THE DYNAMICS OF PRIVATIZATION, PRIVATE SECTOR SIZE AND VARIATIONS IN THE SIZE OF THE PUBLIC SECTOR: PANEL DATA EVIDENCE FROM AROUND THE WORLD

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By

Muhammad Ali Saeed (Msc)

Department of Economics

University of Leicester

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MUHAMMAD ALI SAEED

ABSTRACT

The study provides an overview of the privatization world, identifying key economic, political and institutional factors that have caused variations in the intensity of privatization across countries from different regions of the world. To assess the future path of the privatization policy, the study investigates the dynamics of the private sector and identifies key economic conditions and institutional frameworks that have contributed to the size of the private sector. Using data on private sector employment as a share of total employment to proxy the size of the private sector, it is found that foreign inflow of funds, privatization transactions, total stocks traded activity, credit to private sector and institutional quality are significant factors that have enhanced the size of the private sector around the world. Secondly, the study re-visits some of the leading hypotheses on determinants of public sector size and tests the effect of institutional quality and political competition on public sector size. Dynamic panel estimation techniques reveal that improved law and order and high levels of institutional quality reduce the size of the public sector. The study shows that increased level of political competition also limits the size of public sector spending. The last chapter of the thesis estimates the effect of privatization policies on economic growth, where it is found that both revenues generated from privatization of state firms and the numbers of privatization transactions have a positive impact on economic growth. The results from the growth chapter also reveal that increased level of public sector size has a negative impact on economic growth which is proxied by GDP per capita growth. The growth chapter also provides evidence of a U shaped quadratic relationship existing between economic growth and public sector size. The results of the growth chapter provide a strong case for the positive macro-economic impact of privatization policies therefore acting as a public policy adviser I would strongly recommend governments around the world to continue on the path of privatization.

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Table of Contents

Abstract
Acknowledgements
Table of contents
List of tables
List of figures

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

List of Tables

Chapter 3

The dynamics of private sector size, institutional quality, financial development and privatization of state-owned enterprises

Chapter 4

Variations in the size of the public sector: Does Institutional quality and political competition matter? Panel data evidence from around the world

Chapter 5

Impact of privatization policies and public sector size on economic growth

List of Figures

Chapter 1

Introduction

The need for expanding the private sector and cutting the size of the public sector has become the focus of government economic policies as countries around the world attempt to overcome the aftermath of the global financial crisis. The financial crisis in the last eighteen months has forced the Greek government to opt for its third multi billion Euros bailout package from the European Central Bank. The United States of America (USA) in the midst of the financial crisis has lost its triple A-credit rating and with the ongoing war in Afghanistan its public debt has reached an all time high. The new head of the International Monetary Fund (IMF) has predicted greater economic difficulties ahead as countries try to lower the level of public sector debt. One thing is for certain that a decrease in the size of the public sector by reducing government spending would not be enough to end the current economic difficulties and countries would have to adopt parallel policies of expanding the private sector size to fully recover from the financial crisis. Therefore, the current study looks at four important areas that need investigation: firstly, the need to look into the dynamic world of privatization and identify key economic and institutional determinants that have driven individual counties towards the sale of state-owned enterprises. Secondly, to identify factors that have affected the private sector size around the world. Thirdly, to revisit existing theories on the determinants of public sector size to evaluate the various factors that have affected the size of the public sector. And in the last chapter the study evaluates the impact of privatization activity and public sector size on economic

development proxied by per capita GDP. The study conjectures that a link exists between privatization of state-owned enterprises and private sectors in economies of the world; furthermore it is evident that the growth in both privatization and private sectors will also affect the size of the public sector.

Existing literature has found various economic, institutional and political factors in influencing privatization around the world. Recognizing the heterogeneous country specific-factors in the privatization world, the study provides an overview of individual countries that have transferred state enterprises to private hands. It is seen in the second chapter that political factors and the left-wing ideological basis of the ruling government were the main hurdles of privatization in South-Asian countries. India, the biggest economy in the South Asian region and a member of the World's G-20 nations, had to endure the deep-rooted anger towards the privatization policies among its electorate. On the other hand right-wing governments enjoying overwhelming majority in legislature, were only able to pursue policies of divesture in Pakistan, the second biggest nation in the South Asian region. The deep unpopularity of the privatization policies among the electorate was also evident in Latin America where political forces were responsible for halting the sale of public assets in countries like Brazil. On the economic front Drazen and Easterly (2001) predicted privatization to be intensified under deteriorating economic conditions while Bortolotti et al (2003) found privatization being triggered by favorable economic conditions for a panel of developing and developed countries. In the second chapter the existing study shows that privatization in Mexico and Malaysia was primarily driven by worsening public debts and privatization of public firms was an integral part of Chinese economic growth policies. On the effect of institutional quality measures on privatization policies it has

been found by studies like Adams and Mengistu (2008a) that the two are highly correlated, the lack of quality institutions can be attributed to have been a major hurdle in the process of privatization in the African region: and in the last thirty years the African region has witnessed the least amount of privatization activity as compared to other regions.

The third chapter forms a hypothesis that privatization policies and the three factors influencing privatization in the previous chapter are all key determinants affecting the size of the private sector around the world. The non-availability of any existing work on the determinants of the private sector posed a major challenge to the study, where the selection of the explanatory variables was done within the framework of economic and institutional factors critical to the development of the private sector. The selection of the variable to proxy the size of the private sector also posed a considerable test, as leading sources of country level data like the World Development Indicators, International Financial Statistics and Penn World Tables do not provide statistics on private sector share of GDP. To overcome the lack of data on the private sector size, the study relied on private sector employment data provided by the International Labour Organizations (ILO). The study was unable to find any existing work that would have used employment data to proxy private sector size but studies like Rodrik (1998) have used public sector share in employment to proxy the size of the public sector, which to some extent provides legitimacy to the use of cross-country data to see the variations in the private sector. The only discouraging fact about the ILO data on employment in the private sector is that it is limited to 48 developed and developing countries. The limitations of the ILO data set did not discourage the existing work from empirically testing the dynamic world of the private sector and the detailed results presented in the

this chapter provide insights into the factors affecting the private sector in a panel of countries which includes nations like India and the United States of America.

The emergence of quality of institutions as a key variable in effecting the size of the private sector in the third chapter motivated the study to use the institutional measures to investigate also the variations in the size of the public sector in the fourth chapter. The political risks variables provided by the International Country Risk Guide (ICRG) covering the period of 1984 to 2009 are used in the fourth chapter to proxy the level of institutional quality. The biggest advantage of the ICRG data base is that it provides data on more than 100 countries of the world. The extensive coverage of the ICRG database and the availability of an index of political competition provided by the Database of Political Institutions (DPI) enabled the study to assemble a panel data set of nearly 88 countries for the fourth chapter. The larger selection of countries from all regions of the world is more representative of the real world than the data set used in the third chapter, which was limited to 48 countries due to the availability of employment data for the selected countries. The 88 countries selected on the basis of availability of institutional quality and political competition index also had available data on public sector share in GDP provided by the Penn World Tables 6.3. The public sector share in GDP is used as the dependent variable in the entire set of regressions in the fourth chapter with various determinants of public sector size which are used as explanatory variables.

Overall the first four chapters of the study provide an insight into the dynamic world of privatization and investigate the key factors causing cross-country variations in the size of both public and the private sectors. The recognition of the key institutional and

economic variables is probably not enough to provide a complete picture on the influences of privatization of state owned firms and public sector expenditure on the overall economic development in nations across the world. Thus, the study empirically tests the impact of privatization policies and public sector size on GDP per capita growth for a panel of countries. Once more the chosen panel in the fifth chapter is different from the earlier chapters as every effort has been made to include the maximum number of countries that have privatized state owned firms in the estimated time period from all available sources. World Bank's privatization database is used to provide data for the majority of the developing countries, whereas privatization data for developed countries is taken from Privatization Barometer and lastly, the privatization data for some of transition economies of Eastern Europe is taken from the Structural Change Indicators provided by the European Bank for Reconstruction and Development (EBRD). The multiple data sources help the study to provide a comprehensive insight into the macro-economic impact of privatization policies in nearly all countries including China that have adopted the policy of selling state-owned firms. The use of heterogeneous sources of data especially the three sources of privatization variable has its weaknesses and may affect the reliability of my results but to provide policy implications to governments across various regions of the world, it is important to include data from all available sources. It is also important to mention here that the study's main source of privatization data is the World Bank Privatization database which relies on the other two sources of privatization data namely Privatization Barometer and EBRD privatization database. So the data sources may be separate but within them there exist some degree of professional harmony. The reliance on other two databases is acknowledged by the World Bank Privatization database.

The three empirical chapters of the study (i.e chapter 3, 4 and 5) rely on annual data and in chapter 4 four-year moving averages are used for estimation as opposed to using four or five year non-overlapping averages. The use of annual data in the current study has been influenced by the recommendations made by Bergh and Karlsson (2010). The use of non-overlapping averages data is primarily adopted to capture the steady state relationship between the variables being tested; a technique which can also lead to removal of key variations, the variations that can potentially help to improve identification of variables of interest. Thus to maximize the utility of available data and capture the useful variations present in time series data, the study employs annual data in the entire set of regressions. The selection of the empirical methodology for the current study is guided by the existing literature where numerous studies such as Arellano-Bond (1991) and Islam (1995) imply that economic relationships are dynamic in nature and the use of dynamic panel estimators lets the investigator better comprehend the dynamics of adjustment. The current study conjectures that the relationship between private sector size and the determinants causing variations in its size, as well as the relationship between public sector size and its determinants is dynamic in nature. The presence of a dynamic relationship implies the inclusion of the lagged dependent variable as an additional right hand side variable and thus the study employs throughout an empirical methodology that has been designed to give unbiased results in the presence of the lagged dependent variable as an additional right hand regressor.

In summary the results of the three empirical chapters of the study are as follows;

- The study provides a debate on the determinants of private sector size and finds that the numbers of privatization transactions, foreign inflows of funds, financial development and institutional quality have a positive impact on the size of the private sector.

- The study introduces institutional quality as a determinant of public sector size and finds that an improvement in law and order would lead to a reduction in the size of the public sector. The study adopts an econometric methodology that controls for the persistence exhibited by the public sector size data.

- Using an econometric technique that controls for the endogenous right hand side regressors in a typical growth regression, the study finds a positive macro-economic impact of privatization policies. The positive macro-economic impact is for a data set that includes China and Transition economies of Eastern Europe, a set of countries that have been overlooked by existing studies. The growth chapter also reveals that public sector share in GDP has a negative impact on economic growth.

Chapter 2

Privatization across various regions of the World

Sale of state owned enterprises to private hands is commonly known as "Privatization", a word that was initially coined in the late 1970s by the British Prime Minister Margaret Thatcher to start one of the world's biggest privatization programs. The main thrust of British privatization was seen during the 1980s and by the time right-wing Conservative Prime Minister Margaret Thatcher left 10 Downing Street in early 1991, Britain to a great extent had rolled back the frontiers of the state. The fall of communism and the emerging economies of Asia and South-America in the early 1990s made privatization of state owned enterprises a world-wide phenomenon. Privatization reached its peak in the late 1990s and with onset of the global financial crisis in 2008 the world saw a sharp decline[1] in the number of privatizations. The recent global financial crisis may have slowed down privatization but at the same time it has prioritized the urgency of countries to reduce the level of public debt. Historically speaking high levels of domestic and foreign debt were responsible for privatization to take place in the first place. The right wing ideology of the conservative party and the high level of public debt were the two main drivers of divesture in Britain in the late 1970s. Bortolotti et al. (2003) identified high level of public debt and functioning financial institutions as two main triggers of privatization in a panel of 34 developed and developing countries. Ramamurti (1992) pointed out towards high budget deficits and governments' fiscal reliance on international donors such as World Bank and International Monetary Fund

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[1] World Bank Privatization database 2009.

(IMF) as the main drivers of privatization in developing countries. The Executive Board of the IMF[2] in 2004 approved a US $ 367 Million Standby Arrangement payment to Romania after the country had experienced accelerated privatization program in 2003.

Boubakri et al. (2009) showed increased level of nation's public debt triggered privatization for a sample of 56 developed and developing countries. With available cross-country evidence on the economic factors such as public debt to have triggered privatization in the past one can say that in the post financial crisis world facing increased level of public debt, we can potentially witness another wave of world-wide privatization in both debt ridden developing and developed countries. So it is essential to analyze critical economic and political factors that preceded privatization of the last century in individual countries from different important regions of the world. Therefore before proceeding on to the empirical chapters of the thesis this chapter provides a Privatization overview of some of the World regions and outlines factors that lead them towards privatization in the last thirty years. The selection of the various regions below is purely done on the grounds of providing greater insight to the developing world and available Privatization data from the World Bank.

2.1 Privatization in Asia

Pakistan has witnessed seven elected, four caretakers and 1 military dictatorial government since 1990, who have all supported the basic idea of privatizing state owned enterprises. But it was only the right wing government enjoying an overwhelming parliamentary majority from 1990 to 1993 which provided the major

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[2] International Monetary Fund Press Release No. 04/137 July 7, 2004.

impetus to Pakistan's privatization program. In January 1991 a dedicated government institution in the name of *Privatization Commission* was established to oversee the divesture of state owned firms. In terms of privatization deals the peak was seen in 1992 where 48[3] transactions took place. At that time Pakistan was lead by a right wing Prime Minister whose own steel mill was nationalized by a leftist government in mid 1970s.

In 1993 the right wing[4] government was booted out by the military and in a subsequent election the traditional leftist party the Pakistan People's Party slowed down the privatization in its three year rule. The nuclear tests and a limited war with India in the late 1990s also slowed down the momentum of transfer of state enterprises, but the dictatorial military regime in the early 2000 provided a boost to the process of privatization. With no threat from critical opposition groups Pakistan's governments' most lucrative assets were sold in a five year period between 2002 and 2007. The accelerated pace of privatization in the first decade of the new century was also influenced by the International Monetary Fund (IMF) as payments such as the release and approval[5] of US $ 118 Million through its PRGF-Supported Program was made conditional to the future privatization of Habib Bank Pakistan, the largest state-owned bank in Pakistan. From the outset the commission spelled out its objectives which were as follows;

1. Decreasing the level of government fiscal deficit

2. Increased efficiency of privatized enterprises

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[3] Annual Report 2010, Privatization Commission Government of Pakistan.

[4] The classification of Pakistan's government orientation is taken from Database of Political Institutions (2010).

[5] International Monetary Fund Press Release No. 03/26 February 28, 2003.

3. Establishment and development of domestic stock markets

The Commission used the issuance of shares in domestic stock markets and open market competitive bidding as the two main methods of privatizing state owned firms to achieve its above mentioned objectives. The methods were perhaps simple but the objective of reducing public debt via privatization was probably the most difficult and ambitious objective that had been assigned to the privatization commission. There existed a substantial mismatch between Pakistan's debt and the revenues that were raised from the process of privatization. Little less than 1 billion rupees were generated by 48 privatization deals in 1992 and in the same year government's fiscal deficit was close to 95 billion rupees.

In terms of maximum privatization revenues it was in the year 2005 that Pakistan's privatization raised 22 billion rupees (3.6 billion US $) for the exchequer, while government's fiscal debt in 2005 had climbed to 250 billion rupees (42 billion US $). Pakistan's privatization was able to improve efficiency of privatized firms, Bonaccorsi di Patti and Hardy (2005) found Pakistan's privatized banks enhanced their profit efficiency immediately after state relinquishing control over them. They also found privatization coupled with deregulation of the banking sector resulted in "superior bank performance" in Pakistan. In the period of 2002-2007 Pakistan's most lucrative enterprises were sold through its domestic stock markets and in terms of the stock development the period of 2002 to 2007 was definitely the finest moment in Pakistan's stock markets. In a nut shell Pakistan's privatization can be attributed to right-wing governments who had faced no political opposition, while the policy of divesture did fulfill some of its desired objectives. Firstly, the efficiency of privatized firms and

secondly, the development of Pakistan's domestic stock markets were a fallout of the privatization process.

During the last decade of the 20th century developing countries from different regions of the world embraced privatization of state-owned enterprises. Latin American countries raised privatization revenues of 177 billion[6] US $ in the period of 1991 to 1999 while countries from South Asia were only able to raise 11.7 billion US $ in the corresponding period. The low intensity of privatization in Asia can be attributed to negligible public support for divesture in nations like India; the biggest economy in the South Asian region. The low popularity of privatization in India can be attributed to the fear of people losing their jobs in privatized firms as traditionally India's state enterprises have been used by politicians to provide jobs to increase their political weight among voters. The fall of communism and a balance of payments crisis in 1991 lead India towards a more market oriented economy away from a centrally planned economy based on the Soviet Union model. The Policies of economic liberalization in India were announced by the victory of Indian National Congress (INC) Party in 1991 general elections. Privatization of state owned enterprises and opening of Indian borders to foreign investment were two key components of the economic liberalization policies adopted by a traditionally leftist party. Ministry of Disinvestment was also set up in the early 1990s to overlook the transfer of state owned enterprises. In the subsequent five years rule, the Congress party was unable to make a strong headway in transferring state owned enterprises to private hands and was only able to generate 5.5 billion US dollars in privatization revenues. During the same period, the Indian economy witnessed one of its strongest growth rates ever. In 1991 the Indian economy had an annual GDP growth

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[6] World Bank Privatization Database 2001.

of 1.06 %[7] and by 1996 when INC government lost the general elections, India's annual GDP growth had climbed to 7.55 %. Even in times of economic prosperity and economic liberalization the leftist ideological base of the Congress party proved a major hurdle for intensive privatization programs.

India saw the worst period of political upheaval in its history from 1996 to 1999 where five successive federal governments were formed in a short period due to a hung vote in the 1996 general elections as no political party/alliance achieved a working majority in the lower house of the Indian parliament. Country's President called for a general election in 1999 which witnessed a victory of a 24 party alliance lead by Bharatiya Janta Party (BJP) and a formation of a traditional right wing[8] government at the federal level. The new right-wing government provided a wholehearted attempt to privatize some of India's state owned enterprises. In the five year rule of BJP, the Indian government raised an impressive 8.76 billion US dollars in terms of privatization revenues. The right wing government of BJP inherited an annual GDP growth rate of 7.39 % in 1999 and at the time of defeat in the 2004 general elections the Indian economy was growing at an impressive annual rate of over 8%. Both the left wing government of 1990's and the right wing Indian government of early 2000 witnessed healthy growth rates but only the right wing party of BJP followed a wholehearted privatization program. The subsequent return of a minority INC in 2004 at the federal level was only possible with the support of the Indian Communist party (the left front) which made the closing of the disinvestment ministry a precondition to providing political support to the INC. The slow pace of Indian Privatization can also be attributed to the non-reliance of the Indian economy to international donors such as the IMF; as it was highlighted earlier that

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[7] World Development Indicators 2010
[8] The classification of Indian government orientation is taken from Database of Political Institutions (2010).

countries like Pakistan and Romania were forced through their respective Structural Adjustment Programs of the IMF to adopt the route of privatizing of state-owned enterprises.

The rise of the leftist parties to power in 2004 witnessed a major blow to the transfer of state owned enterprises to private hands. Thus it is possible to conclude that India's privatization program has been driven more on the basis of ideological roots of ruling parties and economic factors either good or bad have not been able to influence the policies of divesture. The extent of political factors influencing privatization can be fully understood from the following results obtained from research on Indian privatization; "We find that the government delays privatization in regions where the governing party faces more competition from opposition parties. The results also suggest that political patronage is important as no firm located in the home state of the minister in charge is ever privatized." Dinc and Gupta (2011) page 266. International pressure to create more competition in its domestic market and the desire of India to become a global economic player has been a major factor in promoting the sale of state owned assets within the difficult political environment. The strength of India's institutional quality, the independent judiciary and need to develop internationally reputable financial institutions has also played a key role in promoting the process of privatization. Kapur and Ramamurti (2002)

Malaysia was one of the earliest countries to adopt the privatization program in the Asian region as the country saw its first privatization way back in 1983. The three past decades of Malaysian policy of divesture were primarily driven by a mixture of economic, institutional and political factors. The falling oil price in early 1980's

coupled with world recession lead to decreased Malaysian exports and as a reaction the

Malaysian government introduced expansionary fiscal policy. The economic difficulties

of the Malaysian were also compounded by the heavy industrial investments of the

1970's and their repayments which were primarily financed by foreign countries. The

combination of world recession and increased public spending aggravated public debt in

Malaysia. Soon after the 1982 general elections the newly elected Prime Minister

Mahathir announced austerity plans for the economy and the newly elected government

announced plans to follow the Bretton Woods institution by initiating privatization of

Malaysian state-owned enterprises. The release of First Privatization Master Plan in

Malaysia in the mid 1980s coincided with the ruling government happily embracing the

right-wing ideological climate from countries like United States of America (USA) as

for the first time in its history the Malaysian government signed a bilateral military deal

with USA. In the first wave (1983-1990)[9] only 37 state firms were transferred to private

hands, the low number of privatized firms was primarily due to numerous economic

difficulties of the 1980s and lack of public support for privatization.

The election of 1990 provided a 75% parliamentary majority[10] to the newly formed

government to pursue its election pledge of increased privatization whereby 204[11] state-

owned firms were transferred to private hands from 1991 to 1995. The intense pace of

privatization of early 1990s came to a standstill due to the East Asian financial crisis of

1997 which engulfed the Malaysian economy and its major trading partners. The right

wing[12] government and public support for privatization were able to restart the policies

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[9] Guidelines on Privatization, 1985. Government of Malaysia.

[10] Database of Political Institutions (DPI) 2010.

[11] Privatization Master plan, Government of Malaysia.

[12] The classification of government orientation is taken from the Database of Political Institutions (2010).

of privatization only when the Malaysian economy had come out of the East Asian financial crisis in 2002.

Financial constraints were highlighted by Sun and Tong (2002) to have been the driving force for Malaysian government to embark on policies of privatization which were successful in increasing the efficiency of domestic firms. Political considerations were found by Tan (2008) to have taken precedent over economic consideration in designing a privatization policy in Malaysia. The book highlighted the hurdles in the way of successful privatization programs which were mainly caused by political factors that also adversely affected the institutional quality in Malaysia. The lack of institutional quality and political hurdles could have been two major factors that have prevented full scale privatization in Malaysia as in the last twenty years it has raised privatization revenues of 12 billion US $ as compared to a transition economy like Poland which has raised 27 billion US $ from privatization revenues in the corresponding period .

The hypothesis of right-wing ideology and central government's fiscal debt to be triggering privatization fails to hold in the case of China where the country's left-wing[13] communist party government with a positive current balance initiated privatization in 1991. Chinese privatization was part of the bigger plan of transforming a centrally planned economy to a free market capitalistic economy. Market liberalization was found to be a significant factor in promoting privatization of 683 Chinese firms from 1995-2001 in 11 cities whereas the threat of workers redundancies was found to be the main hurdle in the sale of state-owned enterprises by Guo and Yao (2005). The Chinese

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[13] The classification of Chinese government as left-wing is taken from the Database of Political Institutions (2010).

privatization program has raised more than 170 billion[14] US $ in revenues equivalent to

Eastern Europe and Central Asian region privatization revenues since the turn of the

century. Considering the size and scope of the Chinese economy these figures are not

overwhelming, as only 20.5%[15] of state-owned enterprises had been privatized in China

from 1999-2004[16]. The beginning of the Global Financial also saw a major fall in

privatization in China in 2008, which can be attributed to various economic factors.

Firstly the decline of foreign buyers of Chinese firm's as a consequence ongoing Global

financial crisis where foreign direct inflows into China have dropped from 4[17]% of its

GDP in 2007 to 2 % of GDP in 2009. Secondly China's international trade has also

faced a declining trend since reaching a peak in 2007 and thirdly China's stock market

has also had major fluctuations in economic activity since the end of 2007. China's

international trade has been on a declining trend since the onset of the International

banking crisis and the recession that followed the crisis.

2.2 Privatization in Eastern and Central Europe

The fall of communism in the early 1990s also witnessed the transformation of Eastern

and Central European countries from Soviet style centrally planned economies to free-

market economies and existing literature commonly refers to these countries as "the

transition economies". Privatization of state owned enterprises was an integral part of

the changes that took place in the transition economies. Privatization revenues worth

2.37 trillion US $ (World Bank Privatization) were raised from 1988 to 2008 in 28

economies of central and eastern Europe. These revenues were far greater than South

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[14] World Bank Privatization Database 2010.

[15] Bai et al.(2009).

[16] World Bank Privatization Database 2010.

[17] World Bank World Development Indicators 2010.

Asian and South American economic regions effort of privatization during the same period, which indeed reflects the intensity of the privatization process in transition economies. The impact of privatization on firm level productivity and efficiency has been positive for the transition economies, Djankov and Murrel (2002) and Estrin et. al (2009) provide a detailed survey of firm level studies in transition economies during the last twenty years. In terms of individual countries in the Eastern Europe, Czech Republic was one country which adopted an aggressive privatization policy from the outset in 1989. The "small privatization" law passed by the federal assembly in 1990 allowed 10,000 small firms being transferred to private hands in less than two years time. The coupon privatization of large Czech and Slovak firms which started in late 1991 was able to raise net revenues of 10 billion US $ in one calendar year of 1992. The birth of separate Slovak Republic in January 1993 did not prove to be a large hurdle for Czech privatization process as the country's first right wing government privatized more than 2,100 state firms in its first three years in office.

The first wave of privatization involved Czech firms worth 17 billion US $, where some firms were sold through direct sales while others were transferred via voucher privatization program. Political stability from 1992 to 1998 under the leadership of Prime Minister Vaclav Klaus and President Vaclav Havel with opposition in total disarray also turned out to be positive for the Czech privatization program. Using a data set of 1,121 large-scale Czech firms Gupta et al. (2008) found results which were consistent with government's objective of "maximizing privatization revenues and public goodwill" as Czech government initially privatized firms which were more profitable. The more profitable firms being privatized earlier also reduced government's concern of employment losses in the aftermath of the privatization process.

Privatization process in Poland in contrast had to face many political challenges after the fall of communism as the Polish parliament passed its first privatization law in July 1990. The first wave of privatization was marred by domestic political confrontation where only 30 firms were privatized by the end of 1991. The process suffered a major setback in the summer of 1992 where the country witnessed three different governments in the short span of three months.

Polish government under the Prime Minister ship of Hanna Suchocka provided impetus to the privatization process by introducing the "Mass Privatization Program" law in March 1993. The new law was defeated on the Polish legislative floor as Christian National Union a coalition partner of the ruling party voted against the resolution. It was only after significant changes made to the mass privatization legislation and support received from President Lech Walesa that the new privatization law was passed by the legislature in April 1993. The new mass privatization program was popular among ordinary Polish people as it provided a chance to them to buy shares of newly privatized firms. The popularity of privatization was short lived as September 1993 Polish elections saw a victory by the Democratic Left Alliance which subsequently slowed down the pace of privatization in its three years of rule. Thereafter, the individual five year rule of Self-Defence Party (SRP) and Democratic left Alliance (SLD) from 1996 to 2005, the government's desire to join the European Economic Union and the strength of the Polish economy provided major support to Polish privatization of state-owned enterprises. The continuous political upheaval and Left-wing parties ruling Polish governments in the last twenty years could be classified as a major factor behind the selection of firms chosen for early privatization as De Fraja and Roberts (2009) also

found that welfare maximization was governments top most priority in terms of sequencing of privatization in Poland.

2.3 Privatization in Latin America

Latin American countries were among the first developing nations to have embraced privatization in early 1980s. The move towards privatization was primarily triggered by democratization and rising debt burdens of Latin countries, as new democratically elected governments intensively reduced the size and scope of the state sector. As seen in Fig 2.1 Latin American countries were the leaders across the developing countries in raising privatization revenues from 1990 to 1999. In those ten years, Latin American countries accounted for 55%[18] of total privatization revenues in developing nations. It is also evident from Fig 2.1 that there was a sudden fall in intensity of privatization in Latin countries where revenues of more than 177 billion US $ of the 1990s fell down to 37 billion US $ in the first eight years of the current century.

Fig 2.1 Developing countries privatization revenues in millions US $ (1990-2008)
Source: World Bank Privatization Database 2010.

Privatization Revenues in Millions US $

	East Asia and Pacific	Latin America	Eastern Europe and Central Asia	Middle East and North Africa	South Asia	Sub-Sahran Africa
■ 1990-1999	44,100	177,839	65,466	8,197	11,854	8,264
■ 2000-2008	183,957	37,186	171,208	30,146	17,474	12,461

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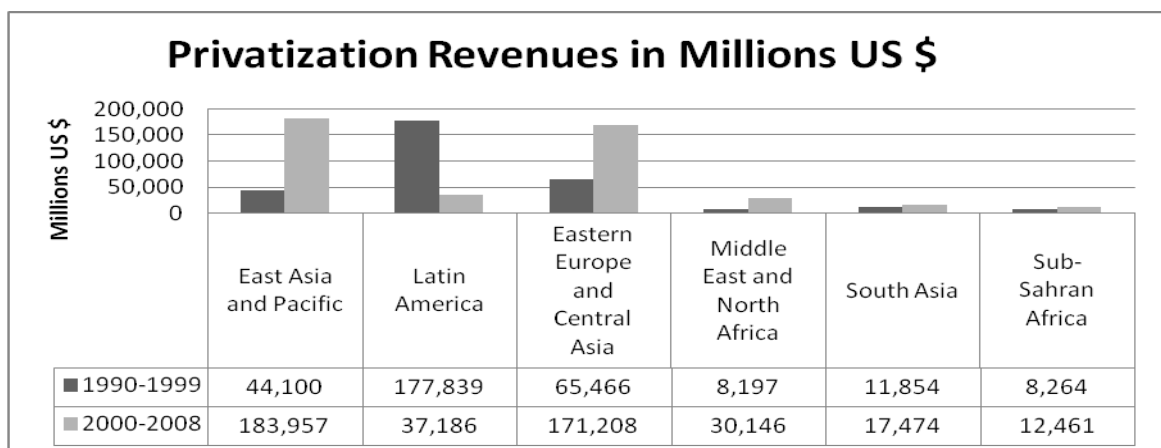
[18] World Bank Privatization Database 2010.

In one of rare analysis of factors affecting the Privatization in 16 Latin American countries Biglaiser and Brown (2003) investigated factors that contributed towards privatizing of state-owned firms in Latin American countries. Total external debt, current account balance, inflation, GDP per capita, autocracy, democracy, centralized executive authority, polarization, fragmentation, ideology and honeymoon period of new government were a combination of economic and political variables to explain privatization in South America. Using Ordinary Least Square (OLS), Fixed and Random effects estimators Biglaiser and Brown (2003) found public sector debt was the only economic variable that had a significant impact on privatization. They found that Latin American countries privatized more when their public sector debt was falling. "Our results imply privatization is much less likely to occur when state firms are holding relatively high levels of debt. Investors are reluctant to purchase enterprises that carry significant debt: they are simply not willing to assume the additional burdens associated with carrying the existing debt unless there is some form of compensation" Biglaiser and Brown (2003) page 84.They also found that there was no honeymoon period in Latin American countries in terms of privatization and it was more likely to take place in second or third year of the Presidential terms. And in the case of government change the privatization process would slow down for two years and pick up pace in the remaining incumbency period of the new regime. Their results actually showed that in the year of election and its subsequent year the state sector actually grew by .08 % of GDP in the 16 Latin American countries. "The negative sign on the coefficient indicates that there is no honeymoon: privatization is more likely to occur in the latter stages of a president's term in office." Biglaiser and Brown (2003) page 83. Privatization activity occurring at the latter stages of incumbent governments might be

due to the presence of strong military and civilian bureaucratic set up which would oppose the reduction in the size of the public sector. Subsequently elected governments are only able to exert their complete power over economic policies in Latin American countries once they have been in power for considerable period of time. The study also found that the IMF Standby agreement prevailing in some of the Latin American countries had an insignificant impact on the intensity of the privatization program. The negative relationship found between public sector debt and intensity of privatization by Biglaiser and Brown (2003) for Latin American countries is opposite to results found by Bortolotti et al. (2003) for developed and developing countries where the latter found increased public sector debt to have been the major factor behind privatization.

The Brazilian economy had one of the biggest privatization programs in Latin America. The Brazilian government relinquished control of 119 state owned enterprises and the revenues of privatization were equivalent to 67.9[19] billion US $ between 1991 and 2001. In terms of the Brazilian economy, the privatization revenues generated in ten years amounted to 5 % of its GDP. The commencement of the privatization program at the federal level in 1991 was undertaken by a right wing President who commanded a comfortable majority in the Brazilian electorate. The beginning of the privatization was at the backdrop of a weak Brazilian economy in 1990 as it had a negative 4.3% annual GDP growth and a negative 5.94% annual GDP per capita growth. The negative growth in Brazil coinciding with the start of the privatization program gives weight to the argument that developing countries would be reluctant to privatize in times of economic growth and happily embrace privatization as a quick fix in times of economic hardship. At the turn of the century, the Brazilian economy had turned around as it recorded a

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[19] Chong and Lopez-de-Silanes (2005).

4.3% annual GDP growth and subsequently the Brazilian privatization also lost its momentum. In the last three of years of the previous century it recorded more than 100 privatization transactions and in the first three years of the current century with a growing economy Brazil only managed to sell 23 state owned firms. The slow pace of privatization can also be attributed to the victory of the left-wing Workers Party in 2003 which had traditionally been the strongest opponent of the privatization process in Brazil.

The financial crisis has had a negative impact on the Brazilian economy which first time in the 21st century has recorded a negative 1 % annual GDP growth in 2009 with central government debt rising to 61 % of its GDP. The worrisome economic environment and the Brazilian ambition to join the elite group of most industrialized economies may see a repeat of 1990s intensive privatization program in Brazil especially in the energy sector which has largely been under the control of the state sector. Investigating the impact of privatization on Brazilian firms Chong and Lopez de Silanes (2005) found privatized firms had increased their efficiency and profit level. The employment effect of privatization process in Brazil was similar to UK where privatized firms were keen to lay off workers in the post-privatization period. It was also found that only the Brazilian elite were inclined towards privatization and the majority of the population was against the policies of divesture as majority of the Brazilian population could not participate in the process of privatization. Voucher privatization and public offers of shares in newly privatized firms as experienced by Eastern European economies could be followed by future privatization in Latin American countries to be more popular in the general public.

Since the end of the First World War the Mexican state owned enterprises had been growing at a steady pace till 1982, a time at which it reached its highest. It was in 1983 that Mexican Government headed by Salinas initiated one of the world's largest[20] privatization programs. From 1982 to 2003 the state owned enterprises dropped from 1,155 to 210. World Bank (2009) reported Mexican government generated 40.48 billion US $ from 1988-2008 in privatization revenues, an amount greater than the entire South Asian region's privatization revenues for the corresponding period. At the beginning of the privatization program Mexico's domestic debt was 35%[21] of its annual GDP and reached its peak in 1986 climbing to 61% of annual GDP. It was around 1988 the Mexican economy started to generate revenues from sale of state firms. The number of privatized firms and government revenues peaked in Mexico around 1991 and interestingly it was around 1991-1992 periods that the Latin American economy saw its domestic debt dropped to less than 20% of GDP as compared to high debts of the 1980s. Revenues from privatization and removal of state subsidies to former state owned enterprises helped the Mexico's government in lowering both domestic and external debt. The turn of the century virtually saw the death of the privatization program in Mexico as there was no privatization transaction recorded[22]from 2001 to 2004.

The victory of a right-wing party at the Presidential level and at the level of Congress in 2006 re-ignited the privatization process in Mexico especially in the infrastructure sector but in the absence of an absolute majority the right-wing PAN has still been unable to privatize Mexico's energy sector. Internationally, the Mexican privatization program has been appreciated for its role in decreasing public sector debt but Chong

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[20] Chong and López-de-Silanes (2004).

[21] Cuenta Pública" (SHCP, 1982-2003).

[22] World Bank Privatization Database (2010).

and Lopez (2004) found that public utilities and state owned energy sector had been greatly ignored in the privatization process. Moreover, the study also found failures to have taken place in the Mexican privatization of state controlled banks and public highways.

The extent of political influence in derailing the process of privatization was evident from the experiences faced by Uruguay where the country generated less than half a billion US $ in privatization revenues from 1988 to 2008. Luis Alberto Lacalle won as Uruguay's President in 1989 on the promise of privatizing state-owned enterprises and in 1990 announced plans to sell government owned telecommunications giant Administration Nacional de Telecommunications (ANTel) in an attempt to fulfil his election pledge. ANtel's choice of privatization was near perfect as it was the only profitable telecommunication firm in the region addable to changes in domestic and foreign technology as the positive outlook of the firm attracted considerable interest from local and foreign investors. At the same time, Uruguay's constitution required the approval of the legislative for any privatization and, as it turned out, the Chamber of Deputies and other bureaucratic hurdles delayed the sale of ANtel for two years. "In 1992, a coalition consisting of pensioners, leftist parties, and opposition factions grew as the pending sale neared. The coalition helped sponsor a referendum in December 1992, where 78 percent of the electorate rejected the privatization laws. The referendum shelved privatization of ANTel indefinitely." Biglaiser and Brown (2003)

2.4 Privatization in Africa

It can be seen from Fig 2.1 that the Sub-Saharan African region witnessed one of the smallest privatization programs with respect to generating privatization revenues in the developing World. The low intensity of privatization in African countries can be attributed to many factors, firstly, Manuel (2003) highlighted that non-transparent nature of privatization process had proved to be a major hurdle in African countries to sell state-owned enterprises. It also pointed out that discretionary power of state actors during the process of transfer had also negatively affected the expansion of the privatization program. It also emphasized the improvement in institutional quality in African countries to facilitate the delivery of key public services and also put in place an effective regulatory environment. Adams and Mengistu (2008a) used ordinary least square estimation techniques for 22 Sub-Saharan African countries for the time period of 1991 to 2002 and found that macro-economic factors, political factors and institutional factors were all equally important to process of privatization in Sub-Saharan Africa. The paper did acknowledge that the African region had recorded on of the smallest privatization program in the world, as the region only accounted for 4% of Worlds privatization proceeds from 1988 to 2003. On the other hand in terms of privatization deals it accounted for 27% of Worlds privatization deals in the same period. The paper found that inflation in the 22 Sub-Saharan countries had a significant and positive impact on privatization, lending support to the economic crisis motivated privatization policies by African governments. The paper showed that the qualities of political leaders were also critical to the success of privatization along with the quality of state institutions. The paper did not find any significant relationship between democracy and the intensity of privatization, alongside the debt variable which also had

an insignificant impact on privatization polces for the 22 Sub-Saharan African nations. Due to high correlation between various indicators of the World Bank Governance Indicators the paper used an average of all Governance indicators which had a positive influence on African privatizations. The paper also employed individual Governance indicators in OLS regressions and found that majority of them had an insignificant impact on the intensity of privatization.

The low intensity of privatization in African region in my view can also be attributed to the local resentment that builds up to economic policies dictated by International donors such as the IMF who have been strong proponents of privatization in developing countries. The desire to see greater privatization by the IMF can be gauged by Ouattara (1998) writing as the Deputy Managing Director of the IMF, where he strongly advocated a bigger and transparent privatization program for African countries to have a prosperous 21st century. Before taking his assignment at the IMF Mr. Allasane Ouattara had been the Prime Minister of Côte d'Ivoire for three years which provides some weight to the influences being exerted by international donors to see increased level of privatization in the African continent.

Conclusion

The chapter identifies three key factors namely economic, political and institutional factors in influencing privatization policies in the above selected regions. The identification of these three factors will help in the selection of explanatory variables in the coming three empirical chapters. GDP per capita and Initial level of GDP per capita are used in the three empirical chapters to take into account the role of economic factors

in influencing the size of both public and private sectors around the world. On the political side the use of ICRG political risks variables and left-wing dummy takes into account the effect of political factors. Once more the use of ICRG political risks variables both as averages and the use of law and order help to capture the effect of institutional quality on the dependent variables in the next three empirical chapters.

The future of privatization can be difficult to predict as it depends on two factors. Firstly, it depends on future economic and political landscape of countries of the world which are difficult to predict. And it is evident from the above individual country analysis that political and economic factors are important in promoting the process of privatization. South Asian countries have faced the most difficult political environment in terms of the pace of privatization program. Economic determinants have taken precedent in privatization of Latin American countries in the last thirty years. The success witnessed in Eastern Europe can be attributed to both political and economic factors in intensifying the sale of state-owned enterprises. Secondly, the intensity of future privatization would also greatly depend on the size of the public and private sectors around the world. For this very reason the study separately focuses on factors that have caused variations in both the public sector and the private sector around the world concentrating on economic and political landscapes in a panel of countries. Thus both the public and the private sector separately require focus as these sectors have their own distinct and unique dynamic foundations. Countries which have considerably large state sectors would either have to make them efficient or transfer them to private hands under prevailing economic and institutional environment, whereas countries like the UK which has sold nearly all its kitchen silver, would only be left to privatize its forests.

Chapter 3

The dynamics of private sector size: privatization programs, institutional quality and financial development

Abstract

The study examines key economic conditions and institutional framework affecting the size of the private sector for a panel of 48 developing and developed countries over the period 1995 to 2007. With absence of existing literature on the dynamics of private sector size and non- availability of a variable to proxy private sector size, the study utilizes private sector share in total employment as a variable to proxy the size of the private sector. Utilizing the dynamic panel data estimation techniques, the paper finds that institutional quality coupled with privatization transactions has a positive and statistically significant impact on the size of the private sector, whereas privatization revenues generated by the government have a negative impact on the private sector. In terms of other economic determinants of private sector size namely foreign inflows of funds, per capita GDP, stocks traded and credit to private sector all have a positive impact. The study also finds that government consumption expenditure "crowds out" private sector size. The orientation of ruling governments offers ambiguous results as left-wing governments favor the private sector in European Bank for Reconstruction and Development (EBRD) countries and the majority results for the 48 country sample also suggest that left-wing governments have a positive impact on private size but the

variable is sensitive to changes in other explanatory variables. The study also provides
key policy guidelines for the development of the private sector around the world.

3.1 **Introduction**

The Neoliberals' policies of Ronald Reagan and British Prime Minister Margaret
Thatcher emphasized the enhanced role of private sector in setting economic priorities
of the state. Since the start of the 1980s policies of privatization, sound institutional
framework and financial development around the world have lead to the development of
the private sector but till now existing literature does not provide any theoretical or
empirical evidence on how these policies directly impact the all important size of
private sector. The current study initiates a new avenue of research by investigating the
dynamics of private sector and identifies factors that have influenced private sector size
in countries around the world. The first question that arises in one's mind is that in the
presence of existing literature looking at the variations in the size of the public sector is
it really important to have a separate look at the private sector? And the answer is yes,
as the private sector needs to a separate evaluation form the public sector which is full
of contradictory evidences. Wagner (1890) put forward the idea of positive relationship
between increased government expenditure and economic development but Roy (2009)
using United States data for the second half of the last century, has shown that increased
government size is detrimental to economic development. Roy's (2009) paper has been
a major source of inspiration for the current research as the study feels that the paper is
one of the strongest evidence against the Wagner's (1890) study. Schaltegger and
Torgler (2006), Folster and Henrekson (2001) have also shown that there is a significant
negative impact of government consumption on economic development. As numerous

studies are converging to the idea of negative association between government consumption expenditure and growth, it is imperative for economies to roll back the frontiers of the state further than ever before. Reducing the size of the public sector highlights the importance of factors influencing private sector growth. While summing up recent studies on privatization, Megginson (2007) argued that the simple transfer of state owned enterprises to private hands will not work until it is combined with institutional and legal reforms. The ever increasing literature supporting the reduced size of the public sector and transfer of state owned enterprises to private hands with an improved institutional quality framework reaffirms the importance of understanding the dynamics of private sector size. To understand the dynamics of the private sector, it is important to identify economic conditions and institutional framework that will contribute to the size of the private sector.

Private sector size

The biggest challenge of the current research was to find the data on the most appropriate variable to proxy the size of the private sector and understand the dynamics of the private sector. Bennet et al. (2007*)* have used private sector share in Gross Domestic Product (GDP) as a proxy for the size of private sector as one of the variable explaining voucher privatization for transition economies of Eastern Europe. Structural Change Indicators (SCI) of EBRD are the source of data for the Bennet et al. (2007) research, but unfortunately the SCI data is limited to 25 transition economies of Eastern and Central Europe. Hassan et al (2009) selected private investment as a share of total investment to proxy private sector size in a panel regression of Chinese provinces. Private sector share in GDP and private investment is limited in terms of its coverage of

nations and therefore to expand the sample data set the current research relies on International Labor Organization (ILO) data on private sector share in total employment as the proxy for the size of the private sector. The ILO data set primarily contains public data on private sector employment for 48 countries which is used as the first panel data set. The data on private sector employment includes employment in private registered companies, as well as in private entities engaged in informal activity. Taylor and Brown (2006) have used employment in the private sector to study the effects of United States of America's central and local government's policies on the economic activity of the private sector.

Fig. 3.1: Size of the private sector
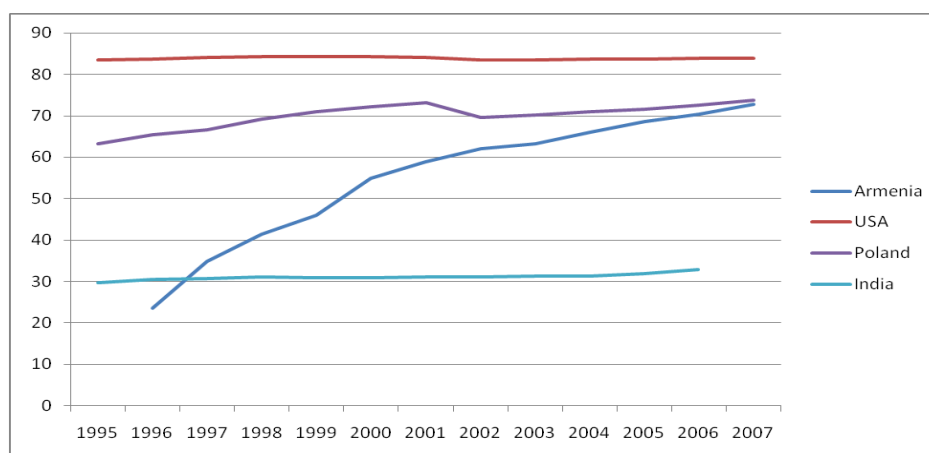
Notes: Private sector employment as a % total employment for Armenia, India, Poland and United States of America (USA).

Haggarty and Shirley (1997) used seven different variables to measure the performance of the public sector in the post-privatization world; share of public sector employment in total employment was one of the seven variables used to gauge the size and impact of the public sector around the world. The use of employment data as a measure of the size

of the state sector provides support for using private employment data as a proxy for the size of the private sector. Private sector employment data is plotted for four countries in Fig. 3.1 and it can be seen that there exists considerable variation in the private sector size across different countries of the sample. The size of the private sector in figure 3.1 for USA is around 83% and in other countries like Poland and Armenia, the size of the private sector employment has been steadily increasing since the 1990s and is edging closer to 80% of total employment. The remainder of the chapter is organized as follows. Section 2 outlines the theoretical model of factor markets. Section 3 provides details of various determinants of private sector size while section 4 reviews existing literature. Section 5 provides details of data used and empirical methodology. Section 6 provides and discusses results supplemented by key policy implications. Then the chapter concludes.

3.2   Equilibrium model of factor markets

The prime reason for the selection of the equilibrium model of factor markets as the conceptual framework is because the models explains the variations in the labor supply through various country/state level characteristics. Due to the availability of private sector employment data and the model explaining variations in the labor supply provides justification to selection of the equilibrium model of factor markets. The model was developed by Brown et al. (2003) to investigate the impact of government expenditure on private sector employment and private sector output for a panel of states in the United States of America (USA). The Brown et al. (2003) model assumed that the representative individual in the country j is a utility maximizing individual and when

employed works at the market wage rate. Firms in the economy maximize profits at given market prices. The representative individual's utility function is as follows:

$$U = U (q, N, L, A_j, G_j) \tag{1}$$

Where G_j is government expenditure in country j, A_j is a vector of different characteristics of country j, L is the labor supply, q and N are respectively the quantity of land and goods consumed by the representative individual. The budget constraint for the individual is as follows:

$$P (1+ \tau) q + n_j(1+ \tau) N = w_j L_j (1- \tau) + I (1- \tau) \tag{2}$$

Where P is the prevailing national market price for goods consumed q, n_j is the rental price of land, w_j is the prevailing wage rate, τ is the level of taxes imposed by governments in country j and I is the non-labor income. Using equations (1) and (2) the indirect utility function in country j is as follows:

$$V_j = V (w_j(1- \tau) , I (1- \tau), P (1+ \tau), n_j(1+ \tau), A_j, G_j)) \tag{3}$$

Then the model assumes that in the long run there is equal expected utility across countries and production function in each country j can be expressed as:

$$Q = Q (L_j, K_j, N_j, A_j, G_j) \tag{4}$$

Q is the output of goods; labor (L), capital (K) and land (N) are the additional factors of production in country j. Profit maximization of firms with rate of return on capital (r_j) which is assumed to be equal across countries in the long run can be expressed as follows:

$$\text{max } \pi_j^* = \pi \left(P. Q_j - w_j L_j - r_j (1+\tau) K_j - n_j(1+\tau) N_j \right) \tag{5}$$

The long run profits of firms are assumed to be zero ($\pi_j^* = 0$) due to free entry and exit of firms. Following Brown et al. (2003), the long run equilibrium wage rate and equilibrium rental price of land can be respectively expressed as follows:

$$w_j = w (\tau, P, r, I, A_j, G_j) \tag{6}$$

$$n_j = n (\tau, P, r, I, A_j, G_j) \tag{7}$$

As land is immobile across countries in the model, its price in equation (7) can be attributed to all areas of the economy including government policies. Considering the long run equilibrium equations of wage rate, rental price of land and the production function as in equation (4), the study follows Brown et al. (2003) to obtain labors reduced for equation which is expressed as follows:

$$L_j = L (\tau_j, P, r, I, A_j, G_j) \tag{8}$$

In each country j, the variations in labor are caused by: the prevailing national prices for capital and output, non-labor income, country characteristics and government policy. In

the absence of any micro-foundations guiding the selection of country characteristics contained in variable A in equation (8), the hypothesis built below outlines the various determinants of private sector size that should be included in variable A. There are no studies on the determinants of private sector size but the studies on the determinants of privatization such as Bortolotti et al. (2003) and Roberts and Saeed (2011) provide some suggestions on the factors affecting private sector size. However private sector size and privatization are two different processes that require independent investigation. Thus the study conjectures that privatization programmes, foreign investment, financial development, institutional quality and political affiliation of government are various factors explaining the variations in the size of the private sector and need to be included in variable A. one must admit here that all components of equation (8) are not incorporated in the empirical testing of the chapter. The study takes the left hand side variable in equation (8) which is the variations in supply of labor and country characteristics contained in vector A towards the estimated equation.

3.3 Determinants of the size of the private sector

This section provides the details of various economic, political and institutional factors that should be included in vector A of equation (8) to explain the variations in the size of the private sector around the world. The section below also builds key hypothesis with these key factors that would be latter tested in the empirical section of the chapter.

Privatization programs

Hypothesis 1: Cēterīs paribus, intensity of privatization programs should positively impact the size of the private sector.

World Bank Privatization database reported privatization transactions worth 414,620 million US dollars took place around the world from the year 2000 to 2007. Mass privatization programs since the late 1970s have made a considerable contribution to the size of the private sector in regions across the world. There is a large body of existing literature that has investigated the impact of privatization around the world. Donaldson and Fafaliou (2007) investigated the theory behind the privatization process and found that it is difficult to find a convincing theory to support privatization process or oppose it, but they did conclude that ideology of free and competitive markets will be the driving force behind the process of privatization. The ideology of freer and competitive markets should also be a positive signal for the growth of the private sector.

Biais and Perotti (2002) provided evidence in favor of right wing politicians who privatized to gain political strength. Bortolotti et al. (2003) showed that rich countries facing large public debts with well functioning financial and legal institutions are more prone to privatize. Adams and Mengistu (2008a) found governance levels and income inequality to be the key determinants of privatization in Sub-Saharan Africa. Analyzing privatization in Poland De Fraja and Roberts (2009) established that Polish government was more interested in the welfare of its population than the aspiration to earn hard currency through the privatization process. In one of rare studies of privatization in North America Bel and Fageda (2009)'s results highlighted fiscal constraints, economic efficiency, political considerations and ideological considerations to have played a key role in USA's local privatization program. Bortolotti et al. (2003) also provided greater insight into the political and economic determinants of privatization around the world and their results highlighted the role of public debts in triggering privatization policies.

Existing literature provides evidence on various determinants of privatization but at the same time there is no direct evidence on the extent of privatization activity in affecting the size of the private sector. The link between the two may be straightforward or obvious but it needs to be verified with actual data.

Privatization revenues as a share of GDP and number of privatization transactions across countries is used to proxy the variable of the size of the privatization programs across the selected panel of countries. For majority of the countries in the panel the data on privatization variables is obtained from World Bank privatization Database. For some Eastern European nations EBRD's SCI provides privatization data while Privatization Barometer is the source for privatization data on some Western European economies. In existing privatization literature Perotti and Oijen (2001), Boubakri et al. (2005b), Megginson et al. (2005) and Adams and Mengistu (2008a) have used the World Bank as the source for their data on privatization variables.

Foreign direct investment

Hypothesis 2: Cēterīs paribus, foreign capital inflows will increase the size of the private sector.

Foreign Direct Investment (FDI) has played a key role in developing economies around the world especially in the last twenty years, Bevan and Estrin (2004) found market size to be an important determinant of attracting foreign capital inflows. Djankov and Hoekman (2000) gave evidence in favour of foreign inflows having a positive impact on local firms total factor productivity through transfers of latest technology. Increasing market size and the benefits of technology transfers from FDI partnerships can also

increase the number of private sector firms. Merlevede and Schoors (2009) found privatization programs in 10 transition economies to positively influence "equilibrium FDI stock". Foreign investments have also facilitated privatization programs in countries with weak domestic financial institutions which are unable to raise high level of capital required to transfer larger state enterprises into private hands. Existing literature shows a positive relationship existing between privatization programs and FDI for developing economies. Foreign direct investment through the channels of total factor productivity, technology transfers and facilitating privatization programs should have a positive influence on the size of the private sector. Foreign direct investment inflows as a share of GDP will proxy for the level of capital inflows in the sample of countries and the data is obtained from World Development Indicators 2009.

Financial development

Hypothesis 3: Cēterīs paribus, different channels of financial development will increase the size of the private sector.

Rajan and Zingales (2003) have outline financial development to be the convenience by which new and old firms can have access to finance. The availability of finance at competitive rates should be a major force in increasing the size of the private sectors around the world. It has been argued that countries with strong and well functioning quality financial institutions have been able to develop faster than countries with weaker financial intermediaries. The advancements in financial liberalization should also lead to a decrease in the cost of borrowing capital and subsequently increase the level of investment in the economy. Stock market capitalization and the development of the banking sector have also been identified as two of the leading components of financial

development. Andrianova et al. (2008) provided a link between financial development and institutional quality and found that the presence of both would increase private sector banking.

Stock markets can also increase the size of the private sector through different channels; firstly, by acting as a means of faster capital growth. Secondly, facilitating privatization programs through share issue privatization. Thirdly, in attracting foreign capital inflows and lastly, the stock markets can also ensure protection of share holders right. Perotti and Oijen (2001) and Boubakri and Hamza (2007) found a positive and significant impact of privatization on stock market development and Megginson et al. (2004) had found that stock market development had a favorable impact on privatization programs. Boubakri and Hamza (2007) have addressed the issue of endogeneity between privatization programs and stock markets and categorized initial legal framework as a precondition for privatization programs to influence the other in both developed and developing countries. Levine and Zervous (1998) found stock markets to positively influence capital accumulation and productivity efficiencies in the economy. Beck and Levine (2004) had found that stock markets influence the economy independent of the banking system. Ramos (2009) in the study of 101 stock markets from around the world found a positive impact of stock markets in increasing the level of competition in the economy. The ability of banks to finance private firms and the existence of stock markets should be a good sign for the growth of the private sector. Domestic credit provided to the private sector and total stocks traded both as a share of GDP are used in estimation. Claessens and Laeven (2003), Baltagi et al. (2007) and Baltagi et al. (2009) have used these two financial development indicators to proxy financial development in their respective studies.

Institutional quality

Hypothesis 4: Cēterīs paribus, sound institutional framework will enhance the size of the private sector

In one of the influential studies of his time North (1990) provided the rational that it is the absence of quality institutions that impede the economic growth in the third world nations. Protection of private property rights and enforcement of contracts are an essential basis for the existence of the private sector; its absence should become an obstacle to the growth of the private sector. Security of intellectual property rights has played a key role in developing new technologies by private firms in North America. The attainment of rule of law and control of corruption is also of critical importance in economic development and their absence can negatively affect the quality of both public and private sector enterprises. As discussed in the next chapter of the study, the improved quality of institutions is responsible for decreasing the size of the public sector, so it is vital to include institutional quality as an explanatory variable of private sector size. Two variables are used to proxy institutional quality in the sample data set: firstly, an average of all 12 ICRG political risk components is used in estimation. Due to the high correlation between individual ICRG variables Adams and Mengistu (2008a) and Boubakri et al. (2009) have used the average of institutional variables in their respective studies. By employing an average of all 12 ICRG variables in estimation, it also aids study to capture some unique country specific factors that might have been missed by the right hand side variables employed in the estimation section. It would also be useful to provide a brief insight into the meaning of the twelve political risks variable provided by ICRG.

a. **Government Stability**: This variable provides an evaluation of a government's ability to pursue its policies and also its ability to hold onto its executive power within the given constitutional framework.

b. **Socioeconomic Conditions**: This variable provides an evaluation of socioeconomic pressures that can constraint the working of the government. The variable also provides an assessment of social dissatisfaction present in the country.

c. **Investment Profile**: This variable provides an evaluation of factors affecting the risks to investments within the country.

d. **Internal Conflict**: This variable provides an evaluation of political violence and its subsequent impact on the country's governance.

e. **External Conflict**: This variable evaluates the level risk from foreign violent and non-violent pressures on the government and its governance system.

f. **Corruption**: This variable gauges the level of corruption within the political system.

g. **Military in Politics**: This variable provides an assessment of the level of Military interference in a country's political system.

h. **Religious Tensions**: This variable provides an assessment of risks from inexperienced religious leaders trying to impose their own will through civil disobedience or civil war.

i. **Law and Order**: This variable is divided in two parts; firstly, Law provides an assessment of the strength and impartiality of the legal system. And Order provides an assessment of the popular observance to the legal system.

j. **Ethnic Tensions**: This variable provides an assessment of the level of tension in the country due to racial, language and nationality issues.

k. **Democratic Accountability**: This variable provides an assessment of the responsiveness that a government shows towards the electorate.

l. **Bureaucratic Quality:** This variable provides an assessment of the institutional strength and quality of a country's bureaucratic setup.

The second variable used to proxy institutional quality is an average of only five ICRG variables namely Government Stability, Control of Corruption, Law and Order, Bureaucratic Quality and Democratic Accountability. The average of these variables helps to identify directly the influences of various dynamics of government sector only on the size of the private sector.

Political affiliation of government

Hypothesis 5: Cēterīs paribus, left wing governments will oppose policies that increase the size of the private sector.

In the earlier chapter of the study it was highlighted that political affiliations played a critical role in determining the level of intervention a government has in the economy. Traditionally, left wing/socialist governments have advocated a much broader role of the government and on the other hand the right wing/conservative governments want to see private sector thriving. Historically speaking, it was the right wing government of Margaret Thatcher in the late 1970s which initiated the policy of selling state-owned enterprises in Britain. Ideologically, right wing governments are more market oriented in their approach towards the economy and want to minimize the role of the state. The

attitude of right wing to opt for a larger private sector is also driven by the desire to empower the middle class through mass privatization programs and to enlarge their vote bank to win future elections. Biais and Perotti (2002) showed that right-wing governments use privatization of state assets to gain political support among the electorate.

Bortolotti et al. (2001) and Bortolotti et al. (2003) have also found political considerations to play an important role in determining the extent of privatization programs around the world. Right wing governments would therefore tend to increase the size of the private sector just not through mass privatization programs but through more progressive capitalistic economic policies. Ideological harmony also plays an important role in determining the level of international cooperation among countries. The countries in the data set can be divided in three groups with respect to their ideology which are right wing, left wing and centrist form of government. To investigate the role of political affiliation on the private sector a left wing dummy variable is employed throughout the dynamic panel estimations. The source of data is the Database of Political Institutions (DPI) of the World Bank. Bortolotti et al. (2009) have also used DPI to study the effects of ruling political regimes on privatized firms.

The theory of public choice advocates that individuals in a society are primarily driven by their self interest, where politicians are merely interested in getting re-elected and bureaucrats are only after their careers. In the presence of the public choice theory, it is unlikely that state owned enterprises (SOE) can be run efficiently. Self interest is probably not the only reason behind the inefficiency of the government sector as

presence of corrupt bureaucratic practices coupled with interference from the government lead to state firms being inefficient and thus increasing government debt.

Government Consumption

Hypothesis 6: Cēterīs paribus, increased government consumption expenditure will have a negative impact on the size of the private sector.

In developing countries state enterprises are also used to decrease unemployment in the economy at the expense of increased wasteful government expenditure. Vining and Boardman (1992), Boubakri and Cosset. (1998), Dwenter and Malatesta (2001), La Porta et al (1999), Karpoff (2001), Megginson et al (2005) and Boubakri et al. (2005a) have shown that transfer of state owned firms to private hands has made them more efficient and profitable. La Porta et al. (2002) showed that government owned banks retard financial development and argued that in the case of government ownership of banks, politics influences the route of resource allocation in the economy, leading to inefficiency of firms. In addition to the five hypotheses built earlier, the study will also use government consumption expenditure as an additional control variable to investigate whether government activities "crowds out" private sector employment? Government consumption expenditure as a share of GDP drawn from World Bank will be used to proxy the influences of public sector expenditure. The level of economic development proxied by per capita GDP is also be taken into account as additional control variable to measure its impact on the private sector along with the economic and institutional variables identified in the earlier section of the chapter.

3.4 Existing literature

Using the theoretical model of factor markets, Taylor and Brown (2006) found that various aspects of public expenditure for both local and state authorities "crowds out" private sector in terms of employment and output. Employment in the private sector was one of the three indicators of private sector activity and the results showed that employment variable had economically and statistically consistent results with the other two indicators of private sector activity. Taylor and Brown (2006) also found that increased expenditure by the government sector hampered private sector capital and employment accumulation. Brown et al. (2003) also provided evidence that increased government expenditure had a negative influence on private sector employment, private capital and private sector output for United States of America (USA). The negative influence was found to be stronger in the 1980s then the 1990s as the latter decade experienced reduction in the size of the public sector in USA.

The importance of the private sector has long been recognized but it has only just found itself a place in cross-country growth regressions. Hasan et al. (2009) recognize the increase in the size of the private sector as one of the most important institutional development for economies in transition like the Chinese economy. Hasan et al. (2009) incorporate private sector presence in their growth regressions using the ratio of private sector capital investment to total capital investment and find its influence to be positive and significant on real capita GDP growth using both OLS and two-step GMM estimators. Historically, the private sector in China was only legally recognized by a constitutional amendment as late as 1999 and even in this short period time the private sector has contributed positively to Chinese economic growth and leading power in

terms of its share in world exports. Private sector development is measured by the share of private sector output in GDP by Bennet et al. (2007) as a control variable in measuring the impact of different privatization methods on growth in transition economies. They find no significant impact of private sector on growth for majority of their regressions. The paper, while controlling for the effect of exchange rates and oil prices on growth in the dynamic GMM, model finds a positive and significant impact of private sector output on growth.

3.5 **Data and empirical methodology**

For the purpose of estimation, two sets of panel data have been included from 1995 to 2007; panel data can reveal more about the dynamics of the countries in the sample across time than a single cross section. Islam (1995) has in detail described the benefits of using panel and dynamic panel estimators over cross sectional regressions. Panel A data set includes 48 countries from around the world (see Table 3.2b for the list of countries), chosen primarily for the existence of data on employment in the private sector in those countries. The panel of 48 countries includes a sizeable amount of Transition economies of Eastern Europe, therefore to check for robustness of results a second panel consisting of 21 EBRD economies is also used in estimation. The splitting of the sample allows the study to see the impact of privatization policies on private sector size for Eastern European countries trying to enter the European Union (EU). Tables 3.1a and 3.1b provide summary statistics of the two data sets. It can be seen from Table 3.1a that the private sector employment shows variations. The mean value of the private sector is 72.69 % with Bulgaria having a minimum 23% private sector employment as a share of total employment. On the other hand Colombia having a 94%

private sector employment as a share of total employment. The foreign inflows of funds which are net inflows of funds as a share of GDP also help the study to proxy the level of openness in the economy.

The lack of micro-foundations in outlining the explanatory variables of the size of the private sector leads the study towards the conduct of standardized regression analysis and principal component analysis. Both these techniques aid the study to answer the question of which of the independent variables has a greater effect on the dependent variable in a multiple regression analysis. The standardized regression beta co-efficient are estimated and reported in Tables 3.3a and Table 3.3b to measure the importance of each explanatory variable in causing variations in the size of the private sector. Per capita GDP has the highest standardized co-efficients in the larger data set but importantly foreign inflows of funds (0.106), privatization revenues (0.175) and institutional quality (0.27) also have relatively significant influence on the private sector size variable. The key explanatory variables in the second and third column of Table 3a show that standardized regression co-efficients are high enough to be included as explanatory variables. Table 3.3b which is limited to the 21 EBRD, countries also shows that variables reflecting the five hypothesis of the study are important to the variations in the private sector employment. The standardized coefficients are the estimates of a regression on variables that have been standardized so that their variances are equal to1.

The principal component analysis is also conducted and results are reported in Table 3.4a and Table 3.4b to assess the importance of each variable in the two data sets. In both the data sets privatization revenues and foreign inflow of funds have eigenvalues

greater than one and the ideological variable in the larger data set its eigenvalue is close to 1, implying that these variables are important to the data set and therefore be included in estimation. The complete list of variables and sources of data are given in Table 3.2a. List of countries in both panels is given in Table 3.2b.

Arellano-Bond first difference dynamic panel two-step GMM estimation

The aim of the paper is to identify economic conditions and institutional framework that contribute to the size of the private sector and to achieve this aim it is important to utilize estimation techniques which use both the cross-sectional and time series scope of the data set. There is considerable evidence in the existing literature[23] of public sector size exhibiting persistence and investigating the data on the private sector employment, one has to admit that it shows considerable persistence and demands the inclusion of the lagged dependent variable in the estimated equation. The inclusion of the lagged dependent variable is also able to capture, through the course of specification, dynamics that normally take place in the economy. The specification simply states that the size of the private sector is not only influenced by the above mentioned factors but also by the past values of the private sector size. Baltagi (2005) highlighted examples in existing literature of economic relationships which are dynamic in nature. The inclusion of the lagged dependent variable renders OLS, fixed effects, random effects and first difference OLS estimator to be biased and the preferred estimator in this case is the Arellano-Bond (1991) dynamic panel Generalized Method of Moments (GMM) estimator. The Arellano-Bond GMM estimator basically works by first differencing the model, then estimating it by instrument variables with lagged regressors used as

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[23] Pickering and Rockey (2011)

instruments. The differencing of the model by the Arellano-Bond estimator eliminates any country specific effects inherently present in the current model of private sector size. The differencing of the model also takes care of potential endogeneity that may be present due to the country specific effects and the explanatory variables in the model. The Arellano-Bond GMM estimation also assumes that all the right hand side regressors, apart from the lagged dependent variable, are strictly "exogenous", (Baltagi 2005). The strict assumption of exogenous regressors has been addressed in the existing literature by Balatagi et al. (2009) by lagging all the right hand explanatory variables by one period. The lagging of the right hand variables eliminates chances of potential bias in the estimated coefficients occurring due to simultaneous shocks in the economy affecting the private sector and the factors explaining the private sector size. Therefore, the empirical model to be tested in log linear form by first-difference GMM two-step dynamic panel estimator is as follows;

$$\ln \text{ private sector size}_{it} = \alpha + \xi \ln \text{ private sector size }_{it-1} + \beta \ln X_{it-1} + \mu_{it} \qquad (9)$$

Where private sector size is the dependent variable of country i in time t and vector X contains all the explanatory variables of the estimated equation and are all lagged by one period. Vector X contains foreign direct inflows, per capita GDP, credit to private sector, privatization programs, institutional quality, government orientation and total government consumption. The Vector X does not contain any regional dummies and to check for robustness a second panel consisting of only 21 Eastern European countries is used in estimation to see the impact of the explanatory variables on private sector size in the environment of Eastern European countries implementing privatization policies to enter the European Union (EU). It is worth noting here that the policies of privatization

might not have an instantaneous impact on private sector size and the positive impact of policies of sale of state enterprises takes place with two to three year lagged period. Therefore one drawback of using the empirical model of equation (9) is that it does not take into account the two to three year lagged impact of privatization policies that it might have on private sector size. The limited data for the privatization revenues and privatization transactions is the prime reason for not using a two or a three lagged value of privatization revenues. The error term μ contains both time and country specific effects.

$$\mu_{it} = \mu_i + \varepsilon_t + \nu_{it} \tag{10}$$

Due to the presence of lagged dependent variable in the above equation, the estimated beta coefficients only reflect the short-run effects and long-run effects can be calculated by dividing each estimated beta by 1- ξ, where ξ is the estimated coefficient of the lagged dependent variable (Baltagi et al. 2009). To test the validity of the Arellano-Bond estimator, existing literature uses three tests; Firstly, the Sargan (1958) test of over-identifying restrictions, which tests the overall validity of the instruments. The second test is the autoregressive test (AR) test, which tests the hypothesis that the error term is not serially correlated in the differenced equation. The way the estimator is constructed the differenced error term is permitted to be first-order serially correlated but the second-order-serial correlation will go against the assumptions of the first-difference GMM estimator. Due to the number of advantages that the two-step GMM estimator has over the one-step GMM estimator, it is employed throughout the current study. Cameron and Trivedi (2005) have also argued in favor of two-step GMM estimator as the most efficient estimator as compared to the one-step GMM estimator.

Beck and Levine (2004) find two-step GMM estimator to be statistically and economically more significant than the one step GMM estimator. The two step GMM estimator also provides heteroskedastic reliable coefficient estimates as compared to the one step estimator. The employment of the two-step GMM procedure also takes into account potential autocorrelation problem that might be existing in the data set.

3.6 Estimation results

Maximum one period lag for the dependent variable is used for all two step GMM estimation and a maximum of three lags of the dependent variable are used as the instrument variables for the complete set of panel estimations in chapter 3, chapter 4 and chapter 5. The selection of maximum three lags of the dependent variable is done so that the instrument set for the dependent variable is able to take into account the possible simultaneity being caused by the past three year values of the dependent variables. Increasing the number of lags of the dependent variable in estimation can also lead to an increase in the total instrument count in estimation. Therefore the minimum one period lag for the dependent variable is employed throughout.

The baseline results from regressions of Equation 9, using the Arellano-Bond two-step GMM estimator are reported in Table 3.5 where the lagged dependent variable is positive and highly significant at 1% level in each column, providing evidence in favor of persistence in the private sector size variable and lending support to the use of powerful GMM dynamic panel estimators as compared to fixed effects or random effects regression. Foreign inflow of funds is positive and significant in the first column of Table 3.5 lending support to study's second hypothesis of a positive impact of

foreign flow of funds on country's private sector. Intuitively, there should be a positive impact of economic development on private sector size and results also show that the co-efficient of per capita GDP in the first column is positive and significant in column 1of Table 3.5. The positive and significant impact of per capita GDP on private sector size raises the issue of simultaneity but the use of the first difference GMM method takes care of the simultaneity existing in the model of private sector size. Beck and Levine (2004) also employed the first difference GMM procedure to take care of simultaneity existing in their model of stock markets and economic growth. In the second column, the variable of private credit proxied for the level of financial development is added to the regression and yields a positive and significant impact on private sector size. In the third column of Table 3.5, the variable of privatization revenues as a share of GDP is added to the regression and six[24] countries get dropped from the panel data set due to lack of privatization revenues data. The privatization revenue turns out to have a negative and insignificant impact on private sector size, contradicting the earlier hypothesis of the study. In the fourth column of Table 3.5 the variable of institutional quality[25] is added to the regressions and as compared to the previous column four[26], additional countries get dropped from the data set. The variable of institutional quality has a positive and significant impact on private sector size, once more lending support to the hypothesis built earlier.

In the next regression a left-wing government orientation dummy variable is added to the regression and it has a negative and significant impact on private sector size. The significant influence of ideology dummy shows that government orientation is important for the development of the private sector. In the regression, government

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[24] Botswana, Canada, Ireland, Mauritius, Norway and United States of America (USA).

[25] Average of 12 ICRG political risk components

[26] Georgia, Kyrgyz Republic, Macedonia and Tajikistan.

consumption is added to the regression, the addition of the government consumption

variable did not affect the economic and statistical significance of the earlier results.

The government consumption variable has a negative and significant impact on private

sector size, the negative association of government consumption and private sector

activity is in line with Taylor and Brown (2006) results based on United States data.

Credibility to the two step GMM estimation results is provided by the entire set of

regressions passing the first order and second order serial correlation tests and also the

Sargan test of over identification of restrictions in Table 3.5.

 To further investigate the influence of policies of privatization on private sector size,

the variable of number of privatization deals is used to proxy privatization in estimation

and the results are show in Table 3.6. The privatization deals variable has a positive and

highly significant impact on private sector size in all the reported regressions. The

positive influence of privatization deals is in conjecture with the earlier built hypothesis.

The use of number of deals variables did not change the economic and statistical

significance of other key variables except for the government orientation dummy

variable which becomes positive and significant in two columns of Table 3.6. The use

of privatization deals variable reduces the total number of countries in the sample from

48 to 35. Total stocks traded as a share of GDP as a measure of financial development is

used to assess the influence of stock markets on private sector size in Table 3.7. The

variable of total stocks traded is positive and highly significant in all six regressions and

the privatization deals variable also yields results consistent with the hypothesis of the

study. The only result that contradicts the earlier formed hypothesis is the positive and

significant impact of the left-wing government orientation variable in the two columns

of Table 3.7. The positive impact of left-wing ideology variable might be due to the

external pressures put on governments to enlarge the size of the private sector and their

ideological background takes a secondary place in implementation of economic policies

of the country. Results in Table 3.7 should be looked at with caution as the use of stocks

traded as an explanatory variable leads to some of the dynamic panel estimation failing

the second order serial correlation test.

The second variable used to proxy institutional quality in Table 3.8 is an average of

only five ICRG variables namely Government Stability, Control of Corruption, Law and

Order, Bureaucratic Quality and Democratic Accountability. The average of these

variables helps to identify directly the influences of various dynamics of government

sector on the size of the private sector. Boubakri et al. (2009) has also used the same

average of five ICRG variables to proxy institutional quality and gauge its impact on

economic growth in the presence of privatization variable. Foreign direct inflows and

per capita GDP have a positive and significant impact on private sector size in all eight

regressions of Table 3.8. Private credit is used to proxy financial development in

estimation and its co-efficient remains positive in all columns of Table 3.8 where it is

significant in all regressions with privatization deals variable. Contradicting the earlier

hypothesis, the privatization revenues variable continues to have a negative impact on

private sector size and is also statistically significant in the four regressions it is used in.

On the other hand the positive impact of privatization deals on the dependent variable is

in line with the earlier formed hypothesis and also consistent with results reported in

earlier tables. In terms of the other explanatory variables, the dummy variable of left-

wing governments provides ambiguous results in Table 3.8. There is also consistent

evidence of government consumption expenditure in crowding out private sector size.

Results in Table 3.8 should also be looked at with some caution as the use of stocks traded as an explanatory variable leads to some of the dynamic panel estimation failing the first order serial correlation test.

To check for robustness of earlier results, the study uses Arellano-Bond two step GMM estimator for the panel of 21 EBRD countries where private sector share in employment is again used to proxy private sector size in estimation. The lagged dependent variable is significant in majority of the regressions reported in Table 3.9 giving support to the use of the dynamic panel estimator. Majority of the explanatory variables are statistically insignificant except for the privatization deals, financial development and government's orientation variables. The co-efficients of foreign inflows, privatization revenues and privatization deals are positive as conjectured in the earlier part of the study. The regression results in Table 3.9 do not pass the second order correlation test and therefore the results should be looked at with caution. The use of two different data sets, the first one for a larger set of countries and the second one only for EBRD countries do not provide 100% identical results however the results also do not contradict majority of the hypotheses established earlier.

To check for further robustness of results the variable of trade openness is added as an explanatory variable in the regressions reported in Table 3.10 for the 48 country panel data set. In column 1 of Table 3.10 the variable of trade openness has a positive and significant impact on private sector size. The trade openness variable throughout the five regressions of Table 3.10 remains significant with a positive co-efficient, lending support to the idea that the size of the private sector would benefit from an open economy. In terms of other variables the variables of net foreign inflows, per capita

GDP and private credit all have a positive and significant impact on private sector size. The variable of government consumption expenditure as per the earlier built hypothesis has a negative and significant impact on private sector size. The positive impact of left-wing ideology on the private sector can be attributed to governments facing a lot of pressure from foreign countries and international donors to expand the size of the private sector. The five two-step GMM first difference regressions in Table 3.10 pass the first-order serial correlation test, the second-order serial correlation test and the Sargan test of over identifying restrictions.

Conclusion

The study has found three main factors that have significantly affected private sector size across countries of the sample: firstly, institutional quality which has had a positive influence; secondly, foreign inflows of funds have also had a positive impact on private sector and thirdly, financial development has also had a positive influence in fostering the growth of the private sector. The results imply that policy makers both in the developed and developing countries, who aspire to increase the activity of the private sector, cannot afford to have any of these three important economic variables missing from their economic systems. In terms of the privatization policies, the hypothesis of the current study was that it would lead to an increase in the private sector size and the results showed that the hypothesis was only valid when privatization deals was used to proxy the policies of divesture in estimation. On the other hand, privatization revenues were found to have had a negative influence on private sector size; this negative impact can be explained by the notion that governments around the world would have mostly used privatization revenues to ease public sector debts or used it to launch mega

projects under the public sector. Further investigation on the utilization of privatization revenues can throw more light on the dynamics of government behavior in the post-privatization world. However; such investigation is beyond the scope of the current study.

Both indicators of financial development, that is, private credit and stocks traded, have a positive and significant impact on the dependent variable. The direct link between financial development and private sector size is evidence supporting the views of Baltagi et al. (2009) where they advocated emergence of "new firms" as a consequence of financial development. Stock markets provide opportunities for existing and new private firms to obtain capital, without relying on the banking channels to obtain the requisite financing. Results from the current study also show that increased activity in the stock market increases private sector size. On the other hand, stock markets have also been central in implementation of privatization programs and in some countries privatization programs have lead to the development of the stock markets. Thus there exists a dynamic inter-relationship between stock markets and privatization programs. In the existence of this dynamic relationship and stock market's ability to directly finance private firms, it is suggested that developing countries need to strengthen existing stock markets and open new ones.

The study provides ambiguous results on the impact of government orientation on private sector size, as the left-wing dummy variable in majority of the regressions had a positive impact and was also was very sensitive to the selection of other explanatory variables. The positive impact of left-wing ideology on the private sector can be attributed to three reasons; firstly, that all governments, whether left-wing or right-wing,

in recent times have adopted friendly policies towards the private sector. Secondly, with the existing political debate on the "demise of ideology" this pivot around the idea that all political parties once in power tend to adopt greater centrist ideological policies. Thirdly, governments face a lot of pressure from foreign countries and international donors to expand the size of the private sector. The study also finds government consumption expenditure to have had "crowded out" private sector size and it is in line with Taylor and Brown (2006) who found a negative impact of state and local governments consumption expenditure on the economic activity of the private sector. The results confirm the intuitive recognition that countries across the world would need to lower government consumption expenditure to promote private sector activity. Lowering government's consumption expenditure combined with the optimal use of privatization revenues signals a brighter future for the development of the private sector. The study has made an attempt to initiate a new avenue of research in the factors that influence the size of the private sector among countries with different geographical locations and varying levels of economic development. As there is no perfect way to model the real world, the study suggests future research to use different variables to proxy the private sector size and look for other economic and institutional variables that would influence the size of the private sector and have been overlooked in the current research.

3.7 Chapter 3 Tables (private sector size)

Table 3.1a: **Summary statistics (sample of 48 countries)**

	N	Mean	Standard Deviation	Minimum	Maximum
Private sector size (private sector share in total employment)	570	72.6953	14.01555	23.47931 (Bulgaria 1996)	94.6581 (Colombia 2006)
Private credit (% of GDP)	614	56.10412	49.47079	1.166045 (Azerbaijan 1996)	210.4178 (Malaysia 1997)
Foreign direct inflows. Net Inflows(% of GDP)	622	4.040077	4.895923	-15.1032 (Ireland 2005)	45.14986 (Azerbaijan 2003)
Privatization revenues (% of GDP)	484	4.984091	8.177924	0	38.1 (Georgia 2001)
Privatization deals (Total number of privatization transactions)	381	12.6063	61.96304	0	1136 (Romania 1998)
Stocks traded (% of GDP)	549	35.77714	54.01611	0	372.4518 (UK 2007)
Institutional quality1	525	6.208234	.8879709	4.048611	8.006945
Institutional quality2	525	4.862238	.8464545	2.716667	6.6
Left-wing government orientation	624	.3557692	.4791298	0	1
Per capita GDP (Constant 2000 US $)	624	9253.222	10647.78	122.1356	42065.21
Government consumption (% of GDP)	621	16.86564	4.913594	5.690266 (Romania 1999)	28.54064 (Botswana 1995)
Trade as a % of GDP	621	87.64207	39.10101	19.72411	220.4073

The sources and detailed definitions of variables is given in Table 3.2a.

Table 3.1b: Summary statistics (sample of 21 EBRD countries)

	N	Mean	Standard Deviation	Minimum	Maximum
Private sector size (private sector share in total employment)	239	63.7764	13.87006	23.47931 (Bulgaria 1996)	81.2 (Kyrgyz Republic)
Private credit (% of GDP)	269	24.73762	19.12886	1.166045(Azerbaijan 1996)	96.10892(Estonia 2007)
Foreign direct inflows. Net Inflows(% of GDP)	272	5.540936	5.829254	-14.36879 (Azerbaijan 2007)	45.14986 (Azerbaijan 2003)
Privatization revenues (% of GDP)	260	10.62269	9.594105	0	38.1 (Georgia 2001)
Institutional quality1	187	5.890671	.6862157	4.145833	7.215278
Institutional quality2	187	4.4291	.675731	2.833333	6.25
Left-wing government orientation	273	.3406593	.4748014	0	1
Per capita GDP (Constant 2000 US $)	273	2814.642	2664.422	122.1356 (Tajikistan 1996)	13333.94 (Slovenia 2007)
Government consumption (% of GDP)	273	16.29362	4.856035	5.690266 (Romania 1999)	27.39892 (Ukraine 1997)

The sources and detailed definitions of variables is given in Table 3.2a.

Table 3.2a: Data sources

Variable	Proxy	Sources of Data
Private sector share in employment % of total employment (Private sector size)	Private sector size	LABORSTA: International Labor Organization:
Domestic credit provided to private sector % of GDP (Private credit)	Financial development	World Development Indicators
Foreign direct inflows. Net Inflows(% of GDP)	Foreign direct investment	World Development Indicators
Privatization revenues cumulative, in per cent of GDP (Privatization revenues)	Shift in government policy	World Bank Privatization Data base, Privatization Barometer and Structural change indicators of European Bank for Reconstruction and Development (EBRD)
Privatization transactions (Privatization deals)	Shift in government policy	World Bank Privatization Data base, Privatization Barometer
Total stocks traded as a % of GDP (Stocks traded)	Stock market development	World Development Indicators
Institutional quality1 (Average of 12 variables: investment profile, democratic accountability bureaucratic quality, government stability, socio economic conditions, internal conflict, external conflict, corruption, military in politics, religion in politics, law and order and ethnic tensions)	Institutional quality	International Country Risk Guide (ICRG).
Institutional quality2 (Average of 5 variables:Government stability, Control of corruption, Law and order, Bureaucratic quality and Democratic Accountability)	Institutional quality	International Country Risk Guide (ICRG).
Corruption	Institutional quality	International Country Risk Guide (ICRG).
Law and order	Institutional quality	International Country Risk Guide (ICRG).
Left-wing government orientation	Government orientation	World Bank Database of Political Institutions
Per capita GDP	Level of economic development	World Development Indicators
Government consumption expenditure as a share of GDP (Government consumption)	Government expenditure	World Development Indicators
Private sector share in GDP(Private sector share) Only available for EBRD Countries	Private sector size	Structural change indicators European Bank for Reconstruction and Development (EBRD)
International Trade	Trade Openness	World Development Indicators

Table 3.2b: List of 48 countries

1	Albania	17	Georgia	33	Norway
2	Argentina	18	Germany	34	Philippines
3	Armenia	19	Greece	35	Poland
4	Azerbaijan	20	Hungary	36	Romania
5	Belarus	21	India	37	Russia
6	Botswana	22	Ireland	38	Slovakia
7	Bulgaria	23	Italy	39	Slovenia
8	Canada	24	Kyrgyz Republic	40	Spain
9	Chile	25	Latvia	41	Sri Lanka
10	Colombia	26	Macedonia	42	Sweden
11	Croatia	27	Malaysia	43	Tajikistan
12	Czech Republic	28	Mauritius	44	Thailand
13	Denmark	29	Mexico	45	Turkey
14	Estonia	30	Moldova	46	United Kingdom
15	Finland	31	Morocco	47	Ukraine
16	France	32	Netherland	48	United States of America

List of 21 EBRD countries

1	Albania	11	Kazakhstan	21	Ukraine
2	Armenia	12	Kyrgyz Rep		
3	Azerbaijan	13	Latvia		
4	Belarus	14	Macedonia		
5	Bulgaria	15	Moldova		
6	Croatia	16	Poland		
7	Czech Republic	17	Romania		
8	Estonia	18	Slovak Republic		
9	Georgia	19	Slovenia		
10	Hungary	20	Tajikistan		

Table 3.3a: Standardized regression analysis
Dependent variable: Private sector share in total employment (private sector size).
48 countries. Annual data 1984-2007

	Beta Co-efficient[1]	Beta Co-efficient[1]	Beta Co-efficient[1]
Private credit	-.0087029	.0336821	-------------
Foreign direct inflows	.1066959	.0914984	.0937196
Privatization revenues	-.1750568	-.2159571	-.2383692
Institutional quality1	-.2746044	-.3861474	-.31204
Left-wing government orientation	-.0721643	-.0156788	-.0824889
Per capita GDP	.6489438	.6346697	.7515302
Government consumption	-------------	-.3553937	-.3042233
Stocks traded	-------------	-------------	-.2292701

[1]Beta co-efficient are the standardized regression co-efficient
The sources and detailed definitions of variables is given in Table 3.2a.

Table 3.3b: Standardized regression analysis
Dependent variable: Private sector share in total employment (private sector size).
EBRD countries. Annual data 1984-2007

	Beta Co-efficient[1]	Beta Co-efficient[1]	Beta Co-efficient[1]
Private credit	-.1697432	-.0364641	---------------
Foreign direct inflows	.0732601	.0482024	.0519269
Privatization revenues	.4282095	.3528052	.4711428
Institutional quality1	.1813194	.1673301	-.1480811
Left-wing government orientation	.002422	-.0208644	-.1109305
Per capita GDP	.1694687	.1643138	.5494162
Government consumption	-----------	-.1861582	.003186
Stocks traded	------------	--------------	.1339362

[1]Beta co-efficient are the standardized regression co-efficient
The sources and detailed definitions of variables is given in Table 3.2a.

Table-3.4a: Principal component analysis
Dependent variable: Private sector share in total employment (private sector size).
48 countries. Annual data 1984-2007

	Eigenvalue	Difference	Proportion	Cumulative
Private sector size	3.45146	1.95019	0.3835	0.3835
Privatization revenues	1.50127	.352108	0.1668	0.5503
Foreign direct inflows	1.14916	.173029	0.1277	0.6780
Left-wing government orientation	.97613	.362574	0.1085	0.7864
Institutional quality1	.613556	.0835426	0.0682	0.8546
Private credit	.530013	.107663	0.0589	0.9135
Per capita GDP	.422351	.211552	0.0469	0.9604
Government consumption	.145262	--------	0.0161	1.0000

The sources and detailed definitions of variables is given in Table 3.2a.

Table 3.4b: Principal component analysis
Dependent variable: Private sector share in total employment (private sector size).
EBRD countries. Annual data 1984-2007

	Eigenvalue	Difference	Proportion	Cumulative
Private sector size	2.99756	.976218	0.3331	0.3331
Privatization revenues	2.02134	.718069	0.2246	0.5577
Foreign direct inflows	1.30327	.55319	0.1448	0.7025
Left-wing government orientation	.750082	.0487377	0.0833	0.7858
Institutional quality1	.701345	.196734	0.0779	0.8637
Private credit	.504611	.161642	0.0561	0.9198
Per capita GDP	.342968	.113862	0.0381	0.9579
Government consumption	.149716	-----------	0.0166	1.0000

The sources and detailed definitions of variables is given in Table 3.2a.

Table 3.5: Privatization revenues and private sector size
Arellano-Bond first difference two-step GMM (xtabond)
Dependent Variable: Private sector share in total employment (private sector size). Annual data.1995-2007.

	(1)	(2)	(3)	(4)	(5)	(6)
Lagged dependent variable	0.725***	0.710***	0.673***	0.694***	0.694***	0.700***
	(0.0133)	(0.0107)	(0.00376)	(0.00396)	(0.00406)	(0.00442)
Foreign direct inflows	0.00950***	0.00641***	0.00835***	0.00708***	0.00707***	0.00659***
	(0.000646)	(0.000559)	(0.000399)	(0.000372)	(0.000372)	(0.000530)
Per capita GDP	0.00601***	0.00471***	0.00693***	0.0103***	0.00994***	0.00793***
	(0.00135)	(0.00112)	(0.00124)	(0.00160)	(0.00159)	(0.00186)
Private credit		0.00873***	0.0113***	0.00237	0.00222	0.00333**
		(0.00154)	(0.00129)	(0.00170)	(0.00174)	(0.00163)
Privatization revenues			-0.000354	-0.00117***	-0.00118***	-0.00118***
			(0.000333)	(0.000322)	(0.000325)	(0.000355)
Institutional quality1				0.0956***	0.0966***	0.0958***
				(0.00696)	(0.00691)	(0.00805)
Left-wing government orientation					-0.00216**	-0.00176
					(0.00101)	(0.00122)
Government consumption						-0.0266***
						(0.00266)
Constant	1.123***	1.170***	1.292***	1.031***	1.033***	1.095***
	(0.0488)	(0.0385)	(0.0137)	(0.0169)	(0.0174)	(0.0123)
First-order serial correlation (p-value)	-2.349	-2.5881	-2.5373	-2.0233	-2.0247	-2.0375
	(0.0188)	(0.0096)	(0.0112)	(0.0430)	(0.0429)	(0.0416)
Second-order serial correlation (p-value)	-.30507	-.09963	.01406	.42028	.42003	.42905
	(0.7603)	(0.9206)	(0.9888)	(0.6743)	(0.6745)	(0.6679)
Sargan Test (p-value)	(0.1024)	(0.2066)	(0.4834)	(0.3455)	(0.3560)	(0.3509)
Observations	449	438	316	263	263	263
Number of id	48	48	42	38	38	38

*** *indicates statistical significance at 1% level,* ** *indicates statistical significance at 5% level,* * *indicates statistical significance at 10% level, Figures in parentheses are standard errors. The sources and detailed definition of variables is given in Table 3.2a.. List of countries is given in Table 3.2b. All the variables are estimated by taking natural logs and the explanatory variables have been lagged by one period.*

Table 3.6: Privatization deals and private sector size
Arellano-Bond first difference GMM (xtabond)
Dependent Variable: Private sector share in total employment (private sector size). Annual data 1995-2007.

	(1)	(2)	(3)	(4)	(5)
Lagged dependent variable	0.710***	0.750***	0.756***	0.754***	0.763***
	(0.0107)	(0.00321)	(0.00277)	(0.00251)	(0.00358)
Foreign direct inflows	0.00641***	0.00439***	0.00483***	0.00484***	0.00431***
	(0.000559)	(0.000191)	(0.000215)	(0.000245)	(0.000338)
Per capita GDP	0.00471***	0.00479***	0.00357**	0.00482***	0.00632***
	(0.00112)	(0.00135)	(0.00163)	(0.00172)	(0.00190)
Private credit	0.00873***	0.0313***	0.0253***	0.0246***	0.0252***
	(0.00154)	(0.00216)	(0.000508)	(0.000629)	(0.00118)
Privatization deals		0.00230***	0.00451***	0.00452***	0.00421***
		(0.000198)	(0.000223)	(0.000195)	(0.000185)
Institutional quality1			0.0717***	0.0728***	0.0641***
			(0.00472)	(0.00501)	(0.00550)
Left-wing government orientation				0.00309**	0.000663
				(0.00131)	(0.00109)
Government consumption					-0.0664***
					(0.00332)
Constant	1.170***	0.915***	0.794***	0.791***	0.932***
	(0.0385)	(0.0154)	(0.0173)	(0.0184)	(0.0106)
First-order serial correlation (p-value)	-2.5881	-1.7382	-1.6435	-1.6447	-1.6659
	(0.0096)	(0.0822)	(0.1003)	(0.1000)	(0.0957)
Second-order serial correlation (p-value)	-.09963	-.41656	-.0724	-.06386	-.24625
	(0.9206)	(0.6770)	(0.9423)	(0.9491)	(0.8055)
Sargan Test (p-value)	(0.2066)	(0.4126)	(0.3682)	(0.3748)	(0.4961)
Observations	438	229	219	219	219
Number of id	48	35	35	35	35

*** *indicates statistical significance at 1% level,* ** *indicates statistical significance at 5% level,* * *indicates statistical significance at 10% level, Figures in parentheses are standard errors. The sources and detailed definition of variables is given in Table 3.2a.. List of countries is given in Table 3.2b. All the variables are estimated by taking natural logs and the explanatory variables have been lagged by one period.*

Table 3.7: Stock market activity and private sector size
Arellano-Bond first difference GMM (xtabond)
Dependent Variable: Private sector share in total employment (private sector size). Annual data 1995-2007.

	(1)	(2)	(3)	(4)	(5)
Lagged dependent variable	0.754***	0.760***	0.777***	0.758***	0.758***
	(0.00962)	(0.00353)	(0.00751)	(0.0142)	(0.00405)
Foreign direct inflows	0.00240***	0.00345***	0.00382***	0.00412***	0.00360***
	(0.000308)	(0.000206)	(0.000374)	(0.000382)	(0.000591)
Per capita GDP	0.00674***	0.0129***	0.0111***	0.0127***	0.0139***
	(0.000486)	(0.000761)	(0.00110)	(0.00147)	(0.00179)
Stocks traded	0.00739***	0.00980***	0.00911***	0.00950***	0.00855***
	(8.83e-05)	(0.000301)	(0.000589)	(0.000610)	(0.000605)
Privatization deals		0.00375***	0.00426***	0.00424***	0.00371***
		(0.000300)	(0.000187)	(0.000190)	(0.000341)
Institutional quality1			0.0512***	0.0515***	0.0431***
			(0.00750)	(0.00641)	(0.00557)
Left-wing government orientation				0.00454***	0.00248**
				(0.00159)	(0.00104)
Government consumption					-0.0607***
					(0.00345)
Constant	0.993***	0.898***	0.744***	0.812***	0.987***
	(0.0395)	(0.0194)	(0.0436)	(0.0657)	(0.0200)
First-order serial correlation (p-value)	-1.8044 (0.0712)	-1.6489 (0.0992)	-1.6261 (0.1039)	-1.6399 (0.1010)	-1.6357 (0.1019)
Second-order serial correlation (p-value)	1.039 (0.2988)	**2.1646 (0.0304)**	**2.0493 (0.0404)**	**2.0447 (0.0409)**	**1.7791 (0.0752)**
Sargan Test (p-value)	(0.3435)	(0.4841)	(0.5896)	(0.6355)	(0.5857)
Observations	390	222	218	218	218
Number of id	44	33	33	33	33

*** *indicates statistical significance at 1% level,* ** *indicates statistical significance at 5% level, * indicates statistical significance at 10% level, Figures in parentheses are standard errors. The sources and detailed definition of variables is given in Table 3.2a. List of countries is given in Table 3.2b. All the variables are estimated by taking natural logs and the explanatory variables have been lagged by one period.*

Table 3.8: Institutional quality2 and private sector size
Arellano-Bond first difference GMM (xtabond).
Dependent variable: Private sector share in total employment (private sector size). Annual data 1995-2007.

	(1)	(2)	(3)	(4)	(5)	(6)
Lagged dependent variable	0.680***	0.680***	0.684***	0.758***	0.756***	0.753***
	(0.00550)	(0.00560)	(0.00793)	(0.00244)	(0.00252)	(0.00717)
Foreign direct inflows	0.00612***	0.00608***	0.00495***	0.00346***	0.00343***	0.00299***
	(0.000454)	(0.000454)	(0.000694)	(0.000177)	(0.000189)	(0.000209)
Per capita GDP	0.0197***	0.0192***	0.0164***	0.00701***	0.00815***	0.00849***
	(0.000958)	(0.00105)	(0.00147)	(0.00189)	(0.00185)	(0.00194)
Private credit	0.00197	0.00182	0.00166	0.0284***	0.0281***	0.0252***
	(0.00163)	(0.00167)	(0.00184)	(0.000757)	(0.000747)	(0.00140)
Privatization revenues	-0.00121***	-0.00120***	-0.000992***			
	(0.000215)	(0.000201)	(0.000295)			
Privatization deals				0.00455***	0.00456***	0.00399***
				(0.000104)	(0.000106)	(0.000209)
Institutional quality2	0.0607***	0.0602***	0.0492***	0.0618***	0.0603***	0.0436***
	(0.00333)	(0.00332)	(0.00544)	(0.00438)	(0.00560)	(0.00752)
Left-wing government orientation		-0.00185	-0.00149		0.00320***	9.53e-05
		(0.00152)	(0.00133)		(0.00105)	(0.00169)
Government consumption			-0.0246***			-0.0459***
			(0.00302)			(0.00801)
Constant	1.094***	1.098***	1.195***	0.777***	0.777***	0.953***
	(0.0318)	(0.0321)	(0.0435)	(0.0120)	(0.0109)	(0.0230)
First-order serial correlation (p-value)	-1.996 (0.0459)	-1.9966 (0.0459)	-2.0009 (0.0454)	**-1.606 (0.1083)**	**-1.6083 (0.1078)**	**-1.6207 (0.1051)**
Second-order serial correlation (p-value)	.58053 (0.5616)	.58092 (0.5613)	.60557 (0.5448)	.2741 (0.7840)	.28468 (0.7759)	.05589 (0.9554)
Sargan Test (p-value)	(0.3048)	(0.3172)	(0.5355)	(0.4119)	(0.4357)	(0.7415)
Observations	263	263	263	219	219	219
Number of id	38	38	38	35	35	35

*** *indicates statistical significance at 1% level,* ** *indicates statistical significance at 5% level, * indicates statistical significance at 10% level, Figures in parentheses are standard errors. The sources and detailed definition of variables is given in Table 3.2a. List of countries is given in Table 3.2b. All the variables are estimated by taking natural logs and the explanatory variables have been lagged by one period.*

Table 3.9: EBRD countries and private sector size
Arellano-Bond first difference Two-Step GMM (xtabond).
Dependent variable: Private sector share in total employment (private sector size). Annual data.1995-2007.

	(1)	(2)	(3)	(4)	(5)	(6)
Lagged dependent variable	0.615***	0.466***	0.454***	0.416***	-0.143	0.0477
	(0.0270)	(0.0706)	(0.0799)	(0.100)	(0.115)	(0.316)
Foreign direct inflows	0.000621	0.00169	0.00575	0.00644	0.0123***	-0.00737
	(0.00141)	(0.00166)	(0.00378)	(0.00397)	(0.00396)	(0.0112)
Per capita GDP	-0.0707***	-0.0280	-0.0262	-0.0272	0.263	0.383
	(0.0239)	(0.0242)	(0.0233)	(0.0343)	(0.281)	(0.353)
Private credit	0.102***	0.0713***	0.0856***	0.0875***	0.0862	0.0751
	(0.0126)	(0.0211)	(0.0228)	(0.0236)	(0.0809)	(0.0942)
Privatization revenues		0.00766	0.00714	0.00936	-0.00678	0.0385
		(0.00659)	(0.00769)	(0.00973)	(0.0713)	(0.0934)
Left-wing government orientation			0.0408***	0.0404***	0.0930*	0.0657
			(0.0104)	(0.0104)	(0.0524)	(0.0413)
Government consumption				-0.0200	-0.103	-0.0134
				(0.0778)	(0.0781)	(0.101)
Institutional quality2					0.0493	0.0433
					(0.101)	(0.156)
Privatization deals						0.0158***
						(0.00514)
First order serial correlation test (p-value)	**-1.5096**	**-1.3512**	**-1.395**	**-1.3108**	**1.3882**	**-.5906**
	(0.1312)	**(0.1766)**	**(0.1630)**	**(0.1899)**	**(0.1651)**	**(0.5548)**
Second -order serial correlation test (p-value)	1.1313	1.3724	1.3147	1.3181	.16273	-.54789
	(0.2579)	(0.1700)	(0.1886)	0.1875	(0.8707)	(0.5838)
Sargan test (p-value)	(0.9091)	(0.9935)	(0.9901)	(0.9897)	(0.9999)	(1.0000)
Constant	1.857***	2.239***	2.200***	2.405***	2.613	0.509
	(0.121)	(0.204)	(0.283)	(0.688)	(2.086)	(3.413)
Observations	178	170	170	170	109	71
Number of id	21	21	21	21	15	12

*** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level, * indicates statistical significance at 10% level, Figures in parentheses are standard errors. The sources and detailed definition of variables is given in Table 3.2a. List of countries is given in Table 3.2b. All the variables are estimated by taking natural logs and the explanatory variables have been lagged by one period*

Table 3.10: Privatization revenues and private sector size.48 country sample. (Trade Openness added to the regressions)
Arellano-Bond first difference two-step GMM (xtabond)
Dependent Variable: Private sector share in total employment (private sector size). Annual data.1995-2007.

	(1)	(2)	(3)	(4)	(5)
Lagged dependent variable	0.667***	0.690***	0.663***	0.663***	0.659***
	(0.0131)	(0.0106)	(0.00263)	(0.00293)	(0.00562)
Foreign direct inflows	0.00769***	0.00619***	0.00793***	0.00796***	0.00720***
	(0.000481)	(0.000495)	(0.000431)	(0.000416)	(0.000515)
Per capita GDP	0.00903***	0.00629***	0.00908***	0.00923***	0.0116***
	(0.00139)	(0.00123)	(0.00167)	(0.00167)	(0.00253)
Trade Openness	0.0418***	0.0177***	0.0187***	0.0188***	0.0229***
	(0.00302)	(0.00263)	(0.00172)	(0.00175)	(0.00306)
Private credit		0.00698***	0.00926***	0.00917***	0.0113***
		(0.00169)	(0.00133)	(0.00124)	(0.00134)
Privatization revenues			-0.000411	-0.000409	-0.000427
			(0.000344)	(0.000344)	(0.000353)
Left-wing government orientation				0.00187*	0.00266*
				(0.00112)	(0.00160)
Government consumption					-0.0371***
					(0.00531)
Constant	1.164***	1.171***	1.244***	1.243***	1.309***
	(0.0500)	(0.0365)	(0.0109)	(0.0112)	(0.0264)
First order serial correlation test (p-value)	-2.3627 (0.0181)	-2.5694 (0.0102)	-2.518 (0.0118)	-2.5143 (0.0119)	-2.4906 (0.0128)
Second -order serial correlation test (p-value)	.05965 (0.9524)	-.19981 (0.8416)	-.02967 (0.9763)	-.03628 (0.9711)	-.0027 (0.9978)
Sargan test (p-value)	(0.1705)	(0.1742)	(0.4326)	(0.4412)	(0.4785)
Observations	449	438	316	316	316
Number of id	48	48	42	42	42

*** indicates statistical significance at 1% level, ** indicates statistical significance at 5% level, * indicates statistical significance at 10% level, Figures in parentheses are standard errors. The sources and detailed definition of variables is given in Table 3.2a. List of countries is given in Table 3.2b. All the variables are estimated by taking natural logs and the explanatory variables have been lagged by one period*

Chapter 4

Variations in the size of the public sector: Does institutional quality and political competition matter? Panel data evidence from around the world

Abstract

Using panel data evidence for 88 developing and developed countries from around the world, the study estimates the impact of institutional quality on public sector size. Dynamic panel estimation technique is adopted to control for the persistence in the public sector size data. In the presence of some the leading theory on determinants of public sector size, the study finds that higher institutional quality reduces the size of the public sector. The reduction in the size of the public sector due to an improvement of institutional quality is based on the philosophy that private sector would substitute the public sector if there is prevalence of law and order in economies around the world. Secondly, the study finds evidence of increased level of political competition reducing the size of the public sector. The study uses institutional quality data from International Country Risk Guide (ICRG) political risks variable from 1984-2007 and the data on political competition is obtained from Database of Political Institutions (2009). The central insight of the chapter is built around the institutional quality variables as compared to last chapter where the variable was one of the many explanatory variables

of private sector size. To take into account the slow changing variable of institutional quality the dynamic panel estimator is used for both annual and four year moving averages data.

4.1 Introduction and motivation

One of the major fallouts of the 2008-2010 global recessions has been the need to reduce the size of the public sector, where by policy makers around the globe have launched programs to cut public sector size. So, in current times of austerity, it is critical to have another look at the variables affecting public sector size. The existing economic and political variables causing variations in size of the public sector have attracted attention from both the theoretical and empirical sides of economics research. Shelton (2007) has categorized one half of the existing theoretical models of public sector size as determinants of demand for the public services and other half focusing on the determinants of supply of the public sector services. Rodrik's (1998) theoretical model of trade openness, Wagner's (1890) law of income, Alesina and Wacziarg's (1998) model of country size and Easterly and Levine's (1997) model of ethnic fractionalization are models explaining the demand for public services. On the other hand Benabou's (1996) model of political rights, Persson and Tabellini's (1999) model of electoral rules and Oates's (1972) model of fiscal federalism all explain the supply of public services.

In the above mentioned theoretical models of public sector size, models that show the variations in public sector size via the channels of political institutions and electoral rules have recently become popular in the political economy literature. Persson and

Tabellini (2003) showed that Presidential system of government has smaller public sector size as compared to the parliamentary form of government. With the significance of the political intuitions in public sector size literature, one needs to check whether the political environment along with the apolitical variables are enough to explain the full picture of variations in public sector size. The current chapter makes two contributions to the existing literature; firstly, it extends the political economy debate by investigating the impact of institutional quality on public sector size within the framework of existing explanatory variables. The study builds the hypothesis that countries where institutional quality is higher will have smaller public sector as compared to countries with weaker institutions. Using a panel data set of 88 developing and developed countries the results show a significant relationship between institutional quality and public sector size. The biggest advantage of looking at the overall institutional quality of countries in the context of public sector size as opposed to political determinants is due to the fact that some countries do not have any meaningful political institutions and thus it is important to look at a broader picture to fully understand the dynamics of public sector size.

Secondly, the study adds to the existing literature by investigating the impact of political competition on the public sector size by employing an index of political competition as opposed to employing variables like the Presidential dummy variable or the number of votes won by the leading political party. In Persson and Tabellini's (1999) theoretical framework, level of political competition was the "central insight" in explaining the variation in the size of the public sector. Using the index of political competiveness provided by Database of Political Institutions (DPI), the current study finds higher levels of political competition has a negative and significant impact on the size of the public sector. The remaining chapter is organized as follows. Section 2

provides insight to the determinants of public sector size. Section 3 describes the data

and introduces the econometric techniques used in the study. Section 4 reports

estimation results followed by conclusion.

4.2   Determinants of public sector size

a.   Institutional quality and public sector size

There is a consensus in existing literature of North's (1990) proposition on the

importance of institutional quality to economic development. But the non-existence of a

theoretical model in explaining the impact of institutional quality on public sector size

did pose a considerable challenge to the current study in building a hypothesis that

explains the effect of institutional quality on public sector size. Low levels of taxation,

limited role of the government combined with enforcement of contracts are essential

determinants of economic development (La Porta et al. 1999). The economic and

regulatory role of the government can only be acceptable if it adheres to the prevalent

constitutional framework. The International Country Risk Guide (ICRG) defines law

and order as "an assessment of the strength and impartiality of the legal system". A

strong legal system empowers the citizens of a country to punish politicians; the

strength of the legal system puts limits on the behavior of ruling politicians and

influential government bureaucrats. It also stops politicians from favoring certain

groups in terms of government contracts which can be indirect bribes paid out to

consolidate and prolong their stay in power. With weak legal system politicians can

prolong their stay in power and impose greater taxes on its citizens to fulfill their

policies of discriminatory incentives. Padro-i-Miquel (2004) found that African

politicians belonging to a specific ethnic group were able to substantially increase tax rates for other ethnic groups in a weak institutional environment. Thus, a well functioning legal system can put checks on the conduct of ruling elite and also put checks on politicians' willful fiscal expenditures. An observance to the law can provide better protection of private property rights, intellectual property rights and enforcement of contract agreements which should have a positive impact on the size of the private sector and subsequently reduce the size of the public sector. The index of law and order drawn from ICRG is used in the current study to proxy the strength of the legal system. *Hypothesis 1: Prevalance and improvement of law and order will reduce the size of the public sector.*

In their analysis of corruption in various economies, Vishny and Shileifer (1993) highlighted two different types of corruption. Firstly, when bribe is paid along with the required government fee to win import licenses and permits, this type of corruption does not lower the tax revenue of the government but only helps those who can afford to pay the necessary bribe. The second type of corruption is when only the required bribe is paid to a corrupt bureaucrat or politician and no subsequent imports license fee or permit fee is deposited in the government treasury. One form of corruption would not have an adverse impact on the tax revenues of the government but both should have a negative impact on foreign inflows of capital and the efficiency of the private sector. The falling efficiency of the private sector would lead to greater intervention by the government, thus increasing the size of the public sector.

Weak institutional quality and high levels of corruption would require greater government regulation and its subsequent monitoring. To implement its regulations the

government needs to hire bureaucrats for monitoring purposes, which increases government expenditure. The monitoring by public servants would encourage corrupt individuals to demand bribes from private agents whenever they come across a market failure or non-compliance to government regulations. The demand for bribes by a certain element of government bureaucracy would mean increased monitoring of the monitors, eventually leading to greater government expenditure. This vicious presence of corruption would not only increase the size of the bureaucracy but also substantially increase the salaries of public sector employees to deter them from indulging in corrupt practices. "When corruption is hard to prevent, there may be more bureaucrats and higher public-sector wages" (Acemoglu and Verdier, 2000) page 194.

The existence of corruption can also influence different components of government expenditure as corrupt bureaucrats would be inclined to spend more on goods and services which carry the possibility of higher bribes as compared to goods where bribes would be non-existent. Mauro (1998) found educational expenditure to be a major causality of corruption as it was difficult to get heavy bribes from "textbooks or teachers' salaries". Military expenditure and investment on infrastructure would be major beneficiaries of government expenditure in a more corrupt country. For countries like United States of America and Pakistan whose military expenditure is nearly 20% (WDI 2010) of total government expenditure, any increase in military expenditure would lead to increased level of government expenditure. High level of corruption can harm every facet of institutional quality e.g. corruption can easily infiltrate the legal system of a country to offset any benefits that a good legal system can obtain; it can also adversely impact the process of democratic accountability. The index of corruption and

an average of all[27] ICRG political risks variables drawn from ICRG will be used to proxy corruption and institutional quality in estimation.

Hypothesis 2: Prevalence of corruption and weak institutional quality will increase the size of the public sector.

b. Political competition and public sector size

The central insight of Persson and Tabbellini (1999) study was that political competition among politicians results in more efficient outcome of government policies. In the environment of political competition, one set of politicians' promises cuts in taxes to gather support of the electorate, whereas some politicians can promise to increase public spending to win votes and there might be some politicians who could promise both to win the competitive struggle of the ballot box. In a political competitive world where one school of thought suggests "decline of ideology", it can be difficult to hypothesize the impact of political competition on public policy. If it is assumed that incumbent government party and the rival party are both promising increase (decrease) in public spending to win electoral votes; promises which will consequently increase (decrease) public spending immediately before and after the election. It can also be difficult to measure the level of political competition for the purpose of estimation in a large panel data set. Database of Political Institutions (DPI 2009) provides a "legislative index of political competitiveness" for more than 150 countries from 1975 to 2009. The competitive index takes values of 1 to 7, where 1 is assigned to a country without an elected legislature and number 7 is assigned to the most competitively elected legislature. In the current panel data set, majority[28] of the countries are democracies and

[27] All twelve ICRG variables minus corruption

[28] Mean value of polity2 is 4.160494. (polity2 takes minimum value of -10 for autocracies and +10 for democracies)

the mean value of the political competition index is 6.273 in the summary statistics as given in Table 4.1, which reflects a high degree of political competition.

Using panel data for 131 countries for the time period of 1960 to 1990, Mulligan et al. (2004) found no significant difference in aggregate government consumption between democracies and non-democracies. Dummy variable for communist countries, British legal origin, population above 65 years age, total population, value added by agricultural output, military spending and ethnic fractionalization were the other control variables used in their OLS regressions with all important democracy index variable. The only difference that arose in Mulligan et al. (2004) cross- sectional and time series data empirical analysis was that autocratic regimes would torture opposing voices and tax more to support increased level of defense expenditure in order to pro long their stay in office, whereas under democratic regimes the level of political competition would determine the length of public office. Lindert (1994) also found that on average public expenditure on pensions, unemployment benefits, health and welfare spending is same under democracies and non- democracies.

Two theoretical models of political behavior were outlined by Persson and Tabellini (1999) to explain the variations in the size of the government sector. In the "pre-election politics" model, it was assumed that politicians announce their policies before election and well-informed voters elect a party of their choice. The difference in public policy under proportional and majoritarian election rules was analyzed in pre-election model which predicted a smaller public sector under a majoritarian election rule. The prediction of a smaller public sector was centered on the assumption that under majoritarian elections political competition would be high as compared to proportional

voting rule. In Persson and Tabbellini (1999) "post-election model" it was assumed that politicians design public policies after assuming office and politicians can only be held accountable for their past history in future elections. In the post-election scenario the study differentiated between Presidential and Parliamentary forms of government. It was hypothesized that political competition would be tougher and size of the public sector be smaller under a Presidential system of government as opposed to a Parliamentary form of government. One explanation of the Presidential form of government could being tougher than the Parliamentary form of government is that the Presidential candidates faced political scrutiny in the entire country whereas the candidates in the Parliamentary form of government face political scrutiny in their respective constituency. Using a data set of 64 countries in total out of which 39 countries were classified as parliamentary democracies and the remaining 25 were classified as Presidential democracies, Persson and Tabbellini (1999) found a significant and negative impact of Presidential system on the size of the public sector. The study only found weak evidence of majoritarian election rule to have had decreased the provision of public goods in the data set. The dependent variable was public sector size proxied by total government expenditure as a share of GDP. The log of per capita income, international trade, share of population above 65, ethno-fractionalization and regional dummies were all used as independent variables in the OLS regressions by Persson and Tabbellini (1999). Using cross-sectional analysis of 20 OECD and 20 Latin-American countries, Milesi-Ferretti et al. (2002) found public spending was higher under proportional voting system than in the majoritarian voting system.

Using two different measures of political competition for Canada from 1870 to 2000, Ferris et al. (2008) found political competition was the only significant political factor

in affecting the size of the Canadian public sector. Using Johansen's (1995) cointegration test and error correction techniques for a substantial long time series data, Ferris et al. (2008) also showed low level of political competition increased the size of the public sector. Using a data set of 18 highly industrialized countries Cameron (1978) found a positive relationship between public sector size and the frequency of electoral competition. The effect of political competition was found to be negligible once Cameron (1978) took into account the ideological aspect of political parties in the estimated regressions.

Utilizing the Polity IV data set as an indicator of political competition for 18 Latin American countries, Aidt and Eterovic (2011) found that an increase in political competition from low to high lead to a decrease in public expenditure by 2 % and tax revenues also went down by 1.7 %. Using fixed effects estimator for a panel of countries covering the period of 1920 to 2000, the study also found that increased voter participation in the electoral exercise had a positive impact on the public sector size. The role of politics was one of Cameron's (1978) five factors explaining the variations in the size of the public sector: the study hypothesized that as majority of the politicians promise to spend more while in office, the high level of competition will expand public sector size. Cameron (1978) suggested countries with more frequent elections would experience increase in the size of the public sector as opposed to countries with fewer competitive elections. The influence of ideology on the size of the public sector was also one of the key explanations put forward by Cameron (1978).

Other determinants of public sector size

    a. Openness and public sector size

The relationship between international trade and public size was one of the five hypothesis investigated by Cameron (1978) for 18 highly industrialized capitalist economies for the period of 1960 to 1975. The results showed that the expansion in the size of the public sector was primarily driven by exposure to international trade; Cameron (1978) results were built on the hypothesis that more open economies are highly industrialized. The heavy industrialization would lead to high level unionization and a bigger scope for collective bargaining in the economy, leading to stronger labor confederations and frequent left wing governments. The influences of strong labor unions and left wing governments would lead to increased "spending for income supplements" thus increasing the size of the public sector as envisaged by Cameron (1978). The simple correlation between public sector size and international trade was found to be positive 0.78 and Ordinary Least Square (OLS) regression found trade to be the "best single predictor" of increase in government size. The standardized regression analysis also found trade and left-wing governments were the two best determinants in explaining the variations in the size of the government sector where the standardized regression coefficient for international trade and left wing government were 0.58 and 0.34 respectively. Government revenues as a proportion of Gross Domestic Product was used to proxy the size of the public sector and sum of exports and imports as a ratio of GDP was used to proxy openness in the estimated regressions. The other four hypotheses presented by Cameron (1978) on the expansion of the public sector were the level of economic development, the role of indirect taxes, the political ideology of

ruling elite and lastly the role of federalism in affecting the size of the public sector.

Cameron (1978), contrary to the Wagner's (1890) hypothesis, found that economic

development of a country did not play any significant role in increasing the size of the

public sector. Strong evidence was also found in favor of left-wing governments

increasing the size of the public sector, whereas the role of indirect or "hidden" taxes

was also found to be decreasing rather than increasing the size of the public sector.

Cameron (1978) also found that federalism in industrialized nations decreased the size

of the public sector and the centralization of government services was responsible for

increasing its size.

The evidence provided by Cameron (1978) on a positive relationship existing between

openness and public sector size was based on the idea of 18 highly industrialized

countries having the presence of strong labor unions and ruling left wing governments.

The role played by labor unions in developed countries cannot find its parallels in

majority of the developing countries. For this reason Cameron's (1978) results cannot

be generalized for the world. The reduced number of countries in Cameron's study was

one of the motivating factors for Rodrik (1998) to investigate the relationship between

trade openness and public sector size for a 100 plus cross-sectional country sample.

Based on a theoretical model which assumed public goods and private goods to be

perfect substitutes and exports not consumed domestically while imported goods are not

produced at home, Rodrik (1998) hypothesized that countries which are exposed to

greater risk through international trade will have larger level of public expenditure.

Public consumption expenditure as a ratio of GDP from Penn World Tables (PWT) 5.6a

was used to proxy public sector size and openness in the estimation was proxied by the

sum of exports and imports as a ratio of GDP which was also obtained from PWT 5.6a

by Rodrik's (1998) influential work. The simple cross-sectional OLS regressions employed in the seminal study provided evidence of a robust and positive relationship that existed between countries openness and public sector consumption expenditure. Based on their central hypothesis that exposure to external risk was the driving force in increasing public expenditure, Rodrik's (1998) study included external terms of trade risk as an additional control variable in the main regressions. Including the terms of trade risk in the estimation, Rodrik (1998) found that international trade did not play any "independent effect" on public sector size and the impact was only coming through the channel of exposure to external risk. The level of economic development, the dependency ratio in population, the urbanization rate, a dummy for socialist countries, a dummy for OECD countries, regional dummies, a dummy for oil producing countries, debt as a ratio of Gross National Product and country size were additional independent variables used to gauge the impact of openness on public sector size. Rodrik's (1998) evidence was robust to changes in estimator from OLS to panel regressions with fixed effects. The results were also robust to changing the public consumption expenditure as the dependent variable to disaggregated data on public spending on education, public sector revenues as a ratio of GDP and public sector employment as a share of total labor force, where all variables exhibited a positive association of public sector on economy's openness to international trade.

Following the footsteps of Rodrik (1998), the relationship between openness and public sector size was empirically investigated by Ram (2009) for 154 countries covering the period of 1960-2004. Ram's (2009) set of estimated equations and proxies for the estimated variables were mainly influenced by existing literature.[29] The panel data set of

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[29] Rodrik (1998) and Alesina and Wacziarg (1998)

154 countries was estimated on annual data, 5 year means and ten year means data sets. Ram (2009) employed both OLS and two-way fixed effects estimator to see the impact of trade openness on the size of the public sector. The study found consistent support for openness having a positive and significant impact on government size. The positive association of trade openness and public sector size was robust to the use of annual data, five year means and ten year means in the 154 country panel. Ram (1998) also showed that the positive effect of trade openness on public sector size was not influenced merely by the size of the country hence providing support to the external risk hypothesis presented by Rodrik (1998).

Terms of trade externality and demand for insurance were the two key components of the theoretical model formulated by Epifani and Gancia (2009) to examine the relationship between size of the public sector and openness. The first key hypothesis in their theoretical model was that international trade would lower the domestic cost of taxation and thereby increase the size of the public sector. The second key hypothesis of the model was that international trade would raise risk in the domestic economy, thus raising the demand for insurance at home and consequently increasing the volume of domestic public transfers. The key component of Epifani and Gancia (2009) theoretical model was the elasticity of substitution between domestic and foreign goods. In their model countries with higher degree of trade share and lower elasticity of substitution between foreign and domestic goods would have larger size of the public sector as compared to countries with higher elasticity of substitution between foreign and domestic goods. Using cross-sectional analysis for 143 countries, Epifani and Gancia (2009) estimated that a 1.0 % increase in trade openness can increase the public share in GDP by 0.15 %. Political regime variable and degree of financial openness had an

insignificant impact on public sector size in cross-sectional analysis. The interaction variable of institutional quality and trade openness also had an insignificant impact on public sector size. The inclusion of the trade externality variable to the cross-sectional regressions makes the trade openness variable insignificant and the interaction term of trade externality and openness had a positively significant impact on public sector size. Epifani and Gancia (2009) results using panel data set of more than 100 countries covering the period of 1950-2000 and fixed effects within estimator also showed that the interaction term of openness and institutional quality had insignificant impact on public sector size once terms of trade externality variable was added to the estimated regressions.

Looking at the diverse evidence found by cross-sectional[30] and time-series[31] studies on the relationship between openness and public sector size, Benarroch and Pandey (2008) highlighted the importance of using panel data to investigate the impact of open economies on government size. Using five year averages for a panel of 96 countries from 1970-2000 and employing a fixed effects estimator, Benarroch and Pandey (2008) found no statistical significance between lagged trade openness and size of the public sector. The impact of trade openness-volatility on public sector size was also found to be statistically insignificant, contradicting the evidence provided by the seminal work of Rodrik (1998) where both trade openness and trade volatility had a significant impact on public sector size. Also, using the granger causality tests on their panel data set, the authors did not find any statistical relationship between lagged trade openness and public sector size. Firstly, larger public sectors were likely to play a bigger role in the economy and secondly protectionist attitude by the government towards country's

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[30] Alesina and Wacziarg (1998)
[31] Islam (2004)

imports would also increase the public sector were the two hypotheses forwarded by Benarroch and Pandey (2008) in defense of their empirical evidence of the 96 country panel data set.

b. Country size and public sector size

Existing literature also provides evidence that positive relationship between international trade and public sector size can merely be driven by the size of the country Alesina and Wacziarg (1998). The hypothesis is based on the philosophy that larger countries would trade less internationally and then have relatively smaller public sectors due to the benefits of economies of scale. On the other hand smaller countries would be relying heavily on international trade and thus more exposed to the risks highlighted by Rodrik (1998) and hence have larger public sectors. Alesina and Wacziarg (1998) provided both theoretical and empirical evidence of smaller countries having larger public sectors and would also be more liberal in terms of international trade. Their theoretical model was based on the intuition that an increase in country size would lead to decreased per capita cost of government goods for a given level of government expenditure, whereby the reduced per capita cost of government goods would lead to increased consumption of privately produced goods. Employing cross-sectional OLS regressions on five-year averaged data ranging from 1960 to 1989, the study used the size of the population to proxy country size which had a negative and significant impact on government size. The negative effect of country size on public sector size was robust to inclusion of various control variables such as per capita income, urbanization rate, population density and regional dummies. Alesina and Wacziarg (1998) also showed that country size is economically more relevant in explaining variations in government

consumption and international trade is more relevant to changes in level of government transfers. The results found by Alesina and Wacziarg (1998) have not been very popular with recent research on determinants of public sector size as Epifani and Gancia (2009) highlighted the non-robust evidence found on country size and its influence on public sector size was due to confusing nature of theoretical framework presented by Alesina and Wacziarg (1998).

c. Wagner's (1890) hypothesis (Level of income and public sector size)

The positive relationship between country's level of income and public sector size is popularly known as the Wagner's (1890) hypothesis, since being presented for the first time it has become a key variable in explaining the variations of public sector size. There have been numerous studies to date which have theoretically and empirically examined the Wagner's (1890) hypothesis of a positive relationship between level of income per capita and the level of public expenditure in Gross Domestic Product (GDP). Due to the exhaustive nature of existing studies on Wagner's (1890) hypothesis, the current study will evaluate the seminal work by Ram (1987) which looked at both cross-sectional and time series data in testing the Wagner's (1890) hypothesis. In the time-series analysis, Ram (1987) estimated the feasible generalized least-square regression for each of the 115 countries for the period of 1950 to 1980 and found limited support of a positive relationship existing between real GDP per capita on the public sector share of GDP. For the time-series data of 115 countries from 1960 to 1980, Ram (1987) results showed that seventy countries had a positive co-efficient for GDP per capita and 45 countries had a negative co-efficient for GDP per capita in the regressions with public sector share as a ratio of GDP was used as the dependent

variable. Using the mean values (1950-1980) for each of the 115 countries and OLS estimator, Ram (1987) found very limited or negligible support for Wagner's (1890) hypothesis in the sample. There was also negligible support for the hypothesis even when the sample was divided in ten year sub-samples. In fact Ram's study found the total opposite of the Wagner's (1890) hypothesis in the cross-sectional estimates which found that a negative relationship existed between a country's level of development and the size of the public sector. Rodrik (1998) and Ram (2009) have also found evidence contradicting the Wagner's (1890) hypothesis for data sets of more than 100 countries.

The existing literature on the determinants of public sector size is large and it is not possible to cover the entire literature in the current study, therefore readers may refer to Mueller and Stratmann (2003), Persson and Tabelleini (2003) and Shelton (2007) for detailed discussion on the determinants of public sector size.

4.3   Data and econometric techniques

The basic aim of the study is to investigate the impact of economic, political and institutional variables on the size of the public sector for countries from different regions of the world. With this goal in mind, the study uses annual panel data and 4 year moving averages data of 88 countries from 1984 to 2007. Annual data was also used by Ram (2009) to see the variations in the size of the government sector for a panel of 154 countries. The time period chosen for the current study was primarily dictated by two factors. Firstly, the availability of ICRG data and secondly, to investigate factors that have affected public sector size in the pre-financial crisis period. Government Share of Real GDP per capita (RGDPL) taken from PWT 6.3 (Summers and Heston, August

2009) is used to proxy public sector sector size and is used as the only dependent variable in entire estimated regressions. Law and Order, and Corruption are the two institutional variables taken from ICRG's Political Risk Rating data base. The rating consists of 12 different components covering both social and political characteristics of individual countries. Law and Order component is divided in two equally weighted categories: firstly, the category of "Law" which judges a country on the strength of its legal framework and secondly, "Order" which reflects the level of adherence to the prevailing legal framework. The country with a lowest risk in terms of law and order would get the maximum points of 6 and the country on the highest risk category would get zero points for law and order. The component of Corruption is scaled from zero to 6, where 6 points are awarded to the country with least possible corruption in the political system and zero points are given to a country with excessive corruption. The component of democratic accountability is also scaled from zero to six; where 6 points are awarded to a country whose politicians are most "responsive" to the electorate and zero points are awarded to a country where the ruling elite is completely autocratic. The "legislative index of electoral competitiveness" is taken from Database of Political Institutions (DPI 2009); the index is scaled from 1 to 7. The legislative index, takes the minimum number 1 which is awarded to a country with no legislature and maximum number of 7 is awarded to a country where the legislature is elected after the most competitive process. GDP per capita at 2000 US dollars, international trade as a ratio of GDP, total land area, total population, urban population as a ratio of total population, ratio of population above 65 in total population, a dummy variable for Organisation for Economic Co-operation and Development (OECD) countries and a dummy variable for Presidential form of government are used as additional independent control variables in estimation. The summary statistics of variables are given in Table 4.1a. The public sector size

variable shows considerable variation as the minimum value of government share in GDP per capita is 3.89 % for Nigeria in 2003. For Nicaragua it is 53.25 % in 1987, these two figures reflect that some countries around the world provide a very limited role to the public sector. On the other hand some countries of the world provide a major role to the public sector in economic activity like Nicaragua in 1987. The variable of trade openness also shows considerable variations with a minimum value of 11 % as a share of GDP and a maximum value of 327% as a share of GDP. The complete list of variables and their sources is given in Table 4.1b.

Public sector size across countries is generally assumed to be changing very slowly, exhibiting persistence over time. To take into account the "great deal of inertia", Persson and Tabellini (2003b), Epifani and Gancia (2009) and Pickering and Rockey (2011) have suggested the use of lagged dependent variable as an additional explanatory variable to capture the dynamics of public sector size. Baltagi (2005) has recommended Blundell and Bond (1998) System GMM Estimator to be unbiased for a dynamic panel data set with relatively large number of cross-sectional units and small time periods. One of the advantages of the System GMM as opposed to other dynamic panel estimators is its ability to estimate variables that are time invariant for example dummy variables for regional location can be estimated and are of utmost importance to the current public sector size study. The Blundell and Bond (1998) estimator combines the regression in levels with the regression in differences, where the lagged differences of the corresponding variables make the instrument set for the regression in level and the lagged levels of the variables are used as the instrument set for the regression in differences. Consistent with the previous chapter, the study uses two-step GMM estimator as compared to the one-step GMM. To account for the downward bias of the

two-step standard errors, a finite-sample correction procedure introduced by Windmeijer (2005) is employed on all two-step GMM estimations. Boubakri et. al (2009) has used the Blundell and Bond two-step GMM estimator under the Windmeijer (2005) corrected standard errors in investigating the relationship between privatization and emerging market sovereign bond spreads. Hassan et al. (2009) have also used the System GMM estimator with corrected standard errors to study the impact of institutional quality on economic growth for a panel of Chinese provinces.

The use of dynamic panel estimator is not new to public sector size literature where Kimakova (2009) found financial openness increased government size in a panel data set of 87 countries using the Arellano-Bond dynamic panel estimator. Government share in GDP, Trade as a share of GDP, total population, GDP per capita, share of population above 65, land area and share of urban population are expressed in logarithmic format in the entire set of regressions; the use of logarithmic format is consistent with Rodrik (1998). Thus the empirical model to be estimated by dynamic panel estimators is as follows:

$$\ln PS_{it} = \gamma_0 + \delta \ln PS_{it-1} + \beta \ln X_{it} + \mu_{it} \tag{1}$$

where PS is an indicator of public sector size, X is a vector explanatory variables namely international trade, per capita GDP, country size, population above 65 age, urban population, measure of democracy, institutional quality and political competition causing variations in the size of the public sector and error term μ contains both time and country specific effects. Public sector size and variables of institutional quality are perceived to be changing very slowly; therefore, the above equation 1 is estimated using

both annual and 4-year moving averages data for the 88 country panel. As per the non-reliance on moving averages data in the previous was primarily due to the non-availability of a theoretical model guiding the selection of the explanatory variables of private sector size. Therefore each variable was given equal weight in chapter 3, whereas in this chapter the central insight is to investigate the impact of institutional quality on public sector size.

4.4   Estimation results

 As it was noted earlier, the presence of the lagged dependent variable leads to biased results from OLS, fixed effect and random effects estimators. Therefore, Arellano-Bond (1998) dynamic panel estimator is used to estimate equation 1 and the results are reported in Table 4.2. The use of dynamic panel estimator leads to significant variables in both annual and 4-year moving averages data. In the first column of Table 4.2 all explanatory variables other than the share of elderly population are statistically significant. The co-efficient of law and order is negative and significant at 1% level in column 1, reaffirming the main hypothesis of the study. Dummy variable for Presidential form of government is positive and significant in the second column of Table 4.2. The co-efficient of political competitiveness is negative and statistically significant in the third regressions where the variable gets included and is also significant at 5% level in the 4-year moving averages data, thus lending limited evidence of a negative relationship between political competition and public sector size. Few worrisome issues are present in the results reported in Table 4.2: firstly, the failure to reject the null of first order serial-correlation in the last four columns. Secondly the validity of instruments Sargan test is also not passed in some of the estimated

regressions and finally the OECD dummy variable is also dropped by the Arellano-Bond estimator due to multicollinearity. The Arellano-Bond first difference GMM was the preferred estimator in chapter 3 but due to the failure to reject the null of first order serial correlation in half of the results, the current chapter adopts the use of System GMM dynamic panel estimator in the remaining regressions.

System GMM dynamic panel estimator is thus used in the remaining regression where in each table both annual data and the 4-year moving averages data are used for estimation. Table 4.3 reports the baseline regressions, the co-efficient of law and order is negative and statistically significant in the first column, the existence of a negative relationship between institutional quality and public sector size gives further weight to the main hypothesis of the study. In the second column the variable of political competitiveness is added to the regression where it has a negative but statistically insignificant impact on public sector size. The addition of the Presidential dummy in third column did not alter the significance and sign of the institutional quality variable but in itself the Presidential dummy has a positive and significant influence on the dependent variable. The variable of law and order is insignificant in the regressions where the democracy variable (polity2) is included as an additional explanatory variable in the fourth column of annual data estimations. In the four regressions of Table 4.3 using 4-year averages data produces insignificant results for institutional quality variable but it consistently has a negative co-efficient, providing some support to the main hypothesis of the study. The use of 4-year moving averages data lends greater support to the positive impact of trade openness and public sector size whereas there is also evidence of a positive relationship existing between country size and public sector size. The political competition index remains insignificant and negative with the use of

moving averages data in the last three columns of Table 4.3. The Presidential dummy variable in the last column of Table 4.3 is negative and significant, implying a negative impact of the Presidential system on public sector size. The opposite results found in Table 4.3 for the Presidential dummy using annual and moving averages data raises concerns but it is not investigated further as it does not alter the sign of the institutional quality variable. The three diagnostics test of the dynamic panel estimator reported in Table 4.3, namely first order serial correlation, second order serial correlation and the Sargan test all pass with the required econometric benchmarks. Regression estimates of Table 4.3 have been repeated in Table 4.4 using the log of total land area to proxy the size of the country. The results in Table 4.4 reaffirm the negative and significant impact of law and order on public sector size. Results of Table 4.4 do provide greater evidence in support of trade openness having a positive impact on public sector, whereas other explanatory variables have similar results to the previous Table 4.3 where total population was used as one of the explanatory variables. It is worth noting here that the entire set of regressions using annual data do not support the Wagner's (1890) hypothesis but at the same time the use of averages data supports the hypothesis. Ram (1987) also found results that favored the Wagner's (1890) hypothesis and the study also provided a detailed discussion on the country level studies that support the Wagner's (1890) hypothesis.

Average of all ICRG variables excluding corruption is used as a proxy for institutional quality in estimation of equation 1 and the results are reported in Table 4.5. The co-efficient of institutional quality variable is negative in all columns of the table but significant in the first five columns of the estimated regressions. The use of the average index for institutional quality also provides support to the main hypothesis of the study

using both average and moving averages data sets. The index of political competition also appears with negative sign throughout in Table 4.5 and is also significant in column 2 and column 5 of the table, providing support to the negative impact of political competition on public sector size. The index of political competition turns to be statistically insignificant in the presence of the Presidential dummy variable, whereas the co-efficient of dummy variable of Presidential form of government is positive and significant in column 3 and is negative but insignificant in two columns of Table 4.5, the contradictory results of the Presidential dummy were also seen in the earlier table. There is once more support for the positive link between trade openness and public sector size in both annual and moving averages data. The use of 4-year moving averages data in the last 4 columns of Table 4.5 provides support to the positive link between per capita GDP and public sector size whereas there is also evidence of a positive link between the size of the country and its public sector.

The last set of dynamic panel estimation results are reported in Table 4.6 using both annual and moving averages data sets, in the last table corruption is used to proxy institutional quality with other explanatory variables of public sector size. Results show that both the new variable taken from ICRG is statistically insignificant in the entire set of regressions with a negative co-efficient in the regressions using annual data. The co-efficient of legislative index of political competition is negative and significant in columns 2 and 3, once more exhibiting that the size of the public sectors falls when the political competition is high. The positive relationship between trade and the public sector is again evident in Table 4.6, whereas there is limited support to Wagner's (1890) hypothesis in the regressions with 4-year moving averages data. The use of corruption to proxy institutional quality did not statistically support the main hypothesis of the

study but the statistical and economic significance of other explanatory variables are consistent with the study's earlier reported dynamic panel estimation results. Diagnostic tests reported in Table 4.4, Table 4.5 and Table 4.6 are all satisfactory and no econometric issues arise in the dynamic panel estimation using both annual and 4-year moving averages dataset.

Robustness checks

To check for robustness the variable of trade openness was winsorized to limit the role of extreme values with the advantage of retaining all countries in the data set. The results of winsorized variable of trade openness are reported in Table 4.7. The variable of law and order has a negative and significant impact on public sector size, once more lending support to central hypothesis of the chapter. The variable of trade openness also has a positive and significant impact on public sector size in five regressions of Table 4.7, lending support to the Rodrik's (1998) hypothesis of a positive relationship between openness and public sector size. Some of the variables in Table 4.7 exhibit contradictory results with the use of annual and 4-year moving averages data, but as highlighted earlier the chapter prefers estimation results of annual data. The use of other explanatory variables namely age dependency ratio, population under 15 as a share of total population and additional regional dummies also did not affect the statistical and economic significance of the main hypothesis of the study. To check for further robustness, the executive index of political competition taken from DPI 2009 was employed in the dynamic panel estimation in place of the legislative index and the results exhibited similar results to the ones reported in Table 4.2 to Table 4.6.

Conclusion

The chapter adopted the use of both annual and four year moving averages to compare the results with existing work on public sector size like Ram (2009) who also employed annual and 5 year means data to investigate the determinants of public sector size. The use of annual and four moving averages data brings into limelight the debate on Wagner's (1890) hypothesis, with the current study finding contradictory results for the co-efficient of per capita GDP. The conflicting results on the testing of Wagner's (1890) law have also been highlighted by Ram (1987). But in terms of preference the estimation results using annual data are preferred by the current study. Annual data for a panel of countries is able to capture greater variations existing in the data set rather than the use of averages which can remove some key variations of data needed to improve the identification of variables.

The economic recession caused by the Banking crisis in the year 2008 coupled with increased level of US public debt has brought the debate on public sector size at the forefront of public policy. To add insight to this debate the current study suggests establishing a theoretical framework to explain the impact of institutional quality on public sector size across a panel of countries at varied levels of economic development. The study also suggests that the influence of institutional quality on public sector size may be investigated at a regional level, for example South Asian countries or Sub-Saharan African countries that might be good sample of countries to study the dynamics of public sector size considering the unique institutional characteristics these two regions have in the presence of powerful military bureaucracies. The Persson and Tabellini's (1999) theoretical model of political competition was discussed earlier in the

chapter and it is also suggested that future research may extend the model to incorporate the influences of executive constraints on ruling elite in both Presidential and Parliamentary forms of government.

The earlier chapter on the determinants of private sector size did show that institutional quality was a key variable in increasing its size and the results of this chapter have revealed that institutional quality also has a significant impact in reducing the size of the public sector. The negative impact of institutional quality on public sectors has strong implications for developing countries as in the long run better quality institutions would surely help them in economic development and also decrease public sector spending which may be supporting the very poor segments of society. With both costs and benefits associated with the improvement institutional quality in developing and developed countries, the current study overwhelmingly recommends an improvement of institutions around the world as the improvement is of utmost importance for the growth of the private sector. The study also finds limited evidence of a negative relationship existing between political competition and the size of the public sector. The lack of political competition is currently evident in USA where the presences of only two main stream political parties has lead to the establishment of the Tea Party, the party that has vigorously opposed the elevation of US debt ceiling. In terms of other existing theories of the determinants of public sector size, the study finds international trade having a positive impact on public sector size whereas only estimation results from four year moving averages data showed a positive relationship existing between country's per capita income and public sector size. The study strongly recommends that future work on the analysis of institutional quality and its impact on public sector size be carried out based on both micro-economic theoretical framework and empirical testing using cross-

sectional or time series data. The study also suggests that future work may also like to split the data on regional basis, like a study on Latin-American or African countries would be a nice starting point to look into the dynamics of public sector size and an improvement of institutional quality.

4.5 Chapter 4 Tables (public sector size)

Table 4.1a: Summary statistics

	N	Mean	Standard Deviation	Minimum	Maximum
Public sector size (Government share in real GDP per capita)	2112	16.03232	6.541708	3.89 (Nigeria 2003)	53.25 (Nicaragua 1987)
Trade (Imports plus exports as a share of GDP)	2088	67.79552	38.95511	11.08743 (Sudan 1990)	327.443 (Luxemburg 2007)
GDP per capita (constant 2000 US $)	2104	7659.944	10329.64	80.62465 (Congo, Dem. Rep 2001)	56358.12 (Luxemburg 2007)
Population total	2112	5.45e+07 1.63e+08	1.63e+08	239000 (Iceland)	1.32e+09 (China)
Land area (square kilometer)	2096	1000811	2019505	2590 (Luxemburg)	9327489 (China)
Population above 65 years (% of total)	2112	7.136025	4.851477	1.871264 (Senegal 2007)	20.90595 (Japan 2007)
Urban population (% of total)	2088	54.80727	22.63603	8.5 (Trinidad &Tobago 1990)	97.34 (Belgium 2007)
Law and order	2095	3.63414	1.573434	0	6
Corruption	2095	3.236535	1.455077	0	6
Democratic accountability	2095	4.009083	1.561619	0	6
ICRG (average of all ICRG variables excluding corruption)	2095	5.575511	1.334737	1.113636	8.272727
Legislative index of electoral competitiveness	2112	6.276278	1.556764	1	7
Executive index of electoral competitiveness	2112	6.034091	1.779009	1	7
President	2112	.6008523	.4898392	0	1
Polity2	1944	4.160494	6.58223	-10	+10

Definitions and sources of data are given in Table 4.1b.

Table 4.1b: Data sources

Proxy	Variable	Sources of Data
Public sector size	Government share in real GDP per capita	Penn-World Tables 6.3
Trade openness	Trade (imports plus exports as a share of GDP)	World Development Indicators
Income	GDP per capita (constant 2000 US $)	World Development Indicators
Country size	Population total	World Development Indicators
Country size	Land area (square kilometer)	World Development Indicators
Elderly population	Population above 65 years (% of total)	World Development Indicators
Urban population	Urban population (% of total)	World Development Indicators
Law and order (Institutional quality)	Law and order	International Country Risk Guide (ICRG).
Corruption (Institutional quality)	Corruption	International Country Risk Guide (ICRG).
Overall institutional quality	ICRG (average of all ICRG variables excluding corruption)	International Country Risk Guide (ICRG).
Political competition	Legislative index of electoral competitiveness	Database of Political Institutions
Parliament	Parliament	Database of Political Institutions
President	President	Database of Political Institutions
Democracy	Polity2	Integrated Network for Societal Conflict Research (INSCR)

Table 4.1c: List of countries

1	Albania	31	Greece	61	Paraguay
2	Algeria	32	Guatemala	62	Peru
3	Argentina	33	Guyana	63	Philippines
4	Australia	34	Honduras	64	Poland
5	Austria	35	Iceland	65	Portugal
6	Bangladesh	36	India	66	Romania
7	Belgium	37	Indonesia	67	Senegal
8	Bolivia	38	Iran	68	Sierra Leone
9	Botswana	39	Ireland	69	South Africa
10	Brazil	40	Israel	70	Spain
11	Burkina Faso	41	Italy	71	Sri Lanka
12	Cameroon	42	Jamaica	72	Sudan
13	Canada	43	Japan	73	Suriname
14	Chile	44	Kenya	74	Sweden
15	China	45	Luxembourg	75	Switzerland
16	Colombia	46	Madagascar	76	Syria
17	Congo, Democratic. Rep.	47	Malawi	77	Thailand
18	Congo, Republic of	48	Malaysia	78	Togo
19	Costa Rica	49	Mexico	79	Trinidad &Tobago
20	Cote d`Ivoire	50	Morocco	80	Tunisia
21	Denmark	51	Netherlands	81	Turkey
22	Dominican Republic	52	New Zealand	82	Uganda
23	Ecuador	53	Nicaragua	83	United Kingdom
24	Egypt	54	Niger	84	United States
25	El Salvador	55	Nigeria	85	Uruguay
26	Finland	56	Norway	86	Venezuela
27	France	57	Oman	87	Zambia
28	Gabon	58	Pakistan	88	Zimbabwe
29	Germany	59	Panama		
30	Ghana	60	Papua New Guinea		

Table 4.2: Arellano-Bond first difference two-step GMM (xtabond) 1984-2007

Dependent variable: Public sector size (Log of government share in real GDP per capita)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
					4-Year Moving Averages	4-Year Moving Averages	4-Year Moving Averages	4-Year Moving Averages
	Annual Data	Annual Data	Annual Data	Annual Data				
Log of lagged dependent Variable	0.472***	0.466***	0.465***	0.431***	0.516***	0.518***	0.511***	0.516***
	(0.0855)	(0.0853)	(0.0857)	(0.0896)	(0.0341)	(0.0341)	(0.0339)	(0.0269)
Log of trade openness	0.0814*	0.0881*	0.0887*	0.0548	-0.0243	-0.0250	-0.0157	0.00186
	(0.0461)	(0.0455)	(0.0457)	(0.0476)	(0.0226)	(0.0226)	(0.0227)	(0.0233)
Log of GDP per Capita	-0.213**	-0.220***	-0.227***	-0.258***	0.0826***	0.0802***	0.0706***	0.0549***
	(0.0842)	(0.0839)	(0.0833)	(0.0918)	(0.0275)	(0.0271)	(0.0237)	(0.0209)
Log of total Population	-0.232**	-0.250**	-0.235**	-0.209*	0.0109	0.0103	0.0105	0.00749
	(0.109)	(0.111)	(0.112)	(0.122)	(0.0118)	(0.0117)	(0.0114)	(0.0113)
Log of population above 65 years (% of total)	0.0606	0.0711	0.0819	0.178	-0.108*	-0.104*	-0.0996**	-0.0720
	(0.113)	(0.115)	(0.119)	(0.119)	(0.0553)	(0.0533)	(0.0506)	(0.0495)
Log of urban population (% of total)	0.332**	0.352**	0.365**	0.362**	-0.176***	-0.171***	-0.152***	-0.124**
	(0.164)	(0.168)	(0.169)	(0.175)	(0.0581)	(0.0596)	(0.0532)	(0.0491)
Law and order	-0.0180***	-0.0169***	-0.0161***	-0.0172***	-0.0206***	-0.0199***	-0.0184***	-0.0185***
	(0.00611)	(0.00603)	(0.00594)	(0.00601)	(0.00690)	(0.00696)	(0.00664)	(0.00672)
President		0.119**	0.110**	0.0479*		0.0423	0.0174	-0.0207
		(0.0492)	(0.0499)	(0.0284)		(0.0285)	(0.0291)	(0.0280)
Legislative index of political competitiveness			-0.00580*	-0.00498			-0.0102***	-0.00577**
			(0.00318)	(0.00307)			(0.00391)	(0.00258)
Polity2				0.000201				-0.00354***
				(0.00165)				(0.00136)
Constant	5.246***	5.424***	5.185***	5.149***	1.521***	1.491***	1.538***	1.480***
	(1.710)	(1.727)	(1.743)	(1.859)	(0.270)	(0.272)	(0.258)	(0.249)
First order serial correlation (p- value)	-2.9797 (0.0029)	-2.978 (0.0029)	-2.9767 (0.0029)	-2.7255 (0.0064)	**1.2994 (0.1938)**	**1.2463 (0.2126)**	**1.4527 (0.1463)**	**1.2562 (0.2090)**
Second order serial correlation (p- value)	.16215 (0.8712)	.18904 (0.8501)	.20981 (0.8338)	.99575 (0.3194)	-.77232 (0.4399)	-.70567 (0.4804)	-.76492 (0.4443)	-.6777 (0.4980)
Sargan Test (p-value)	(0.0759)	(0.0813)	(0.0781	(0.1753)	(0.1029)	(0.0997)	(0.0911)	(0.1373)
Number of Instruments	70	71	72	73	70	71	72	73

Notes: *** *indicates statistical significance at 1% level,* ** *indicates statistical significance at 5% level, * indicates statistical significance at 10% level, Figures in parentheses are Windemijer (2005) corrected standard errors. The value of the Sargan test has been calculated by re-estimating the model without the Windemijer corrected standard errors command. The sources and detailed definition of variables is given in Table 4.1b.*

Table 4.3: Law and order and public sector size (Blundell-Bond system two-step GMM (xtdpdsys) 1984-2007.

Dependent variable: Public sector size (Log of government share in real GDP per capita)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Annual Data	Annual Data	Annual Data	Annual Data	4-Year Moving Averages	4-Year Moving Averages	4-Year Moving Averages	4-Year Moving Averages
Log of lagged dependent Variable	0.717***	0.713***	0.710***	0.791***	0.947***	0.945***	0.944***	0.933***
	(0.208)	(0.247)	(0.0987)	(0.266)	(0.0652)	(0.0705)	(0.0787)	(0.112)
Log of trade openness	0.0722**	0.0792**	0.0783*	0.0383	0.0567	0.0674**	0.0673**	0.0390
	(0.0350)	(0.0384)	(0.0435)	(0.0626)	(0.0429)	(0.0296)	(0.0288)	(0.0444)
Log of GDP per Capita	-0.0762	-0.0790	-0.0791	-0.0767	0.0738**	0.0611*	0.0630**	0.0697*
	(0.0639)	(0.0669)	(0.0826)	(0.139)	(0.0290)	(0.0340)	(0.0280)	(0.0368)
Log of total Population	-0.00339	0.00157	-0.0117	-0.0664	0.0264***	0.0246**	0.0254***	0.0170
	(0.0385)	(0.0426)	(0.0446)	(0.0650)	(0.0101)	(0.0123)	(0.00980)	(0.0211)
Log of population above 65 years (% of total)	-0.0455	-0.0389	-0.00936	0.0316	-0.139**	-0.133*	-0.137*	-0.130
	(0.148)	(0.139)	(0.113)	(0.128)	(0.0677)	(0.0769)	(0.0714)	(0.0951)
Log of urban population (% of total)	0.0348	0.0645	0.0362	0.113	-0.0441	-0.0133	-0.0142	0.0120
	(0.137)	(0.136)	(0.148)	(0.189)	(0.0499)	(0.0492)	(0.0461)	(0.0609)
OECD	0.525**	0.480*	0.560**	0.447	-0.258*	-0.261*	-0.286*	-0.531**
	(0.250)	(0.257)	(0.283)	(0.478)	(0.133)	(0.137)	(0.148)	(0.212)
Law and order	-0.0191*	-0.0168**	-0.0153*	-0.0157	-0.0119	-0.00871	-0.00867	-0.00806
	(0.00973)	(0.00721)	(0.00923)	(0.0125)	(0.00869)	(0.00934)	(0.00889)	(0.0109)
Legislative index of political competitiveness		-0.0134	-0.00773	-0.00745		-0.0127	-0.0135	-0.0113
		(0.00942)	(0.00470)	(0.0139)		(0.0105)	(0.00906)	(0.0283)
President			0.156**	0.0705			-0.0290	-0.187*
			(0.0624)	(0.127)			(0.0508)	(0.102)
Polity2				0.00399				-4.08e-06
				(0.00443)				(0.00544)
Constant	0.957	0.844	0.975	1.522	-0.563*	-0.532	-0.517	-0.245
	(0.933)	(0.894)	(1.067)	(1.702)	(0.339)	(0.410)	(0.418)	(0.699)
First order serial correlation (p- value)	-2.5356 (0.0112)	-2.3051 (0.0212)	-3.183 (0.0015)	-2.3157 (0.0206)	-2.4848 (0.0130)	-2.4446 (0.0145)	-2.3791 (0.0174)	-2.0293 (0.0424)
Second order serial correlation(p-value)	.46604 (0.6412)	.5126 (0.6082)	.54714 (0.5843)	1.2138 (0.2248)	-1.1453 (0.2521)	-1.272 (0.2034)	-1.3608 (0.1736)	-1.1098 (0.2671)
Sargan Test (p-value)	(0.4560)	(0.4669)	(0.4956)	(0.6958)	(0.4428)	(0.3704)	(0.3989)	(0.6370)
Number of Instruments	92	93	94	95	92	93	94	95

Notes: *The notes of the table are the same as Table 4.2.*

Table 4.4: Land area and public sector size (Blundell-Bond system two-step GMM (xtdpdsys) 1984-2007.
Dependent variable: Public sector size (Log of government share in real GDP per capita)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
					4-Year Moving Averages	4-Year Moving Averages	4-Year Moving Averages	4-Year Moving Averages
	Annual Data	Annual Data	Annual Data	Annual Data				
Log of lagged dependent Variable	0.698***	0.699***	0.698***	0.776**	0.941***	0.939***	0.935***	0.933***
	(0.0991)	(0.120)	(0.0827)	(0.345)	(0.0987)	(0.127)	(0.102)	(0.130)
Log of trade openness	0.0636	0.0692*	0.0676	0.0317	0.0760**	0.0852**	0.0853**	0.0465
	(0.0392)	(0.0395)	(0.0493)	(0.0484)	(0.0355)	(0.0352)	(0.0346)	(0.0502)
Log of GDP per capita	-0.112	-0.109	-0.111	-0.0832	0.0772***	0.0625**	0.0639**	0.0671
	(0.0820)	(0.0979)	(0.0978)	(0.114)	(0.0275)	(0.0273)	(0.0287)	(0.0411)
Log of total land area	-0.0671	-0.0594	-0.0613	-0.0858	0.0349*	0.0290*	0.0309*	0.0277
	(0.0509)	(0.0545)	(0.0521)	(0.0710)	(0.0191)	(0.0158)	(0.0172)	(0.0258)
Log of population above 65 years (% of total)	-0.0499	-0.0388	-0.00233	-0.0217	-0.146**	-0.130*	-0.132*	-0.117
	(0.116)	(0.0797)	(0.0985)	(0.112)	(0.0715)	(0.0730)	(0.0757)	(0.115)
Log of urban population (% of total)	0.0960	0.117	0.0751	0.0993	-0.0563	-0.0278	-0.0308	0.00889
	(0.119)	(0.124)	(0.136)	(0.198)	(0.0548)	(0.0510)	(0.0557)	(0.0655)
OECD	0.558**	0.507*	0.574**	0.430	-0.207	-0.211	-0.230	-0.513**
	(0.262)	(0.263)	(0.274)	(0.269)	(0.141)	(0.142)	(0.146)	(0.203)
Law and order	-0.0188**	-0.0164*	-0.0147**	-0.0137	-0.0132**	-0.0101	-0.0105	-0.00896
	(0.00783)	(0.00956)	(0.00751)	(0.00983)	(0.00602)	(0.0116)	(0.00982)	(0.0102)
Legislative index of political competitiveness		-0.0122**	-0.00662	-0.00755		-0.0114*	-0.0118	-0.0104
		(0.00582)	(0.00455)	(0.0157)		(0.00686)	(0.00789)	(0.0289)
President			0.157**	0.0683			-0.0235	-0.180
			(0.0786)	(0.118)			(0.0548)	(0.114)
Polity2				0.00331				0.000254
				(0.00561)				(0.00634)
Constant	1.880**	1.715	1.711*	1.778	-0.610	-0.530	-0.518	-0.340
	(0.917)	(1.204)	(0.966)	(1.908)	(0.488)	(0.517)	(0.541)	(0.621)
First order serial correlation (p- value)	-3.1592 (0.0016)	-3.0436 (0.0023)	-3.2627 (0.0011)	-1.9838 (0.0473)	-2.26 (0.0238)	-1.9596 (.0500)	-2.211 (0.0270)	-1.9432 (0.0520)
Second order serial correlation(p-value)	.45654 (0.6480)	.50384 (0.6144)	.53814 (0.5905)	1.1882 (0.2348)	-.97494 (0.3296)	-1.0025 (0.3161)	-1.2012 (0.2297)	-.97536 (0.3294)
Sargan Test (p-value)	(0.4666)	(0.4917)	(0.5892)	(0.7608)	(0.4338)	(0.3785)	(0.4084)	(0.7164)
Number of Instruments	92	93	94	95	92	93	94	95

Notes: The notes of the table are the same as Table 4.2.

Table 4.5: Average of ICRG variables and public sector size (Blundell-Bond system two-step GMM (xtdpdsys) 1984-2007.
Dependent variable: Public sector size (Log of government share in real GDP per capita)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
					4-Year Moving Averages	4-Year Moving Averages	4-Year Moving Averages	4-Year Moving Averages
	Annual Data	Annual Data	Annual Data	Annual Data				
Log of lagged dependent variable	0.706***	0.705***	0.705***	0.782***	0.926***	0.925***	0.925***	0.924***
	(0.102)	(0.112)	(0.0815)	(0.226)	(0.0935)	(0.0854)	(0.0933)	(0.150)
Log of trade openness	0.0942*	0.0972*	0.0949**	0.0561	0.0953***	0.0966***	0.0961***	0.0518
	(0.0497)	(0.0571)	(0.0399)	(0.0619)	(0.0281)	(0.0292)	(0.0289)	(0.0676)
Log of GDP per capita	-0.0671	-0.0691	-0.0724	-0.0733	0.0664**	0.0559*	0.0561*	0.0658
	(0.0706)	(0.0733)	(0.0980)	(0.115)	(0.0334)	(0.0292)	(0.0336)	(0.0404)
Log of total population	0.00145	0.00613	-0.00835	-0.0629	0.0258***	0.0258**	0.0265**	0.0188
	(0.0443)	(0.0450)	(0.0471)	(0.0553)	(0.00958)	(0.0113)	(0.0107)	(0.0190)
Log of population above 65 years (% of total)	-0.0145	-0.0100	0.0253	0.0505	-0.112	-0.107	-0.108	-0.114
	(0.0995)	(0.105)	(0.117)	(0.116)	(0.0771)	(0.0676)	(0.0725)	(0.0941)
Log of urban population (% of total)	0.0470	0.0647	0.0364	0.112	-0.0202	-0.00136	-0.00337	0.0168
	(0.111)	(0.112)	(0.131)	(0.136)	(0.0578)	(0.0573)	(0.0608)	(0.0699)
OECD	0.437	0.398	0.484	0.394	-0.215	-0.219	-0.236**	-0.515**
	(0.280)	(0.272)	(0.311)	(0.427)	(0.135)	(0.136)	(0.114)	(0.230)
ICRG	-0.0291**	-0.0250**	-0.0225*	-0.0220*	-0.0295*	-0.0246	-0.0245	-0.0140
	(0.0128)	(0.0117)	(0.0128)	(0.0133)	(0.0165)	(0.0156)	(0.0155)	(0.0254)
Legislative index of political competitiveness		-0.0107**	-0.00595	-0.00638		-0.0101**	-0.0107	-0.0102
		(0.00517)	(0.00748)	(0.0108)		(0.00489)	(0.00747)	(0.0214)
President			0.157**	0.0695			-0.0258	-0.180
			(0.0744)	(0.0801)			(0.0415)	(0.113)
Polity2				0.00431				0.000320
				(0.00327)				(0.00624)
Constant	0.762	0.672	0.831	1.428	-0.629	-0.593	-0.570	-0.285
	(0.805)	(0.859)	(1.108)	(1.348)	(0.447)	(0.429)	(0.488)	(0.726)
First order serial correlation (p- value)	-3.1586 (0.0016)	-3.0954 (0.0020)	-3.2887 (0.0010)	-2.4965 (0.0125)	-2.2095 (0.0271)	-2.2471 (0.0246)	-2.1772 (0.0295)	-1.6664 (0.0956)
Second order serial correlation(p-value)	.45951 (0.6459)	.49791 (0.6185)	.5353 (0.5924)	1.2374 (0.2159)	-1.105 (0.2692)	-1.3105 (0.1900)	-1.3585 (0.1743)	-1.0222 (0.3067)
Sargan Test (p-value)	(0.5064)	(0.4986)	(0.4772)	(0.6897)	(0.4042)	(0.4152)	(0.4522)	(0.6683)
Number of Instruments	92	93	94	95	92	93	94	95

Notes: *The notes of the table are the same as Table 4.2.*

Table 4.6: Corruption and public sector size (Blundell-Bond system two-step GMM (xtdpdsys) 1984-2007.
Dependent variable: Public sector size (Log of government share in real GDP per capita)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Annual Data	Annual Data	Annual Data	Annual Data	4-Year Moving Averages	4-Year Moving Averages	4-Year Moving Averages	4-Year Moving Averages
Log of lagged dependent Variable	0.724***	0.723***	0.722***	0.791***	0.949***	0.941***	0.941***	0.924***
	(0.189)	(0.172)	(0.0891)	(0.265)	(0.0912)	(0.0752)	(0.0713)	(0.160)
Log of trade openness	0.0645*	0.0740*	0.0731	0.0316	0.0602*	0.0741**	0.0737**	0.0452
	(0.0387)	(0.0447)	(0.0449)	(0.0529)	(0.0343)	(0.0331)	(0.0312)	(0.0667)
Log of GDP per Capita	-0.0782	-0.0780	-0.0768	-0.0756	0.0695**	0.0527	0.0539	0.0606
	(0.0901)	(0.0766)	(0.0831)	(0.111)	(0.0298)	(0.0368)	(0.0364)	(0.0496)
Log of total Population	-0.00493	0.00110	-0.0120	-0.0692	0.0319***	0.0310**	0.0312**	0.0208
	(0.0499)	(0.0485)	(0.0473)	(0.0625)	(0.0115)	(0.0148)	(0.0144)	(0.0235)
Log of population above 65 years (% of total)	-0.0426	-0.0402	-0.000377	0.0184	-0.143**	-0.130*	-0.132	-0.122
	(0.0948)	(0.0996)	(0.117)	(0.143)	(0.0609)	(0.0769)	(0.0816)	(0.0995)
Log of urban population (% of total)	-0.00149	0.0448	0.00580	0.114	-0.0377	-0.00325	-0.00505	0.0183
	(0.121)	(0.121)	(0.130)	(0.144)	(0.0575)	(0.0533)	(0.0464)	(0.0601)
OECD	0.524	0.459	0.528*	0.413	-0.351**	-0.325**	-0.339**	-0.590***
	(0.358)	(0.339)	(0.305)	(0.359)	(0.157)	(0.138)	(0.149)	(0.188)
Corruption	-0.00380	-0.00357	-0.000860	-0.00318	0.0107	0.0109	0.0105	0.00969
	(0.0134)	(0.00990)	(0.00964)	(0.0122)	(0.00806)	(0.00678)	(0.00996)	(0.0232)
Legislative index of political competitiveness		-0.0158**	-0.00914*	-0.0103		-0.0144	-0.0150	-0.0123
		(0.00684)	(0.00521)	(0.00772)		(0.00988)	(0.0124)	(0.0206)
President			0.170***	0.0676			-0.0214	-0.171
			(0.0613)	(0.0914)			(0.104)	(0.117)
Polity2				0.00387				-0.000246
				(0.00269)				(0.00662)
Constant	1.089	0.890	1.014	1.580	-0.711	-0.667	-0.644*	-0.320
	(1.224)	(0.986)	(0.983)	(1.602)	(0.504)	(0.465)	(0.362)	(0.832)
First order serial correlation (p- value)	-2.6593 (0.0078)	-2.7515 (0.0059)	-3.2433 (0.0012)	-2.3192 (0.0204)	-2.2431 (0.0249)	-2.3211 (0.0203)	-2.3198 (0.0203)	-1.6176 (0.1057)
Second order serial correlation(p-value)	.48617 (0.6268)	.54341 (0.5869)	.56736 (0.5705)	1.2261 (0.2202)	-1.1825 (0.2370)	-1.3735 (0.1696)	-1.3297 (0.1836)	-1.055 (0.2914)
Sargan Test (p-value)	(0.5505)	(0.4774)	(0.5635)	(0.6946)	(0.3912)	(0.4069)	(0.4244)	(0.7155)
Number of Instruments	92	93	94	95	92	93	94	95

Notes: The notes of the table are the same as Table 4.2.

Table 4.7: Law and order and public sector size (Blundell-Bond system two-step GMM) Trade Openness Winsorized.
Dependent variable: Public sector size (Log of government share in real GDP per capita)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Annual Data	Annual Data	Annual Data	Annual Data	4- year Moving Averages	4- year Moving Averages	4- year Moving Averages	4- year Moving Averages
Log of lagged dependent	0.717***	0.713***	0.710***	0.790***	0.947***	0.945***	0.944***	0.933***
Variable	(0.208)	(0.247)	(0.0987)	(0.266)	(0.0652)	(0.0705)	(0.0787)	(0.112)
Log of trade openness	0.0719**	0.0789**	0.0780*	0.0380	0.0567	0.0674**	0.0673**	0.0390
(Winsorized)	(0.0350)	(0.0384)	(0.0435)	(0.0626)	(0.0429)	(0.0296)	(0.0288)	(0.0444)
Log of GDP per	-0.0762	-0.0790	-0.0791	-0.0767	0.0738**	0.0611*	0.0630**	0.0697*
Capita	(0.0639)	(0.0669)	(0.0826)	(0.139)	(0.0290)	(0.0340)	(0.0280)	(0.0368)
Log of total	-0.00336	0.00159	-0.0117	-0.0664	0.0264***	0.0246**	0.0254***	0.0170
Population	(0.0385)	(0.0426)	(0.0445)	(0.0650)	(0.0101)	(0.0123)	(0.00980)	(0.0211)
Log of population above	-0.0453	-0.0387	-0.00913	0.0318	-0.139**	-0.133*	-0.137*	-0.130
65 years (% of total)	(0.148)	(0.139)	(0.113)	(0.128)	(0.0677)	(0.0769)	(0.0714)	(0.0951)
Log of urban population	0.0349	0.0646	0.0362	0.113	-0.0441	-0.0133	-0.0142	0.0120
(% of total)	(0.137)	(0.136)	(0.148)	(0.189)	(0.0499)	(0.0492)	(0.0461)	(0.0609)
OECD	0.525**	0.480*	0.560**	0.446	-0.258*	-0.261*	-0.286*	-0.531**
	(0.250)	(0.257)	(0.283)	(0.478)	(0.133)	(0.137)	(0.148)	(0.212)
Law and Order	-0.0191*	-0.0168**	-0.0153*	-0.0157	-0.0119	-0.00871	-0.00867	-0.00806
	(0.00973)	(0.00721)	(0.00923)	(0.0125)	(0.00869)	(0.00934)	(0.00889)	(0.0109)
Legislative index of		-0.0134	-0.00771	-0.00743		-0.0127	-0.0135	-0.0113
political competitiveness		(0.00942)	(0.00469)	(0.0139)		(0.0105)	(0.00906)	(0.0283)
President			0.157**	0.0705			-0.0290	-0.187*
			(0.0624)	(0.127)			(0.0508)	(0.102)
Polity2				0.00399				-4.08e-06
				(0.00444)				(0.00544)
Constant	0.957	0.844	0.975	1.523	-0.563*	-0.532	-0.517	-0.245
	(0.933)	(0.894)	(1.067)	(1.701)	(0.339)	(0.410)	(0.418)	(0.699)
First order serial correlation (p-value)	-2.5354	-2.3053	-3.183	-2.3158	-2.4848	-2.4446	-2.3791	-2.0293
	(0.0112)	(0.0212)	(0.0015)	(0.0206)	(0.0130)	(0.0145)	(0.0174)	(0.0424)
Second order serial correlation (p-value)	.4659	.51245	.547	1.2135	-1.1453	-1.272	-1.3608	-1.1098
	(0.6413)	(0.6083)	(0.5844)	(0.2249)	(0.2521)	(0.2034)	(0.1736)	(0.2671)
Sargan Test (p-value)	(0.4557)	(0.4670)	(0.4960)	(0.6956)	(0.4428)	(0.3704)	(0.3989)	(0.6370)
Number of Instruments	92	93	94	95	92	93	94	95

Notes: The notes of the table are the same as Table 4.2.

Chapter 5

Impact of privatization policies and public sector size on economic growth

Abstract

The impact of privatization on economic growth has been investigated in existing literature where some of the previous studies have found a positive impact on growth while other studies have found an insignificant effect or negative impact of privatization on economic growth. With conflicting evidence from existing work, the study investigates the impact of privatization policies on economic growth using a panel of 62 countries from the developed and the developing world for the period of 1995 to 2007. In a major contribution to existing literature the study includes transition economies of Eastern Europe and China a country which has witnessed the biggest privatization program since the beginning of the 21st century. The empirical model uses both revenues from privatization and number of privatization deals to see their macro-economic impact while controlling for the size of the public sector across countries. Using dynamic panel estimation techniques, the study finds a positive and significant effect of privatization revenues and number of privatization transactions on economic growth. Total stocks traded, credit to private sector and market capitalization of listed firms, proxies for financial development, also have a positive impact on GDP per capita growth. The results also reveal that public sector size has a negative and significant

impact on economic growth. In contrast to Barro's (1995) theoretical model of economic growth, the study finds evidence of a U-shaped relationship existing between GDP per capita growth and public sector size. The U- shaped relationship can be due to the fact that public sector expenditure has initially a negative impact on growth and beyond the turning point the size of the public sector becomes huge enough to have a positive impact on economic growth.

5.1 Introduction and motivation

Developed and developing countries have pursued privatization to achieve both micro and macro-economic benefits associated with the change of ownership of state enterprises. Megginson and Netter (2001) and Megginson and Sutter (2006) provide a detailed account of micro economic impact of nearly 80 empirical studies on privatization where the studies unanimously highlight the improvement in efficiency and productivity of privatized firms from different parts of the world. Boubakri and Cosset (1998) also showed evidence of increased profitability and efficiency in 79 post privatized firms in developing countries. In contrast, the few existing country level studies evaluating the macro-economic impact of privatization have generally been inconclusive, where some of the studies showed a positive impact of privatization on economic growth while others found a negative or insignificant impact of privatization policies on economic development. With nearly three decades of privatization, Boubakri et al. (2009) concluded that the empirical evidence between economic growth and privatization provides "ambiguous results." With the World Bank (2010) reporting privatization deals worth US 38 billion taking place in developing countries alone in 2008 and no foreseeable reversal on policies of privatization in the near future, it is

important to address the macro-economic impact of privatization for countries at varied levels of economic development.

The chapter's main hypothesis is that policies of privatization are likely to have a positive impact on economic growth through multiple channels: firstly, through privatization revenues increasing government investment in the economy; secondly, share issue privatization stimulating the development of domestic stock markets; thirdly, privatization revenues lowering government debt and lastly via the post-privatized firm level improvement in efficiency and productivity leading to increased domestic output. With the positive anticipated results of privatization at the macro-economic level and inconclusive evidence from exiting literature, the current study adds to the existing empirical work in a number of ways. Firstly, I use the most recent period of 1995 to 2007 to capture the impact of privatization for a panel of developed and developing countries which includes transition economies of Eastern Europe. China has also been added to the panel data set as the second chapter indicated that it had witnessed one of the biggest privatization programs in the history of the world. Studies on macro-economic impact of privatization focus on either developing countries lumped with developed countries or studies that have focused only on transition economies of Eastern Europe. The current study uses both revenues from privatization and number of privatization deals to capture the impact of divesture on economic development. The study controls for the size of the public sector as its inclusion will help the empirical model to work well with major variations in public sector size within the panel. As per the two previous empirical chapters, this study also tries to make the maximum use of a cross-country and time scope of the data set by employing annual data set as opposed to existing growth literature that uses five-year non-over lapping average data set in

estimation. The averaging of the data can potentially lose the variations in data set, which could be used to estimate parameters of significance with better precision. Using dynamic panel GMM estimation and controlling for the public sector size, the study finds a positive impact of privatization revenues and number of privatization deals on economic growth for a panel of developed and developing countries. The remaining chapter is organized as follows: Section 2 lays down the theoretical basis of the growth model, Section 3 reviews existing growth literature concentrating on government/growth and privatization/growth literature. Section 4 introduces the econometric techniques used to estimate the growth model. Section 5 reports descriptive statistics and reports estimation results and Section 6 concludes the growth chapter.

5.2   Theoretical framework

To understand the dynamics behind country's economic growth, it is imperative to understand some of the theories behind economic growth. First is the neoclassical growth model formulated by Solow (1956) with diminishing returns to capital, who believed that long-run economic growth can only be attributed to exogenous change in technology which is in the hands of non-economic forces. The strong assumption of exogenous change in technology, diminishing returns to capital and the inability to explain sustained long-term economic growth in the Solow growth model, lead economists to the formulation of growth models developed by Arrow (1962) AK model, Barro (1991) and Aghion and Howitt (1992). The main argument in favor of endogenous growth models has been that the changes in the level of technology are not in the hands of exogenous non-economic forces but rather the change in technology is determined endogenously within the economic system by factors like increase in human

capital, research and technology funding and innovating firms seeking maximum profits. "Technology is thus an endogenous variable, determined within the economic system", Aghion and Howitt (2009). The current study recognizes the endogenous economic growth models to be the best in explaining long-term growth across countries and thus uses the Barro (1995) growth model which incorporates the presence of the public sector as one of the determinants of economic growth.

The basic AK model of endogenous growth

$$Y = AK \tag{1}$$

Equation 1 above is the simple version of the production function without the absence of global diminishing returns to capital. The absence of global diminishing returns to capital of the AK model plays a pivotal role in explaining the endogenous growth and is the basic differentiating factor with the neoclassical growth models. This differentiating factor seems more intuitive if K includes human capital, knowledge spillovers, learning by doing and public infrastructure. A in equation (1) is a positive constant and reflects the level of technology. Output per capita in the AK model is $y = Ak,$ where the marginal and average products of capital are constant at A>0.

Government and growth

The changes in the level of technology A, in the AK model, affects the long run per capita growth rate and as in Barro (1995) the current study also incorporates the role of various government activities that can change the coefficient A and thus the short-run

and long run per capita growth rates. Assuming that the production function for firm i take the following Cobb-Douglas form in time t:

$$Y_{it} = A_{it} \, L_{it}^{1-\alpha} \, K_{it}^{\alpha} \, G_t^{1-\alpha} \qquad (2)$$

assuming $k_{it} = K_{it}/L_{it}$ [capital per worker] and $y_{it} = Y_{it}/L_{it}$ [output per worker]

$$y_{it} = A_{it} \, k_{it}^{\alpha} \, G_t^{1-\alpha} \qquad (3)$$

In the above equation 3, G represents total public sector expenditure and α takes values greater than zero and less than one ($0<\alpha>1$). Equation 2 implies that each firm exhibits constant returns to scale in private inputs, labor (L_i) and capital (K_i). The model assumes that labor force is constant and G rises along with K, enabling the economy to grow endogenously. The public sector expenditure is financed by a tax (δ) on output level Y_i. The model assumes that the tax rate is constant over time.

$$G = \delta \, Y_i \qquad (4)$$

$$\delta = Y_i / G \qquad (5)$$

Individual firm's profits after tax are as follows;

$$L_i = [(1-\delta). \, A. \, k_i^{\alpha}. \, G_t^{1-\alpha} - w - (r+\beta). \, k_i] \qquad (6)$$

where w= wage rate and r+ β= rental rate

Profit maximization and the zero profit condition now implies that average rate equals the after tax marginal product of labor and the rental rate equals the after tax marginal product of capital. In particular case, when $k_i=k$, and the rental price can be written as follows;

$$r+\beta = (1-\delta). (\partial Y_i/\partial K_i)= (1-\delta).Aa.k^{-(1-\alpha)}.G^{1-\alpha} \qquad (7)$$

Using equation (3) and (4)

$$G = (\delta AL)^{1/\alpha}. k \qquad (8)$$

Substituting equation (8) in equation (7)

$$r+\beta = (1-\delta). (\partial Y_i/\partial K_i)= \alpha A^{1/\alpha}. (L\ \delta)^{(1-\alpha)/\alpha}. (1-\delta) \qquad (9)$$

Now supposing that the aggregate labor force (L) and the tax rate (δ) are constant, then the after tax marginal product or the rate of return r is constant with k and increasing with aggregate labor (L). Assuming that there are no transitional dynamics and the growth rates of consumption, k and y are y all equal to the same constant χ (per capita growth rate). The value of constant χ can be determined from the expression of consumption growth in the AK model with infinite utility maximizing households which is as follows:

$$\chi_c = c/c = (1/\theta) . (r-\rho) \qquad (10)$$

where c= consumption and r = interest rate

therefore the per capita growth rate is

$$\chi = (1/\theta) \,.\, [\alpha\, A^{1/\alpha} \,.\, (L\, \delta)^{(1-\alpha)/\alpha} \,.\, (1-\delta) - \beta - \rho] \qquad\qquad (11)$$

Looking at equation 11, the public sector expenditure is able to influence per capita growth through **1- δ**, which is the negative impact of taxation on the marginal product of capital and $\delta^{(1-\alpha)/\alpha}$ which reflects the positive role of government expenditure on the subsequent marginal product. According to Barro (1995), Fig 5.1 represents the relationship between per capita growth and public sector spending which is an inverted U shape.

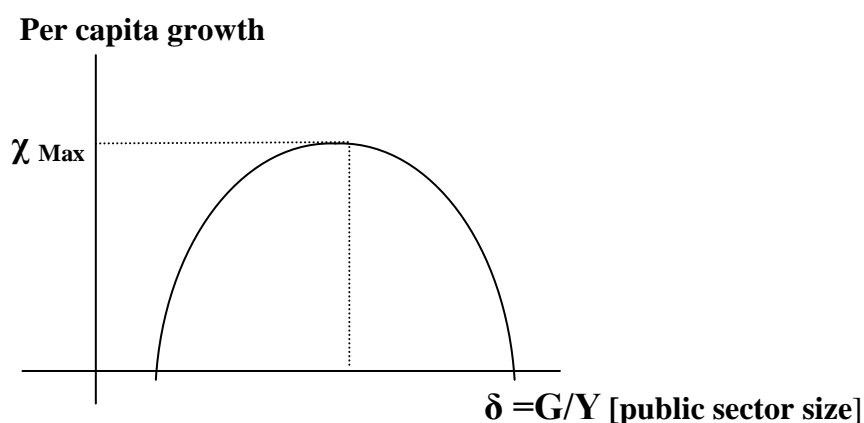*Figure 5.1: The relationship between the size of the public sector (δ = Yᵢ / G) and GDP per capita growth rate (χ) is depicted in Fig 5.1 and is an inverted U shape, as at initial low values of public expenditure there is a positive impact on growth and the growth reaches a maximum point and further increase in public expenditures financed by taxes in the economy have a negative impact on growth.*

The current study will analyze the relationship between per capita growth rate and public sector spending in the other macroeconomic variables and level of institutional development for a panel of 62 countries. Assuming that output in each country i in time t is determined by equation (3) and taking logs on both sides of equation (3), one gets

$$\ln y_{it} = \ln A_{it} + \alpha \ln k_{it} + 1 - \alpha \ln G_{it} \qquad (12)$$

A_{it} in equation (12) reflects the endogenously growing level of technology and a vector of macroeconomic variables, institutional quality and other country level factors that influence both technology and efficiency in country i in time t. Revenues from privatization and the size of the public sector along with other variables of interest will be taken into account to influence both technological and efficiency levels in the sample of countries. Equation (12) will be the basis for empirical investigation and in reduced form with an error term, equation (12) can be expressed as follows:

$$\ln y_{it} = a_{0i} + a_{it} \ln A_{it} + a_{2i} \ln k_{it} + a_{3i} \ln G_{it} + v_{it} \qquad (13)$$

where A is a vector of variables that influence economic growth in country i and time t. Capital (k) will be proxied by level of investment, G represents public sector size and v_{it} is the error term. The vector of variables contained in A in equation (13) will form the central explanatory variables to be tested via equation (14). The entire set of variables contained in equation (13) will enter equation (14) through the variable X.

5.3 Existing literature

Privatization and economic growth

There are a few empirical studies to date that have empirically tested the impact of privatization on economic growth. In particular, Boubakri et al. (2009), using a panel data set for 56 developed and developing countries, found privatization revenues and share issue privatization had a positive impact on growth. Boubakri et al. (2009) used system Generalized Method of Moments (GMM) dynamic panel estimation technique but their estimated model did not include the lagged dependent variable. The inclusion of initial GDP per capita was their logic for the empirical model being dynamic but the variable was insignificant in seven out of eight regressions of share issue privatization. Baltagi et al (2009) on the other hand have highlighted the presence and significance of the lagged dependent variable to justify the use of GMM dynamic panel estimation techniques. The growth regressions employed by Boubakri et al. (2009) included ten different control variables and their selection was purely on the grounds of their relationship with economic growth and the study did not explain the link of these variables to the policies of privatization. The variable of share issue privatization was insignificant in the two growth regressions with the institutional variable. The institutional variable used by Boubakri et al (2009) has been replicated by the current study to assess its influence on economic growth in the post-privatization world. The results of Boubakri et al. (2009) cannot be generalized for the entire world as their panel of countries omits countries like China and transition economies of Eastern Europe, countries which have experienced a massive reallocation of assets from the public sector to private hands since the 1990s. In terms of improving the econometrics of the

system GMM technique the current study utilizes the lagged dependent variable in every dynamic panel regression, whereas Boubakri et al (2009) had not used it as an additional regressor. The current study's results show that the lagged dependent variable is statistically significant in every dynamic panel regression.

Using least square dummy variable approach for a data set of 82 developing countries for the years 1991 to 2002, Adams and Mengistu (2008b) found an insignificant impact of privatization revenues on per capita GDP growth in the presence of six other determinants of growth. Their main privatization variable was an aggregate amount of privatization carried out from 1991 to 2002 as a share of average GDP for the same time period. Their logic for inclusion of an aggregate number for privatization data as compared to annual data was based on the fact that macro-economic impact of privatization is not "instantaneous" and it would depend on the overall level of revenues generated from policy of divesture. One of the variables used by Adams and Mengistu (2008b) was the good governance indicator which was a summary of the six components provided by the World Bank Governance Indicators. Their results showed that institutional quality and foreign direct inflows had generated a positive and significant impact on growth as compared to the policy of privatization in the developing world. The use of income inequality as a dependent variable reduced their data set to 60 developing countries where policies of privatization had failed to reduce income inequality in the presence of other explanatory variables. The study also used three regional dummies in some of their regressions where only the Latin American dummy was found to be significant and the other two did not have a significant impact on the dependent variables. The variable for governance was found to be highly significant and positively related to economic growth in the presence of privatization

revenues variable in Sub-Saharan for the period 1990 to 2001 by Adams and Mengistu (2008b). The institutional quality variable was obtained by the study from the World Bank, and the results showed that it helped to reduce income inequality in the panel of developing countries.

The argument that whether the impact of privatization on economic growth should be modeled on endogenous growth models or exogenous growth models was investigated by McKenzie (2008) using the growth accounting framework for Australia. The study found it difficult to conclude either way as influences of privatization on growth under endogenous growth models are unable to capture the dynamics between explanatory variables if the level specifications are poorly specified. McKenzie (2008) found Australia's privatization program had an insignificant impact on domestic growth. The results showed that both public and private capital was growing at a very slow pace and variations in output were primarily caused by the labor force. The analysis of the study was based only on four economic variables namely GDP growth, public capital stock, private capital stock, employment level and a time trend to capture the rate of technological change in Australia for the period of 1960 to 2003. The paper did conclude that the desired positive macro-economic outcomes from transfer of state owned enterprises to private hands have not been achieved in Australia.

Employing OLS and dynamic panel GMM econometric techniques, Bennet et. al (2007) investigated the impact of privatization on economic growth for 23 transition economies of Eastern Europe from 1990 to 2003. Their main results found that sale privatization had an insignificant impact on GDP growth whereas voucher privatization yielded a positive impact. Bennet et. al (2007) cross-country regressions did control for the size of

the private sector which in majority of the regressions along with capital market development did not have a significant impact on GDP growth. The interaction term of private sector size and stock market development was negative and significant whereas the remaining interaction terms employed in the dynamic panel estimation were statistically insignificant. GMM dynamic panel estimation model used by Bennet et al. (2007) did not use Windmeijer (2005) corrected robust standard errors which could have increased the accuracy of their employed GMM estimator. The results based on empirical testing of transition economies can also not be generalized for the rest of the world as the transition economies of Eastern Europe have inherited different economic and political backgrounds as compared to other countries. The current study utilizes a dummy variable to control for the distinct economic scenarios of transition economies of Eastern Europe.

Recognizing the unique economic and political backgrounds of Sub-Saharan African countries, Adams (2006) was one of the earliest studies that analyzed the impact of privatization policies for Sub-Saharan Africa. The study found that revenues from privatization had an insignificant impact on economic growth while for the same time period the policies of privatization did play a role in reducing income inequality in Sub-Saharan Africa. The variable for governance was found to be highly significant and positively related to economic growth for the period between 1990 and 2001.

Ordinary Least Square (OLS) estimation techniques were employed in the presence of endogenous regressors by Filipovic (2005) and found that revenues from privatization had a negative impact on growth for the sample of 93 developing countries. The use of OLS estimator in the empirical growth analysis of Filipovic (2005) did suffer from a

number of statistical difficulties. Firstly, the existence of reverse causality between privatization and economic growth could have biased OLS estimation results. Secondly, OLS estimation did not control for the unobserved country specific effects which may be inherently present in the model explaining economic growth with other explanatory variables. Thirdly, the inclusion of control variables like "aid for development" might have had a significant relationship to economic growth in developing countries but the study was unable to establish a link between development aid and the process of privatization. On the other hand, Filipovic (2005) found protection of property rights had an insignificant impact on economic growth in the existence of privatization revenue variable. The interaction term of privatization and property rights was also found to be insignificant to economic growth for a group of developed and developing countries.

A strong positive link was highlighted between privatized firms and domestic output by Boubakri et. al (2005) using a multivariate regression analysis of 230 privatized firms in developing countries. The study found that firms increased efficiency and profitability in the post-privatization period which in turn had a positive impact on country's domestic growth. They also showed that the post–privatized firms were more efficient in countries with secured property rights. The variables of institutional quality were found to be positively and significantly affecting performance of privatized firms in developing countries.

Privatization International and World Bank Privatization Database were the sources of privatization proceeds data used by Cook and Uchida (2003) which started a series of research papers that found a negative macro-economic impact of privatization for

developing countries. Using the extreme-bounds analysis for 63 developing countries from 1988 to 1997, Cook and Uchida (2003) found that privatization proceeds had a negative impact on GDP per capita growth, contradicting earlier results found by Barnett (2000) and Plane (1997). The negative relationship found by Cook and Uchida (2003) cannot be easily ignored as their dataset included nearly all developing countries that had experienced the process of privatization. The study obtained data from two comparable datasets and used econometric techniques to identify outliers in the estimated sample. Cook and Uchida (2003) also found a negative impact of government consumption expenditure on growth. World Development Indicators provided by the World Bank was the source of data for government consumption expenditure variable.

International Monetary Fund (IMF) has been advocating developing countries to privatize state owned enterprises to primarily increase private sector activity and decrease governments fiscal debt incurred through loss making public enterprises. In one of IMF's funded studies, Barnet (2000), using data from18 developing countries; found privatization proceeds had a positive influence on real GDP growth and simultaneously reduced unemployment for countries in the sample. The Barnett (2000) study to date is one of the few available evidences of a positive relationship between privatization proceeds and cross-country GDP growth rates. The positive impact of privatization on GDP growth in their sample coincided with the period in which the governments of 18 developing countries had actively received fiscal support from the IMF.

Probit and Tobit models were used for estimation for a sample of 35 developing countries from 1988 to 1992 by Plane (1997) who identified several determinants of the

process of privatization. Foreign direct investment, market capitalization, public debt, saving rate, value added by the public sector, relative exchange rate, need for structural adjustment program and per capita gross national product were the eight key determinants identified by the study. Employing OLS regressions, Plane (1997) also found that privatization proceeds had a positive impact on average growth rate of GDP. The favorable finding in terms of a healthier macroeconomic impact of privatization was found to be greater when combined with institutional development in the sample countries. The study recommended addition of developed economies and transition economies of Eastern Europe in the panel of countries for future empirical studies analyzing the macro-economic impact of privatization.

The difference of opinion in existing literature on privatization and economic growth can be attributed to the different statistical methods, sample period and most importantly the number of countries included in the regression analysis. On the other hand, the areas of agreement in the privatization and its macroeconomic impact empirical studies are the recognition of privatization revenues being an endogenous right hand side regressor along with other explanatory variables like public sector size. The existence of endogenous regressors would, to a great extent, bias the use of OLS estimation techniques. Therefore, the current study, accepting the impact of privatization on growth as an endogenous growth process, will utilize the powerful Arellano-Bover/Blundell-Bond two step system GMM estimation procedures with Windmeijer (2005) robust standard errors for estimation.

With numerous studies highlighting the benefits to firms in the post-privatized economic environment and cross-country studies inability in providing a clear picture or

impact of privatization policies on economic growth, it is important to investigate the policies of divesture in a cross-country context with other variables of interest. While attempting to reassess the role of privatization in a macroeconomic environment, it is useful to recall Adam Smith's (1776) following argument of a positive relationship between privatization and economic growth:

"in every great monarchy in Europe the sale of the crown lands would produce a very large sum of money, which, if applied to the payment of the public debts, would deliver from mortgage a much greater revenue than any which those lands have ever afforded to the crown. When the crown lands had become private property, they would, in the course of a few years, become well improved and well cultivated "Adam Smith (1776).

Existing literature on privatization and economic growth has only relied on privatization revenues as a share of GDP in estimation procedures to see its subsequent impact on economic growth. Revenues from privatization provide extra fiscal space to governments and their best utilization is left to political leaders, who can even use it to further their own political ambitions. Revenues from privatization can be a good measure to see the macro-economic economic impact of privatization, while estimating a growth equation with privatization revenues as a variable in the presence of a variable to proxy the size of the public sector: the privatization variable will effect growth directly and also via the public sector size variable. To capture the independent influence of privatization policy on growth, the current research will also rely on the number of privatization transactions in each country over the sample period. The data on privatization revenues for the developed countries in the panel is obtained from Privatization Barometer, for the developing countries it comes from World Bank

Privatization data base and Structural Change Indicators of European Bank

Reconstruction and Development (EBRD). The privatization data obtained from EBRD

only reports revenues from privatization thus five countries are dropped from

regressions with number of privatization deals as a proxy of divesture of state

enterprises.

In the existing growth literature, Levine and Renelt (1992) and Xalai-Martin et al

(2004) report that there are more than 50 variables which are significantly correlated

with growth and therefore it is not possible to include all of them in the existing

analysis. Therefore, the choice of variables to be included in estimation is primarily

dictated by the theoretical model Barro (1995) explained below in Section 3. Output in

the theoretical model is explained by the level of public sector activity, amount of

capital and a vector of variables that influence a country's level of technology. Policies

of privatization, financial development and institutional quality are included in the

vector of variables along with initial per capita GDP to influence GDP per capita

growth.

Public sector size and economic growth

In one of the most cited articles on economic growth literature, Barro (1991) study

found a negative and significant impact of public sector consumption on GDP per capita

growth. "Government consumption introduces distortions, such as high tax rates, but

does not provide an offsetting stimulus to investment and growth," Barro (1991). While

investigating the determinants of growth for a cross-section of 98 countries, Barro

(1991) found empirical evidence to be inconsistent with the neo-classical growth theory.

The paper started a series of studies on economic growth and variables used in the study have become popular in the growth literature and are mostly referred to as the "Barro regressors," Hassan et al. (2009). The public sector consumption expenditure variable was used to proxy the size of the public sector and it did not include expenditure on education and the military. The paper had used the OLS estimator as the estimation technique and researchers since then have found OLS to give biased results in the presence of endogenous right hand side regressors. The reverse causality in the regressors gives bias results not only for OLS estimation techniques but also renders fixed effects and random affects estimates to be biased and inconsistent.

Barro (1991) had used 98 countries cross-country data set from Penn World Tables for the period of 1960 to 1985, a period which was dominated by state owned enterprises and apart from a few developed countries like Britain, no other country had initiated the process of privatizing state owned enterprises. The fall of communism in Eastern Europe and liberalization of Asian economies in the early 1990s has seen a considerable wave of the process of privatization. Where by the economic role of the government has since been declining, and therefore there is a need to reassess the impact of government consumption on economic growth. Grier (1997), Landau (1986) and Saunders (1985) have also found evidence of a negative relationship between government size and economic growth.

KOF Index of Globalization developed by Dreher (2006) and Economic freedom Index developed by the Fraser Institute were used as the two key variables for a panel of 29 rich countries to analyze the impact of the public sector on economic development. Using Bayesian averaging classical estimation, OLS and panel estimation techniques

Bergh and Karlsson (2010) found that public sector size had a negative impact on economic growth. Bergh and Karlsson (2010) study was limited to 29 rich OECD countries and public sector size was proxied by total tax revenue as a share of GDP and public sector expenditure as a share of GDP. The results obtained from a sample of 29 rich countries cannot be generalized for the whole world and their inclusion of economic freedom and globalization variables also did not have a significant impact on economic growth. The paper also suggested use of econometric techniques that address the potential biased caused by endogenous regressors in estimation of growth equations.

Five different parameters for the relative size of the public sector across different regions in China were constructed by Huynh and Jacho-Chavez (2009) to estimate their impact on economic growth. Using fixed effects regression and controlling for capital, trade and changes in economic structure, Huynh et al. (2009) found public sector share of industrial value added in gross regional product positively influenced regional productivity. On the other hand, public sector share in employment had a consistently negative and significant impact on regional productivity, while public sectors share in total investment had an insignificant impact on regional productivity. Their research indicated that during the transition period of 1990 to 2004 the role of the public sector has been both favorable and harmful to the Chinese economy, offsetting each other in the macro-economic environment.

Using United States of America (USA) data from 1950 to 1998, Roy (2009) found a negative and significant negative impact of public sector size on economic growth. Accepting the inconsistencies caused by OLS estimates of single equation models, Roy (2009) used the three stage least square (3SLS) estimator on a four-equation

simultaneous equation model for the United States data set. While controlling for population size, trade-weighted average of trading partners, exchange rate, foreign capital inflows, trade and share of exports in per capita GDP, the study found a highly significant and negative impact of public expenditure on gross domestic output. The Roy (2009) study advocated reducing the size of the public sector in United States but their results cannot be generalized for the world as majority of countries around the world face very distinct economic conditions and political conditions as compared to the United States and his study evaluated a time period which is more than a decade old.

The studies analyzing the impact of public sector size on growth using disaggregated data of public sector expenditure have also provided conflicting results especially in the presence of both developing and developed countries in large cross-country samples. Using disaggregated data of public sector expenditure and employing seemingly unrelated regression estimator, Bose et al. (2007) found public sector capital, public sector education, transport and communication and public sector defense expenditure had a significant positive impact on GDP per capita growth. The growth regressions of Bose et al. (2007) controlled for political instability, initial life expectancy, initial human capital, initial GDP per capita, private investment and tax revenue in estimating the impact of state sector's disaggregated data on economic development. The use of tax revenue as a control variable in the presence of various components of public sector expenditure variables raises a cause for concern as tax revenue could have been highly co-related with variables of public sector expenditure. Three out of their six variables of public expenditure remain significantly positive even in the growth regressions that included the variable of public sector deficit for the developing countries. The positive

relationship between public sector and economic growth was found for a group of 30 developing countries from 1970 to 1990.

Using Barro-Lee (1994) data set for both developing and developed countries from 1960 to 1985, Hung (2007) found that public sector interest payments, public sector transfers, public sector education and defense expenditure all had a significant negative impact of on GDP growth. The study only found public sector investment to have had a positive impact on economic development. The study advocated the reallocation of funds from public sector consumption expenditure to investment expenditure to foster economic growth in countries around the world. The study found that a 1% increase in public consumption as a share of GDP would decrease economic growth by .216 % and a 1% increase in public investment would foster economic growth by .167 percentage points. So a possible shift of 1% of public sector consumption expenditure to public sector investment would lead to a .38% increase in economic growth for the sample countries.

Using Switzerland's data on state and local governments from 1981 to 2001, Schaltegger and Torgler (2006) found that public sector size significantly Granger-causes economic growth and the reverse relationship does not exist. The study highlighted the limitations of cross-country studies in analyzing the impact of public sector expenditure on growth especially in rich countries and tested the idea of investigating public sector expenditure for the "sub-federal level" using panel data set of 26 Swiss Cantons. The study used investment, labor force, higher secondary school attainment, unemployment rate, agglomeration, total population, population above 65, population under 15, government centralization and German language dummy as

additional control variables in the estimated equations. Schaltegger and Torgler (2006) employed OLS, Fixed effects and first differenced instrumental variable regressions and found a significant negative impact of public sector expenditure on GDP growth for a panel of Swiss cantons. The co-efficient of initial GDP per capita was also found to be negative and significant across the three empirical methods adopted by the study.

Employing the two-stage least square estimator for a panel of 23 rich OECD countries between the period of 1970 to 1995, Agell et al. (2006) found an insignificant impact of public sector expenditure and tax revenue on GDP growth using the two stage least square estimator. The study highlighted the inability of cross-country growth regressions in providing any meaningful results of public sector size on economic growth where the key issue of reverse causality of right hand side regressors was ignored. They suggested the use of "theoretically correct" instrumental variables approach to tackle the issue of reverse causality in explanatory variables of public sector size. Agell et al. (2006) also recognized that most of the available instruments in existing literature are weak thus the hypothesis testing of the relationship between public sector size and economic growth would mostly be unreliable. On the other hand, Folster and Henrekson (2001) using a panel of 23 rich OECD countries for the same time period and employing OLS estimation technique did find a significant negative effect of public expenditure and taxation on economic growth. Their results were robust to the inclusion of rich countries from outside OECD and their significant relationship between public sector size and growth got more robust as additional econometrics problems were addressed.

The debate between the exogeniety and endogeniety of the growth theory was re-ignited by Agell et al. (1997), where they provided a detailed analysis of the theoretical aspects associated with the endogenous and exogenous growth models and believed that it is the endogenous growth models which offer "richer analysis" of the process of growth. Using OLS regressions for the period 1970 to 1990, Agell et al. (1997) found that tax expenditure share in GDP had a positive but insignificant impact on GDP per capita growth for 23 OECD countries. Initial GDP per capita and dependent population were the only two other control variables used in their regression analysis.

Financial development and institutional quality

The inclusion of financial development and institutional quality variables in the current growth regressions is based on two factors: firstly, the available evidence of their significant relationship with GDP per capita growth and secondly, the available evidence of financial development and institutional quality in enhancing the process of privatization around the world. International Monetary Fund and World Bank have included both the development of financial market and privatization of state enterprises as key ingredients to their policies of reforms around the globe. The availability of credit through the banking channel and the existence of robust stock markets should boost the process of privatization. The importance of the stock markets to the process of privatization has been highlighted by Boubakri and Hamza (2007). They accepted the existence of reverse causality between privatization and stock market development and advocated the use of instrumental variables to tackle the issue of endogenous regressors. Their finding of a positive impact of privatization on stock market development was conditional on the initial level of a functioning legal system. The findings of Boubakri

and Hamza (2007) were based on a panel of 61 countries from both the developed and developing world from 1980 to 2003. The importance of institutional quality on the success of privatization policies has also been highlighted in firm level studies such as Boubakri et al. (2005) where the improved performance of 230 privatized firms from the developing countries from 1990 to 1998 was primarily attributed to the presence of quality institutions. "Taken together, our results highlight the importance of corporate governance, macro-economic reforms and environment in explaining the post-privatization changes in performance." Boubakri et al (2005)

In one of the earliest studies, Bortolotti et al (2001) employed both privatization revenues as a share of GDP and number of privatization transactions offered by respective governments to analyze key issues surrounding the process of privatization. Their panel of countries included 49 developed and developing countries for the period of 1977 to 1996, Bortolotti et al (2001) identified economic and political factors that lead countries towards privatization. They found public sector debt and "governing political majority" were two main drivers of the policy of divesture. Bortolotti et al (2001) also found privatization revenues were positively associated with developed financial markets and government credibility, as countries with weak financial institutions and governments that lack political credibility would be unable to achieve the highest level of privatization revenues. Bortolotti et al (2001) showed that institutional quality was a key in governments relinquishing direct control of the privatized firms as countries with a good legal system witnessed a complete handover of state firms to private hands.

"Well-defined property rights are a cornerstone for private sector development and growth", Hassan et. al (2009). The impact of privatization on economic growth is not easy to be analyzed for transition economies such as China and Hassan et al. (2009) use data on private sector investment to study the impact of structural change in Chinese provinces. Using annual data for 31 Chinese provinces from 1986 to 2002, the study found that development of financial markets, better protection of property rights, sound legal environment and political pluralism were enhancing growth in China. Hassan et al. (2009) use initial GDP per capita, enrollment in junior secondary schools and a measure of openness as three control variables in estimation. Development of financial markets had a positive impact on GDP per capita growth of Chinese provinces. The institutional and financial development variables in their Blundell and Bond two-step GMM estimation were treated to be endogenous and the other control variables in estimation were assumed to be exogenous. The study also found a positive and significant impact of private sector presence on economic growth, a result that reaffirms the need to re-examine the impact of public sector size on economic growth.

The key role of finance and institutions, as determinants of economic growth in countries around the world, was recognized by Demetriades and Law (2006). The study used both cross-sectional and panel data for 72 countries at different levels of economic development from 1978 to 2000. The Mean group (MG) and the Pooled Mean Group (PMG) were the two dynamic panel estimators employed to capture both time-series and cross-sectional variations of the dataset. Their results showed that financial development played a bigger role in economic development of middle-income countries as compared to the developed economies. It was also shown that the positive effect of finance lead growth was higher in middle-income countries with sound institutional

framework. Their findings for low-income countries suggested that quality institutions would have a greater impact on economic development than instruments of financial development. Demetriades and Law (2006) had used a weighted average of the five indicators provided by International Country Risk Guide (ICRG) to proxy institutional framework in their estimation.

Existing literature on the role of financial development in influencing economic growth is huge and its coverage is beyond the scope of the current study. Thus, the study suggests readers towards King and Levine (1993), Levine (1997), Rajan and Zingales (1998), Beck et al (2000), Rajan and Zingales (2003) and Ang (2008) for in depth coverage of issues related to finance and growth to the readers. For greater insight on the role of institutional quality promoting economic growth, Claessens and Laeven (2003), Esfahami et al (2003), Huynh et. al (2009) and Aidt (2009) studies can also be looked into.

5.4 **Econometric methodology**

The dynamic panel growth model to be estimated in log linear format is as follows;

$$\ln Y_{it} = \xi \ln Y_{i,t-1} + \beta \ln X_{i,t} + \varepsilon_{i,t} \tag{14}$$

where $Y_{i,t}$ is the log of annual GDP per capita growth, $Y_{i,t-1}$ is the lagged dependent variable, $X_{i,t}$ contains the set of endogenous and exogenous variables namely privatization revenues, privatization deals, public sector size, investment, initial GDP per capita, financial development and institutional quality. The study feels that the

inclusion of both the lagged dependent variable and initial GDP per capita will make the specification dynamic and the use of ordinary least squares (OLS) estimate biased and inconsistent. To account for the dynamic effects and potential endogeneity in the specification, in existing literature Beck et al. (2000) and Beck and Levine (2004) have used the Generalized Method of Moments (GMM) estimators developed by Arellano and Bond (1991) for dynamic panel estimation. The Arellano Bond GMM technique is developed to address the potential econometric issues arising out of endogenous explanatory variables in the dynamic panel growth models like the one being utilized in the current study. The Arellano-Bond estimator has since been extended for the system GMM procedure by Arellano and Bover (1995) and Blundell and Bond (1998) estimator. The main advantage of using system GMM in the presence of endogenous regressors is that the estimator does not require outside instruments. Recognizing the importance of the two-step GMM estimator in the first two empirical chapters, this chapter also adopts the two-step GMM estimator. The variables of privatization revenue, privatization deals, financial development and government size are treated to be endogenous variables and the rest of the variables are treated to be exogenous in the dynamic panel estimation.

5.5 Data and estimation results

For the purpose of empirical analysis an annual panel data set for 62 countries with the time period of 1995 to 2007 has been selected for estimation. The time period chosen is to evaluate the impact of the most recent privatization transactions on economic growth and controlling for the size of the public sector. The selection of countries in the sample is primarily dictated by the availability of data on privatization revenues and

privatization transactions around the world. Summers and Heston Penn World Table 6.3 has data coverage on Government share of real GDP per capita from 1950 to 2007 and in line with previous chapter it is once more used to proxy the size of the public sector. Summers and Heston data set was also used by Ram (1986) for 115 countries in the period 1960 to 1980 which found a positive influence of public sector size on growth and results also showed that total factor productivity was higher in the public sector as compared to the private sector. Gross domestic investment, labor input and growth rate of population were the other variables used by Ram (1986) with the variable of "government consumption" to estimate their impact on per capita growth. Major differences of the Ram's study with other comparable growth studies like Landau (1986) and Barro (1991) were firstly, the absence of school enrollment rates proxied for human capital in his regressions mainly because Ram (1986) did not consider school enrollment rates as a determinant of economic growth. Secondly, Barro's (1991) public sector expenditure was exclusive of military and educational expenditure. To date Ram's findings are considered to be one of the strongest evidences in favor of public sector positively influencing economic growth. The readers can also refer to Dalamagas (2000) who identifies key common areas of public sector studies which eventually find opposing results on the macro-economic impact of public sector around the world.

World Development Indicators provided by the World Bank and Summers and Heston Penn World Tables have been two of the most common used data sources for public sector size, with some following Barro (1991) by excluding expenditure on military and education from public sector consumption expenditure. The other set of researchers follow Ram (1986) by including military and education expenditure in the public sector consumption expenditure. The current study utilizes governments share in GDP variable

inclusive of all components of public sector expenditure obtained from Penn World Tables 6.3, to proxy the size of the public sector. The current study, using dynamic panel estimation techniques for 62 countries from 1995 to 2007 in the presence of their key explanatory variables, finds a negative and significant impact of public sector size on GDP per capita growth.

Domestic credit to private sector, market capitalization of listed domestic firms and total stocks traded expressed as a share of GDP are used to proxy financial development. The institutional variable is an average of the five governance indicators namely law and order, government stability, bureaucratic quality, corruption and democratic accountability which are obtained from the International Country Risk Guide (ICRG) political risk indicators. Share of investment in GDP is used to proxy for physical capital in the current empirical model. Summary statistics are provided in Table 5.1a , the table of summary statistics contains data from 62 countries and will form the basis of dynamic panel regressions in the current study. Two variables take central stage in the current chapter regressions, firstly, the variable of GDP per capita growth, secondly, the variable of privatization revenues. The mean per capita growth for the sample of countries is 3.7% with the minimum value of -14.32% and the maximum value of 33.03 %. In terms of privatization revenues variable the mean value is a little less than 1% of GDP. The maximum value of privatization revenues variable is 38.1 % of GDP for Georgia in 2001 representing a substantial of privatization taking place in the country in that year. To take into account the extreme values of privatization revenues variable the study will winsorize the variable and results will be discussed in the robustness checks of the chapter. Detailed sources of data and the complete set of variables are given in Table 5.1b and list of countries in the panel is given in Table 5.1c.

Empirical results

The dynamic panel estimation results of equation (14) using two-step system GMM are reported in Table 5.2 to Table 5.6. The study uses a dummy variable for 22 transition economies of Eastern Europe in its regressions to take into account the unique economic and political conditions that these countries have faced since the fall of communism. GDP per capita growth is the dependent in all dynamic panel estimations reported in the five tables. Table 5.2 reports eight regressions results and the lagged dependent variable is highly significant in the first seven columns, justifying the use of dynamic panel estimation techniques. In the first column of Table 5.2, the co-efficient of privatization revenues is positive and significant at 10% level, thus confirming the positive macro-economic impact of privatization policies on economic growth. The co-efficient of public sector size is negative and significant at 10% in the first column, implying that the public sector share in GDP has a negative impact on growth. The variable for investment appears with an expected positive sign but is statistically insignificant along with the variables of initial GDP per capita and the dummy variable for transition economies, which are also found to be statistically insignificant. Contrary to existing work the variable of private credit has a negative impact on GDP per capita growth but it is statistically insignificant in the first column of Table 5.2. Institutional quality variable is added to the second column of Table 5.2 and unlike existing evidence it has a negative impact on GDP per capita growth, but the variable is statistically insignificant. The inclusion of the institutional variable did not alter the economic and statistical results of the two important variables namely privatization revenues and public sector size. The variable of private credit becomes positive and significant at 5% level with the

inclusion of the institutional variable in column 2, the positive impact of private credit on economic growth is in line with the existing literature. In the third and fourth column of Table 5.2, the variable of total stocks traded and market capitalization of listed firms are used respectively to proxy financial development. As per existing work both the variables have a positive and significant impact on GDP per capita growth, the regression with stocks traded renders the variable of public sector size to be insignificant. The variable of privatization revenues has a positive co-efficient in the fourth column of Table 5.2 but it is statistically insignificant along with other key explanatory variables. The first four regressions do provide good support to the main hypothesis of the study, which is the positive macro-economic impact of privatization policies whereas there is also limited support for the negative role of public sector size on economic development. The next four columns of Table 5.2 report results with the variable of number of privatization deals having replaced privatization revenues in estimation. The use of privatization deals variable reaffirms the positive impact on economic growth where the privatization variable is significant in all four regressions. The negative and significant co-efficient of public sector size lends support to the detrimental impact it has on economic growth. The use of privatization deals in estimation provides no support to the positive impact of institutional quality on growth whereas there is limited supported for financial development lead growth in the last two columns of Table 5.2. Credibility of the two step system GMM estimation results of Table 5.2 is provided to six out of the eight estimated results where they pass the three diagnostics tests and dynamic panel estimation in two remaining columns should be seen with caution as they are unable to pass the second-order serial correlation test.

In the existing privatization literature, Bennet et al. (2007), Adams and Mengistu (2008b) and Filipovic (2005) have used interaction terms containing the variable of privatization to assess its significance in terms of interaction with other key institutional quality, regional dummies and financial development variables. Table 5.3 utilizes four interaction terms each containing the variable of privatization revenues. The entire set of interaction terms has a positive influence on GDP per capita growth and two out of the four are also significant at 10% level. The public sector size variable is significant in two out of the four regressions with interaction terms with the anticipated negative sign. Table 5.3 once again fails to provide any significant evidence of institutional quality promoting growth whereas its interaction with privatization yields positive and significant results in column 2 of the table. There is once more very limited support to finance lead economic growth in Table 5.3. Credibility of the two step system GMM estimation results of Table 5.3 is provided to all four estimated results where they pass the three diagnostics tests.

The number of privatization deals is used in the interaction term for the next set of results reported in Table 5.4. The entire set of four regressions with the new interaction term has a positive and significant impact on economic growth. The public sector size variable once more has a negative influence on economic growth in Table 5.4 but it is only insignificant in the first two columns of the table. The variables of initial GDP, investment, private credit, stocks traded and institutions are all insignificant in Table 5.4 which contains regressions with interaction terms. In line with two results of Table 5.2, the use of privatization deals in estimation renders two of the four regressions in Table 5.4 unable to pass the second-order serial correlation test.

To check the validity of the inverted U-shape public sector size relationship with GDP per capita growth as per the theoretical model, the study estimates both linear and quadratic terms of public sector size and the results are reported in Table 5.5. The linear and quadratic terms of public sector size are significant in the first column, the linear term of public sector size has a negative co-efficient and the quadratic term has a positive co-efficient: indicative of a U-shaped relationship existing with GDP per capita growth. The U-shaped relationship between public sector size and economic growth contradicts the inverted U-shaped relationship of Barro's (1995) growth model as depicted earlier in Fig 5.1. The average value of public sector size in the 62 country sample set is 19% which is far below the turning point of 50%, thus implying that for the average public sector size the relationship between the size of the public sector and GDP per capita growth is negative. In the next four columns of Table 5.5, the linear and quadratic terms of public sector size appear with different co-efficients, indicative of a U-shaped relationship but the variables are statistically insignificant.

All twenty five dynamic panel regressions have been estimated and credibility of the Arellano-Bover and Blundell-Bond two step system GMM estimation results is provided by nineteen of them passing the first order and second order serial correlation tests and Sargan test of valid instruments. The passing of these three tests is central to the use of the dynamic panel estimator. Out of the remaining six regressions, five of them do not pass the second-order serial correlation test whereas these five regressions do pass the other two diagnostic tests. The sixth regression only fails the first-order serial correlation test in column 3 of Table 5.6, while passing the remaining two diagnostic tests. The value of the Sargan test is close to 1 or equal to 1 in majority of the regressions due to high number of instruments employed by the two-step GMM

estimator. The high number of instruments is primarily due to the inclusion of three explanatory variables as endogenous variables in the system GMM estimation.

Robustness checks

In the first set of robustness checks the privatization revenues variable is winsorized and the results are reported in Table 5.6.Iin the first three column of the Table the co-efficient of the privatization variable has a positive and significant impact on GDP per capita growth. The positive co-efficient of the privatization variable is consistent with the results obtained by Boubakri et al. (2009) for a panel of 56 developed and developing countries. The variable of public sector size is statistically insignificant in all five regressions of Table 5.6. The variables of total stocks trade and market capitalization both have a positive and significant impact on economic growth, lending support to the hypothesis of financial development promoting economic development in countries around the world.

To check for further robustness trade openness variable is added as an explanatory variable and the results are reported in Table 5.7. The addition of the trade openness variable does not change the central hypothesis of the chapter which is the positive macro-economic impact of privatization on economic growth. The trade openness variable has a positive and significant impact on GDP per capita growth in the five regressions of Table 5.7. The positive impact of trade openness on economic development implies that countries would benefit from international trade. The variable of public sector size has a negative and significant impact on economic growth, once more emphasizing the need to reduce public sector sizes around the world.

In the last set of robustness checks, the public sector size variable is interacted with various explanatory variables and the results are reported in Table 5.7. In the first column of the Table the interaction term between public sector size and domestic credit to private sector turns out to be significant with a negative sign. As individual variables, the variable of public sector size and credit to private sector should have opposing affects on economic development. But as the interaction term becomes negative and significant, implying that public sector size plays a dominant role in the interaction term. In the next four columns, the public sector size is interacted with four different measures of institutional quality. The institutional quality variable used throughout the growth chapter is used to interact it with public sector size in column 2. The interaction term turns out to be statistically insignificant with a negative co-efficient. In the next three columns the public sector size variable is interacted with three different measures of institutional quality. Out of the three measures only the interaction term between public sector size and law and order turns out to be significant with a negative sign. The negative impact of the public sector and law and order once more implies that public sector plays a more dominant role in economic activity when interacted with law and order. The three diagnostics tests of the dynamic panel estimator are passed in the entire set of robustness checks from Table 5.5 to Table 5.7.

Conclusion

The dynamic panel estimation technique that control for the endogeneity of the right hand side regressors do provide strong evidence of a positive impact of privatization revenues and number of privatization deals on GDP per capita growth for a set of

countries from different economic backgrounds. The positive impact found in the current study should encourage both developing and developed countries to continue with their respective privatization programs. The study finds evidence of the negative impact of public sector size on economic growth; the evidence may be limited because of statistical significance but the co-efficient of public sector size variable always appeared with a negative sign in the entire set of panel regressions. The negative impact of public sector size on economic growth also advocates for reducing public sector expenditure which in turn potentially increases the number of privatization transactions around the world. The use of quadratic and linear terms for the variable of public sector size contradicts the results of the theoretical model outlined earlier. The U shaped relationship found between the public sector and economic growth implies that only extremely high levels of public spending would have a positive impact on economic growth. The non-significance of the institutional variables is a cause of concern as North (1990) found that there is a positive and significant impact of institutional quality on economic growth. In terms of privatization and economic growth literature one previous study Filipovic (2005) also found an insignificant impact of institutional quality and growth. Filipovic (2005) had also used annual data in estimation, may be the use of annual data along with the privatization revenues variables drives the totally unexpected insignificant impact of institutional quality and economic growth.

In the environment of privatization programs, results show that two of the financial development measures namely total stocks traded and market capitalization of listed domestic firms have a positive and significant impact on economic growth. The importance of well established stock markets is reaffirmed by the current study for the success of privatization programs. The positive relationship between privatization and

per capita growth in the current study adds its voice to the existing privatization and economic growth literature; the findings are opposite to the ones obtained by Filipovic (2005) and Adams and Mengistu (2008b), but the findings are consistent with the results obtained by Boubakri et al. (2009) who did not include transition economies in their estimated panel. The panels of countries used in the current study are more reflective of the real world as transition economies of Eastern Europe are included in the panel with other developing and developed countries from different regions around the world. The first chapter outlined various ideological, institutional and political factors that have lead individual countries towards privatization especially in the developing countries where economic factors were generally overlooked by decision makers on the timing and scale of the privatization process. With the positive macro-economic impact of privatization found in this chapter, one can recommend that country's macro-economic considerations should be incorporated in decision making towards the sale of public sector assets.

The study makes an attempt to start a debate on the determinants of private sector size and shows that privatization policies and financial development are key determinants for the growth of the private sector. The evidence presented in the study shows that an improvement in institutional quality would reduce the size of the public sector. The study also illustrates that privatization policies are beneficial for economic growth and public sector size has the opposite effect. Therefore, the study strongly recommends that governments around the world should continue privatization policies and also employ all important parallel policies to enhance the size of the private sector.

Chapter 5 Tables
Summary statistics
Table 5.1a

	N	Mean	Standard Deviation	Minimum	Maximum
GDP per capita growth. Annual %.	806	3.760751	4.194598	-14.32095 (Indonesia 1998)	33.03049 (Azerbaijan 2006)
Public sector size (Government share in real GDP per capita)	806	19.02978	6.926977	3.89 (Nigeria 2003)	59.65 (Georgia 2007)
Privatization revenues (% of GDP)	799	.9938159	3.779063	--------	38.1 (Georgia 2001)
Privatization deals (Total number of privatization transactions)	715	8.959441	45.72708	1	1136 (Romania 1998)
Private credit (% of GDP)	801	50.38869	44.99573	1.166045 (Azerbaijan 1996)	210.4178 (Malaysia 1997)
Total stocks traded (% of GDP)	717	26.36998	43.03213	------	368.2758 (UK 2007)
Banking credit (as % of GDP)	802	62.91265	47.29617	1.889923	221.8067
Initial GDP per capita (GDP per capita 1995) Constant LCU.	788 6963866	313996.6	1134468	489.0866 (Azerbaijan)	6963866 (Indonesia)
Investment (share of real GDP per capita)	806	21.92391	8.993597	.88 (Nigeria 2001)	52.63 (Thailand 1996)
Market capitalization of listed firms (% of GDP)	710	44.14003	46.72944	.0192957 (Bulgaria 1997)	304.5846 (Malaysia 1996)
Institution (average of 5 ICRG political risks variables)	725	4.555977	.830819	2.683333	6.6
Private sector size (share of private sector employment in total employment)	535	72.47746	14.154	23.4789	94.6583
Law and order	725	4.143333	1.282665	1	6
Corruption	725	2.987011	1.266585	1	6
Bureaucratic quality	725	2.476609	.9761394	0	4
Trade openness	795	81.46838	38.28325	14.93284 (Brazil 1996)	220.4073 (Malaysia 2000)

Definitions and sources of data are given in Table 5.1c.

Table 5.1b: Data sources

Proxy	Variable	Sources of Data
GDP per capita growth	GDP per capita growth	World Development Indicators,
Public sector size	Government Share of Real GDP per capita	Penn-World Tables 6.3
Privatization r revenues	Revenues from privatization as a % of GDP	World Bank Privatization Data base, Privatization Barometer, Structural Change Indicators, EBRD
Privatization deals	Number of privatization transactions	World Bank Privatization Data base, Privatization Barometer, Structural Change Indicators, EBRD
Initial GDP per capita	GDP per capita in the first year of estimation	World Development Indicators,
Stocks traded	Stocks traded total value as a % of GDP	World Development Indicators
Private credit	Domestic credit provided to private sector as a % of GDP	World Development Indicators
Banking credit	Domestic credit provided by the banking sector as a % of GDP	World Development Indicators
Market capitalization	Market capitalization of listed companies as a % of GDP	World Development Indicators
Institution	Average of Government Stability, Corruption, Law and order, Bureaucratic quality and Democratic accountability	International Country Risk Guide (ICRG).
Investment	Investment Share of Real GDP per capita	Penn-World Tables 6.3
Private sector size (share of private sector employment in total employment)	Private sector size employment as a share of total employment	LABORSTA: International Labor Organization:
Law and Order	Law and Order	International Country Risk Guide (ICRG).
Corruption	Corruption	International Country Risk Guide (ICRG).
Bureaucratic Quality	Bureaucratic Quality	International Country Risk Guide (ICRG).
Trade openness	Trade as a share of GDP	World Development Indicators

Table 5.1c: List of countries

1	Albania	17	Finland	33	Macedonia	49	Slovak Republic
2	Argentina	18	France	34	Malaysia	50	Slovenia
3	Armenia	19	Georgia	35	Mexico	51	South Africa
4	Austria	20	Germany	36	Moldova	52	Spain
5	Azerbaijan	21	Ghana	37	Morocco	53	Sri Lanka
6	Brazil	22	Greece	38	Mozambique	54	Sweden
7	Belarus	23	Hungary	39	Netherland	55	Tanzania
8	Bulgaria	24	Ireland	40	Nigeria	56	Thailand
9	Chile	25	India	41	Pakistan	57	Tunisia
10	China	26	Italy	42	Panama	58	Turkey
11	Colombia	27	Indonesia	43	Peru	59	Uganda
12	Croatia	28	Jamaica	44	Philippine	60	Ukraine
13	Czech Republic	29	Kazakhstan	45	Poland	61	United Kingdom
14	Denmark	30	Kyrgyz Republic	46	Portugal	62	Venezuela
15	Egypt	31	Latvia	47	Romania		
16	Estonia	32	Lithuania	48	Russia		

Table 5.2: Privatization policies and economic growth. Blundell-Bond two-step system GMM (xtdpdsys)

Dependent variable: GDP per capita growth, annual data 1995-2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged dependent variable	0.387*** (0.124)	0.355*** (0.128)	0.443*** (0.118)	0.386*** (0.120)	0.305** (0.129)	0.245** (0.123)	0.234** (0.0977)	0.196 (0.131)
Privatization revenues	0.0409* (0.0227)	0.0453* (0.0261)	0.0430* (0.0241)	0.0292 (0.0266)				
Privatization deals					0.0868* (0.0478)	0.106** (0.0540)	0.0936* (0.0538)	0.124* (0.0677)
Public sector size	-1.568* (0.809)	-2.370*** (0.787)	-1.189 (0.788)	-0.555 (1.210)	-3.113* (1.698)	-3.561** (1.513)	-1.828** (0.804)	-1.942** (0.908)
Institution		-0.0778 (0.112)	-0.00171 (0.0789)	-0.0541 (0.123)		-0.0519 (0.112)	-0.0764 (0.111)	-0.0585 (0.125)
Investment	0.281 (0.333)	0.226 (0.240)	0.334 (0.341)	0.307 (0.463)	0.275 (0.305)	0.390 (0.328)	0.407 (0.309)	0.131 (0.433)
Initial GDP per capita	-0.0115 (0.0910)	0.0538 (0.0875)	0.0113 (0.0790)	-0.00983 (0.105)	-0.0219 (0.0544)	-0.0120 (0.0877)	-0.0392 (0.0674)	-0.00654 (0.0700)
Transition dummy	0.603 (0.516)	0.576 (0.372)	0.283 (0.395)	0.594 (0.368)	0.285 (0.230)	0.399 (0.273)	0.724*** (0.260)	0.707** (0.287)
Private credit	-0.109 (0.291)	0.690* (0.407)			0.126 (0.393)	0.0621 (0.439)		
Stocks traded			0.197** (0.0836)				0.201** (0.0910)	
Market capitalization				0.514*** (0.165)				0.425*** (0.149)
Constant	1.102 (1.842)	0.879 (1.844)	-2.575 (1.889)	-2.263 (2.351)	-2.849 (1.875)	-2.074 (1.695)	-2.185 (2.040)	-2.615 (2.457)
First order serial correlation (p- value)	-2.6262 (0.0086)	-2.3754 (0.0175)	-2.5227 (0.0116)	-2.2229 (0.0262)	-2.0745 (0.0380)	-1.911 (0.0560)	-1.9508 (0.0511)	-1.8656 (0.0621)
Second order serial correlation (p- value)	-.22236 (0.8240)	-.35419 (0.7232)	-.84542 (0.3979)	-.96813 (0.3330)	**-1.8021 (0.0715)**	**-1.8332 (0.0668)**	-1.0078 (0.3136)	-1.166 (0.2436)
Sargan Test (p-value)	(0.9991)	(1.0000)	(1.0000)	(1.0000)	(1.0000)	(1.0000)	(1.0000)	(1.0000)
Observations	429	390	357	351	366	352	342	340

***indicates statistical significance at 1% level, ** indicates statistical significance at 5% level, * indicates statistical significance at 10% level, Figures in parentheses are Windemijer corrected standard errors, the value of the Sargan test has been calculated by re-estimating the model without the Windemijer corrected standard errors command. All the variables in the above regressions are estimated in log linear form except for the institution variable

Table 5.3: Financial development and privatization revenues. Blundell-Bond two-step system GMM (xtdpdsys)

Dependent variable: GDP per capita growth, annual data 1995-2007

	(1)	(2)	(3)	(4)
Lagged dependent variable	0.366**	0.329**	0.449***	0.423***
	(0.143)	(0.139)	(0.164)	(0.124)
Public sector size	-2.111***	-1.925*	-1.125	-0.853
	(0.734)	(0.988)	(0.897)	(1.120)
Institution	-0.0287	-0.0281	0.0371	-0.0407
	(0.0984)	(0.0986)	(0.118)	(0.118)
Investment	0.182	0.127	0.345	0.226
	(0.222)	(0.289)	(0.250)	(0.491)
Initial GDP per capita	0.0854	-0.00993	0.0493	0.0246
	(0.0666)	(0.109)	(0.0864)	(0.118)
Transition dummy	0.596	0.133	0.317	0.471
	(0.468)	(0.527)	(0.403)	(0.398)
Privatization revenues* Private credit	0.0478			
	(0.0293)			
Private credit	0.493	0.700		
	(0.339)	(0.463)		
Privatization revenues* Institution		0.0586*		
		(0.0310)		
Privatization revenues* Stocks traded			0.0460*	
			(0.0253)	
Stocks traded			0.113	
			(0.0753)	
Privatization revenues* Market capitalization				0.0293
				(0.0238)
Market capitalization				0.477**
				(0.215)
Constant	1.261	-1.103	-1.759	-1.473
	(1.766)	(3.363)	(1.120)	(3.054)
First order serial correlation (p- value)	-2.1971 (0.0280)	-2.3271 (0.0200)	-2.1745 (0.0297)	-2.292 (0.0219)
Second order serial correlation (p- value)	-.35808 (0.7203)	-.36913 (0.7120)	-.68517 (0.4932)	-1.0349 (0.3007)
Sargan Test (p-value)	(1.0000)	(1.0000)	(1.0000)	(1.0000)
Observations	390	385	357	351

***indicates statistical significance at 1% level, ** indicates statistical significance at 5% level, * indicates statistical significance at 10% level, Figures in parentheses are Windemijer corrected standard errors, the value of the Sargan test has been calculated by re-estimating the model without the Windemijer corrected standard errors command. All the variables in the above regressions are estimated in log linear form except for the institution variable

Table 5.4: Financial development and privatization deals. Blundell-Bond two-step system GMM (xtdpdsys)
Dependent variable: GDP per capita growth, annual data 1995-2007

	(1)	(2)	(3)	(4)
Lagged dependent variable	0.251** (0.116)	0.270*** (0.0916)	0.246** (0.0965)	0.262*** (0.0785)
Public sector size	-3.315* (1.769)	-3.004*** (0.894)	-1.715 (1.413)	-2.098 (1.358)
Institution	-0.0846 (0.107)	-0.106 (0.0946)	-0.0805 (0.139)	-0.0596 (0.107)
Investment	0.347 (0.235)	0.338* (0.179)	0.182 (0.333)	0.0388 (0.303)
Initial GDP per capita	-0.0373 (0.0919)	0.000505 (0.0680)	-0.0111 (0.0993)	0.00540 (0.0827)
Transition dummy	0.451** (0.221)	0.345 (0.239)	0.667** (0.321)	0.616* (0.362)
Privatization deals*Private credit	0.108** (0.0477)			
Private credit	-0.0726 (0.487)	0.0758 (0.451)		
Privatization deals*Institution		0.129** (0.0530)		
Privatization deals* Stocks traded			0.116** (0.0524)	
Stocks traded			0.0735 (0.0897)	
Privatization deals* Market capitalization				0.117** (0.0486)
Market capitalization				0.393*** (0.141)
Constant	-1.610 (1.689)	-2.218 (1.758)	-0.835 (2.874)	-1.953 (2.072)
First order serial correlation (p- value)	-1.9256 (0.0542)	-2.1169 (0.0343)	-1.9276 (0.0539)	-2.2663 (0.0234)
Second order serial correlation (p- value)	**-1.8208 (0.0686)**	**-1.8276 (0.0676)**	-.98902 (0.3227)	-1.1351 (0.2563)
Sargan Test (p-value)	(1.0000)	(1.0000)	(1.0000)	(1.0000)
Observations	352	351	342	340

***indicates statistical significance at 1% level, ** indicates statistical significance at 5% level, * indicates statistical significance at 10% level, Figures in parentheses are Windemijer corrected standard errors, the value of the Sargan test has been calculated by re-estimating the model without the Windemijer corrected standard errors command. All the variables in the above regressions are estimated in log linear form except for the institution variable.

Table 5.5: Public sector size square and economic growth. Blundell-Bond two-step system GMM (xtdpdsys)

Dependent variable: GDP per capita growth, annual data 1995-2007

	(1)	(2)	(3)	(4)	(5)
Lagged dependent variable	0.422***	0.377***	0.474***	0.358***	0.343***
	(0.0841)	(0.0835)	(0.0981)	(0.0952)	(0.112)
Privatization revenues	0.0408**	0.0384***	0.0496**	0.0250	0.0270
	(0.0173)	(0.0143)	(0.0206)	(0.0252)	(0.0200)
Public sector size	-0.124**	-0.0742	-0.0673	-0.0713	-0.0849
	(0.0563)	(0.0503)	(0.0833)	(0.0462)	(0.165)
Public sector size square	0.00122*	0.000608	0.000589	0.000729	0.00136
	(0.000726)	(0.000688)	(0.00100)	(0.000492)	(0.00359)
Investment	0.0896	0.357*	0.128	0.110	.0129
	(0.258)	(0.191)	(0.243)	(0.254)	(.301)
Initial GDP per capita	0.0415	-0.00323	0.0410	-0.0445	0.0530
	(0.0445)	(0.0349)	(0.0587)	(0.0428)	(0.0734)
Transition dummy	0.670***	0.451**	0.252	0.696***	0.772**
	(0.238)	(0.207)	(0.311)	(0.234)	(0.333)
Private credit	0.0714				
	(0.327)				
Banking credit		-0.0431			
		(0.257)			
Stocks traded			0.109*		
			(0.0582)		
Market capitalization				0.463***	0.507***
				(0.147)	(0.132)
Institutions					-0.0965
					(.0920)
Constant	1.693*	1.626*	0.215	0.646	1.053
	(0.983)	(0.911)	(1.315)	(1.047)	(1.762)
First order serial correlation (p- value)	-3.0813 (0.0021)	-2.9787 (0.0029)	-2.7298 (0.0063)	-2.3511 (0.0187)	-2.2627 (0.0237)
Second order serial correlation (p- value)	-.26479 (0.7912)	-.41471 (0.6784)	-.15662 (0.8755)	-.97226 (0.3309)	-1.022 (0.3068)
Sargan Test (p-value)	(1.0000)	(1.0000)	(1.0000)	(1.0000)	(1.0000)
Observations	429	430	380	375	351

***indicates statistical significance at 1% level, ** indicates statistical significance at 5% level, * indicates statistical significance at 10% level, Figures in parentheses are Windemijer corrected standard errors, the value of the Sargan test has been calculated by re-estimating the model without the Windemijer corrected standard errors command. All the variables in the above regressions are estimated in log linear form except for the public sector size, public size square and institution variable

Table 5.6: Privatization policies and economic growth. Blundell-Bond two-step system GMM (xtdpdsys). Privatization Revenues variable Winsorized.
Dependent variable: GDP per capita growth, annual data 1995-2007

	(1)	(2)	(3)	(4)	(5)
Lagged dependent variable	0.306**	0.354***	0.419***	0.432***	0.273*
	(0.155)	(0.104)	(0.156)	(0.147)	(0.166)
Privatization revenues (Winsorized)	0.0658**	0.0589**	0.0425**	0.0262	0.00859
	(0.0322)	(0.0234)	(0.0209)	(0.0247)	(0.0301)
Public sector size	-1.669	-2.322	-1.293	-1.553	-2.038
	(1.437)	(1.430)	(0.857)	(1.031)	(1.794)
Institutions		0.190	-0.0939	0.225	0.182
		(0.159)	(0.0755)	(0.216)	(0.211)
Investment	-0.0282	0.0827	0.423*	-0.160	0.113
	(0.340)	(0.389)	(0.249)	(0.287)	(0.625)
Initial GDP per capita	0.0927	0.0501	0.0126	-0.00750	-0.102
	(0.125)	(0.147)	(0.0590)	(0.0970)	(0.162)
Transition dummy	0.633*	0.624*	0.433	0.392	0.628
	(0.383)	(0.335)	(0.315)	(0.364)	(0.547)
Private credit	0.130	-0.0227			
	(0.351)	(0.439)			
Stocks traded			0.195**		
			(0.0813)		
Market capitalization				0.656***	0.423*
				(0.142)	(0.243)
Private sector size					-0.285
					(0.487)
Constant	2.177	2.054	-0.847	0.650	0.761
	(2.784)	(2.142)	(1.857)	(1.734)	(3.715)
First order serial correlation (p- value)	-1.8592 (0.0630)	-2.5026 (0.0123)	-2.1061 (0.0352)	-2.154 (0.0312)	-2.1694 (0.0300)
Second order serial correlation (p- value)	-.25779 (0.7966)	-.63655 (0.5244)	-.74634 (0.4555)	-.95162 (0.3413)	-1.0547 (0.2916)
Sargan Test (p-value)	(1.0000)	(1.0000)	(1.0000)	(1.0000)	(1.0000)
Observations	385	385	357	349	248

Notes: The notes of the table are the same as Table 5.2.

Table 5.7: Privatization policies and economic growth. Blundell-Bond two-step system GMM (xtdpdsys). Trade openness added.
Dependent variable: GDP per capita growth, annual data 1995-2007.

	(1)	(2)	(3)	(4)	(5)
Lagged dependent variable	0.464***	0.414***	0.438***	0.423***	0.381*
	(0.0932)	(0.0890)	(0.0866)	(0.163)	(0.221)
Privatization revenues	0.0626**	0.0546**	0.0657***	0.0513**	0.0458
	(0.0251)	(0.0248)	(0.0220)	(0.0203)	(0.0315)
Trade openness	2.920***	2.777***	2.472***	2.283***	2.760***
	(0.674)	(0.677)	(0.691)	(0.707)	(0.818)
Investment		0.100	-0.0401	0.167	-0.0582
		(0.273)	(0.207)	(0.347)	(0.332)
Initial GDP per capita		0.0167	0.0116	0.0318	0.0947
		(0.0712)	(0.0439)	(0.0559)	(0.217)
Transition dummy		0.829**	0.518	0.743	0.390
		(0.406)	(0.467)	(0.672)	(0.865)
Public sector size			-1.589***	-2.200*	-2.631**
			(0.603)	(1.226)	(1.127)
Private credit				-0.291	0.415
				(0.354)	(0.742)
Institutions					0.0167
					(0.199)
Constant	1.440	1.614	1.553	2.930	1.232
	(1.266)	(1.109)	(2.137)	(4.207)	(3.396)
First order serial correlation (p- value)	-2.7931 (0.0052)	-2.6974 (0.0070)	-2.8352 (0.0046)	-2.5428 (0.0110)	-2.023 (0.0431)
Second order serial correlation (p- value)	.78031 (0.4352)	.79143 (0.4287)	.76435 (0.4447)	.48968 (0.6244)	.27358 (0.7844)
Sargan Test (p-value)	(0.5787)	(0.5947)	(0.9779)	(0.9999)	(1.0000)
Observations	436	436	436	429	385

Notes: The notes of the table are the same as Table 5.2.

Table 5.8: Public sector size and interaction terms. Blundell-Bond two-step system GMM (xtdpdsys).
Dependent variable: GDP per capita growth, annual data 1995-2007

	(1)	(2)	(3)	(4)	(5)
Lagged dependent variable	0.369***	0.382***	0.404***	0.379***	0.400***
	(0.0838)	(0.119)	(0.108)	(0.141)	(0.141)
Privatization revenues	0.0553***	0.0640**	0.0609**	0.0536*	0.0545**
	(0.0206)	(0.0279)	(0.0290)	(0.0284)	(0.0266)
Trade openness	2.724***	3.215***	3.489***	3.684***	3.418***
	(0.643)	(0.880)	(0.942)	(0.420)	(1.038)
Investment	0.103	-0.184	-0.140	0.0548	-0.0210
	(0.260)	(0.231)	(0.193)	(0.177)	(0.281)
Initial GDP per capita	0.0471	0.00544	-0.00315	0.00126	-0.0291
	(0.0621)	(0.0530)	(0.0687)	(0.0776)	(0.0915)
Transition dummy	0.671	0.758***	0.922***	0.774**	0.454
	(0.469)	(0.257)	(0.349)	(0.387)	(0.342)
Public sector size*Private credit	-0.988*				
	(0.573)				
Private credit	0.606				
	(0.603)				
Public sector size*Institutions		-0.668			
		(0.922)			
Institutions		-0.0147			
		(0.142)			
Public sector size*Law and order			-1.071**		
			(0.472)		
Law and order			0.160		
			(0.134)		
Public sector size*Corruption				-0.144	
				(0.497)	
Corruption				0.00955	
				(0.167)	
Public sector size*Bureaucratic Quality					-0.754
					(0.699)
Bureaucratic Quality					-0.0765
					(0.225)
Constant	2.481	5.446*	4.178	1.570	2.727
	(2.589)	(3.170)	(2.645)	(2.148)	(2.113)
First order serial correlation (p- value)	-2.7581	-2.3128	-2.2527	-2.1816	-2.1828
	(0.0058)	(0.0207)	(0.0243)	(0.0291)	(0.0290)
Second order serial correlation (p- value)	.58255	.74423	.70109	.71706	.71749
	(0.5602)	(0.4567)	(0.4832)	(0.4733)	(0.4731)
Sargan Test (p-value)	(0.9874)	(0.9996)	(0.9994)	(0.9975)	(0.9964)
Observations	429	392	392	392	391

Notes: The notes of the table are the same as Table 5.2.

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