bulgaria	Norway
13.	Iran	India	Spain
14.		El Salvador	Iceland
15.		Honduras	Luxembourg
16.		Jordan	Netherlands
17.		Morocco	Italy
18.		Paraguay	France
19.		Peru	Finland
20.		Philippines	Venezuela
21.		Sri Lanka	Trinidad & Tobago
22.		Swaziland	Uruguay
23.		Thailand	Mauritius
24.		Tunisia	Australia
25.		Brazil	Austria
26.		Malaysia	Belgium
27.		Mexico	Denmark
28.		Panama	Sweden
29.		Turkey	Switzerland
30.			United Kingdom
31.			United States

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