

SIZE OF GOVERNMENT AND ECONOMIC GROWTH

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“My views on government spending can be summarized by the following parable. If you spend your own money on yourself, you are very concerned about how much is spent and how it is spent. If you spend your own money on someone else, you are still very much concerned about how much is spent, but somewhat less concerned about how it is spent. If you spend someone else’s money on yourself, you are not too concerned about how much is spent, but you are very concerned about how it is spent. However, if you spend someone else’s money on someone else, you are not very concerned about how much is spent or how it is spent.”

—Milton Friedman

Background

In economic literature, *size of government* is usually understood to mean its *relative metrics*: share of employees in the government sector in overall employment; share of assets owned by government in total national assets; share of output generated by government-owned businesses in total output; share of government investments in national investments; share of government spending in the gross domestic product. It is less often that the term ‘size of government’ is applied to its *absolute metrics*, i.e. absolute number of government employees (strength of armed forces), absolute size of government assets, or absolute size of government spending.

This paper reviews the impact of the relative size of government on rates of economic growth. Several questions may be formulated within the context of this discussion: Is there any robust relationship between size of government and economic growth rates? Is this relationship of a linear nature? If it is, would it be negative or positive? If it is not, what would be the format of this relationship? How does its nature manifest itself under different conditions? Is there an optimal size of government in terms of maximizing rates of economic growth? If so, what should be the size of government? Can any advice be formulated to the authorities regarding the desirable (optimal) size of government?

There is a vast amount of literature focusing on the negative relationship between size of government and economic growth.¹ Some of these papers offer views on the estimated optimal

¹ Bologna C. Summarizing the 1990-s: reconciliation, stability and economic growth. In: Paths of Economic Growth. The International Experience, Moscow, Delovoy Express, 2001; Veder R. Twelve Government Policy Measures in the Interests of Economic Growth. In: Paths of Economic Growth. The International Experience; Gortney J. Creating an Environment Conducive to Maximum Rates of Sustained Economic Growth. In: Paths of Economic Growth. The International Experience; Stroup R., Gwartney J. The ABC of Economics. - Moscow, National Model of the Economy Institute, 1996; Alesina A. The Political Economy of High and Low Growth. Paper prepared for the Annual World Bank Conference on Development Economics, Washington, DC, 1997; Barro R., Lee J.-W. Losers and Winners in Economic Growth. - NBER Working Paper, April 1993, No 4341; Beach W. Why Taxes Affect Economic Growth. - Heritage Lectures, 1998, September 10, No 624; Begg D., Wyplosz Ch. How Big a Government? Paper presented at the 5th Dubrovnik Conference on Transition Economies, September 1999; Chu K., Schwartz G. Output Decline and Government Expenditures in European Transition Economies. - IMF Working Paper, June 1994, No 68; Commander S., Hamid D., Lee U.J. The Causes and Consequences of Government for Growth and Well-being. -The World Bank background paper for the World Development Report, 1997, April 3; Engen E.M., Skinner J. Fiscal Policy and Economic Growth. - NBER Working Paper, December 1992, No 4223; Freedom, Democracy and Economic Welfare. Ed. by M. Walker. Vancouver, The Fraser Institute, 1988; Grier K.B.,

size of government and suggest that its actual size should be reduced.² Some researchers believe there is insufficient evidence to prove the negative association between the size of government and the rates of economic growth.³

The authors of this paper have on several occasions noted the negative nature of the association between rates of economic growth and size of government for less developed countries, including Russia.⁴ Within the Russian economic discussion this position until recently has been

Tullock G. An Empirical Analysis of Cross-National Economic Growth, 1951-80. - *Journal of Monetary Economics*, 1989, v. 24; Grossman Ph.J. Government and Economic Growth: A Non-Linear Relationship. *Public Choice*, 1988, v. 56; Gwartney J.D., Lawson R., Block W. *Economic Freedom of the World. 1975-1995*. The Fraser Institute, 1996; Gwartney J.D., Lawson R. *Economic Freedom of the World. Vancouver, The Fraser Institute, 1997*; Gwartney J.D., Lawson R. *Economic Freedom of the World. 1998/1999 Interim Report*. Vancouver, The Fraser Institute, 1998; Gwartney J.D., Lawson R., Samida D. *Economic Freedom of the World. 2000 Annual Report*. Vancouver, The Fraser Institute, 2000; Gwartney J.D., Lawson R., Edwards C., Park W., de Rugy V., Wagh S. *Economic Freedom of the World. 2002 Annual Report*. Vancouver, The Fraser Institute, 2002; Gwartney J.D., Stroup R.L. *What Everyone Should Know about Economics and Prosperity*. The Fraser Institute, 1993; Gwartney J., Holcombe R., Lawson R. *The Scope of Government and the Wealth of Nations*. - *The Cato Journal*, Fall 1998, v. 18, No 2; Higgs R. *Eighteen Problematic Propositions in the Analysis of the Growth of Government*. - *The Review of Austrian Economics*, 1991, v. 5, No 1; *Index of Economic Freedom*. Washington, The Heritage Foundation, Annual Reports, 1995-2002; Kosterna U. *A Comparative Analysis of Fiscal Policy in Selected Central European Countries*. In: *Fiscal Policy in Transition*. CEPR, London, 1997; Landau D. *Government Expenditure and Economic Growth. A Cross-Country Study*. - *Southern Economic Journal*, 1983, v. 49, No 3, January; Landau D. *Government and Economic Growth in the Less Developed Countries. An Empirical Study for 1960-1980*. - *Economic Development and Cultural Change*, 1986, v. 35, No 1, October; Marsden K. *Links between Taxes and Economic Growth. Some Empirical Evidence*. - *World Bank Staff Working Papers*, 1983, No 605; Masson P., Michael M. *Long-Term Tendencies in Budget Deficits and Debt*. - *IMF Working Paper*, 1995, No 128, December; Peden Ed., Bradley M. *Government Size, Productivity and Economic Growth: The Post-War Experience*. - *Public Choice*, 1989, v. 61; Rothbard M. *Power and Market. Government and the Economy*, Institute for Human Studies. Mission, Kansas, 1970; Tanzi V. *Fiscal Policy and the Economic Restructuring of Economies in Transition*. - *IMF Working Paper*, 1993, No 22, March; Tanzi V., Schuknecht L. *Reforming Government in Industrial Countries*. - *Finance and Development*, 1996, September; Tanzi V., Tsiouris G. *Fiscal Reform over Ten Years of Transition*. - Paper presented at the 5th Dubrovnik Conference on Transition Economies, 1999, June 23-25; Tanzi V., Schuknecht L. *Public Spending in the 20th Century. A Global Perspective*. Cambridge University Press, 2000; *Unproductive Public Expenditures. A Pragmatic Approach to Policy Analysis*. IMF, Washington, 1995; Vedder R. *Economic Impact of Government Spending: A 50-State Analysis*. - *NCPA Policy Report*, April 1993, No 178, Dallas, Texas; Wildavsky A. *How to Limit Government Spending*. University of California Press, 1980; Wolf Ch. *Markets or Governments. Choosing between Imperfect Alternatives*. Cambridge, Mass, The MIT Press, 1993.

² Ran R. *Optimal Size of Government. What is it?* - *Beloruskaya Gazeta*, August 17, 1998; *The Budget, Taxation and Economic Growth*. - *US Congress, Growth and Prosperity Series*, 1999, v. 2, October; Chao J.C.P., Grubel H. *Optimal Levels of Spending and Taxation in Canada*. In: *How to Use the Fiscal Surplus. What Is the Optimal Size of Government?* Ed. by H. Grubel. Vancouver, The Fraser Institute, 1998; *Economic Growth and the Future Prospects of the US Economy*. - *US Congress, Growth and Prosperity Series*, 1999, v. 1, October; Gupta S., Leruth L, de Mello L., Chakravarti Sh. *Transition Economies: How Appropriate Is the Size and Scope of Government?* - *IMF Working Paper*, 2001, No 55, May; Mitchell D. *Reducing the Size and Scope of Government*. In: *The Supply-Side Revolution: 20 Years Later*. US Congress, March 2000; Scully G.W. *What Is the Optimal Size of Government in the United States?* - *NCPA Policy Report* 1994, No 188, November; Scully G.W. *Measuring the Burden of High Taxes*. - *NCPA Policy Report* 1998, No 215, July; Scully G.W. *Economic Freedom, Government Policy and the Trade Off between Equity and Economic Growth*. Manuscript, 1999; Smith D.B. *Public Rags or Private Riches? High Public Spending Makes Us Poor*. London, Politeia, 2001; Tanzi V., Schuknecht L. *Can Small Governments Secure Economic and Social Well-Being?* In: *How to Use the Fiscal Surplus. What is the Optimal Size of Government?* Ed. by H. Grubel. Vancouver, The Fraser Institute, 1998.

³ Gerson Ph. *The Impact of Fiscal Policy Variables on Output Growth*. - *IMF Working Paper*, 1998, No 1, January; Fisher S., Sahay R., Vegh C.A. *From Transition to Market. Evidence and Growth Prospects*. - *IMF Working Paper*, 1998, No 52, April; Roll R., Talbott J. *Why Many Developing Countries Just Aren't*; Sala-I-Martin X. *15 Years of New Growth Economics: What Have We Learnt?* Columbia University, Discussion Paper, 2002, No 0102-47, April.

⁴ Illarionov A. *Only a Sound Economy Can Guarantee Decent Standards of Living*. - *Finansoviye Izvestiya*, November 16, 1995; *Models of Economic Growth and Russia*. - *Voprosy Ekonomiki*, 1996, No 7; *Excessive Government Spending is Hampering Economic Growth*. - *Finansoviye Izvestiya*, August 22, 1996; *The Burden of Government*. - *Voprosy Ekonomiki*, 1996, No 9; *Government in Russia is Twice the Size that the Domestic Economy Can Sustain*. - *Izvestiya*, November 15, 1996; *Effectiveness of Fiscal Policy in Russia in 1994-1997*. - *Voprosy Ekonomiki*, 1998, No 2; *The Secret of the Chinese Economic Miracle*. - *Voprosy Ekonomiki*, 1998, No 4;

viewed with certain criticism, including by researchers with diverse political affiliations and representing various schools of economic thought.⁵ In some recently published research papers, however, their authors have indicated, at least, the undesirability of expanding the size of government in Russia.⁶

In order to proceed with empirical analysis we first need to define our measure of the relative size of government. Share of government consumption in GDP⁷ is one indicator often used in research, and it has obvious merits from the perspective of international comparisons, because it can be derived from the national accounts for most of modern economies. However, it

The Myths and Lessons of the August Crisis. - *Voprosy Ekonomiki*, 1999, Nos 9-10; How Russia Lost the XXth Century. - *Voprosy Ekonomiki*, 2000, No 1; How to Make 100 Trillion Dollars. - *Ekspert*, February 28, 2000, No 8; Economic Freedom and Wealth of Nations. - *Voprosy Ekonomiki*, 2000, No 4; Pivovarova N. The Role of Government in Macroeconomic Development. Moscow GU-VShE, 1996; Economic and Social Policy Issues, IEA Bulletins: Fiscal Budget and Economic Growth, September 17, 1996; Government Expenditures and Economic Growth, November 14, 1996; What Should the Fiscal Budget Be? October 6, 1997; How to Encourage Economic Growth? February 25, 1998; The Mystery of the Chinese Economic Miracle, March 25, 1998; Criteria of Economic Security. Issues 1 and 2, May 22 and 29, 1998; Economic Freedom in the World. Annual Report - 2000, January 11, 2000.

⁵ Abalkin L. The Rationale of Economic Growth. Moscow: RAS Economics Institute, 2002; Belchuk A., Friedman L. Liberal Fundamentalism. - *Nezavisimaya Gazeta*, May 13, 2000; Valentinov B. Slandered Dream. - *Sovetskaya Rossiya*, December 8, 2001; Gavrilentov E. The Russian Economy: Macroeconomic Policy Outlook. - *Voprosy Ekonomiki*, 2000, No 4; Gavrilentov E. Quality and Quantity. - *Ekspert*, June 3, 2002, No 21; Gaydar E. Liberalization and Stabilization: Five Years Later. - *IEPP Research Papers*, 1997, No 4P, pp. 8—11; Glazyev S. A 'Good Gref!' Economy. - *Tribuna*, June 7, 2000; Glazyev S. Some High-Ranking People Are Baring It All Like Bimbos. - *OPEC.RU*, July 25, 2001; Goreglyad V. The Fiscal System and the Country's Economic Potential. - *Voprosy Ekonomiki*, 2002, No 4; Greenberg R. Ten Years of Systemic Transformation. - *Nezavisimaya Gazeta*, December 22, 1999; Greenberg R. Pragmatists from the East. - *Ekspert*, February 14, 2000, No 6; Greenberg R. Ten Years of Systemic Market Transformations in Central and Eastern Europe and Russia: Summary and Lessons. In: *The Russian Economy: The Transformation Experience of the 1990s and Development Outlook*. Moscow, 2000; Gurvich E.T. Government Policy of Promoting Economic Growth. In: *Macroeconomic Policy Instruments for Russia*. Moscow: TEIS, 2001; Deikin A. The Benefit of Dignity. - *Vremya MN*, November 14, 2001; Dubinin S. We Are Turning Rubles into Candy Wrappers with Our Own hands... - *Novoye Vremya*, August 11, 2002, No 32; Yershov M. Stereotypes in Economic Policy. - *Voprosy Ekonomiki*, 2001, No 12; Ivanter A. The Rising Tide. - *Ekspert*, April 2, 2001, No 13; Klepach A., Smirnov S., Pukhov S., Ibragimova D. Russia's Economic Growth: Ambitions and True Promises. - *Voprosy Ekonomiki*, 2002, No 8; Kovalishin E. The Side-Effects of a Surplus. - *Ekspert*, August 19, 2002, No 30; Mau V. Liberalism Is Here to Stay. - *Ekspert*, March 20, 2000, No 11; Melyantsev V., Friedman L. The Robustness of International Comparisons. - *Nezavisimaya Gazeta*, November 10, 1997; Nekipelov A. A Deceptive Recovery. - *Ekspert*, August 16, 1999, No 30; Menshikov S. A Perspective of Reforms and Economic Management. - *Voprosy Ekonomiki*, 1997, No 6; A Paralysis of Willpower. - *Ekspert*, August 19, 2002, No 30; Plyshevsky B. The Statistical Substantiation of Liberalization. - *Voprosy Ekonomiki*, 1999, No 12; Popov V. Good Policy, Bad Outcome. The Reasons Behind the Difference in The Transformation Slump. In: *Financial Instability and the Long-Term Outlook for Market Transformations in Russia*. Moscow, 1999; Popov V. Shock Therapy Against Gradualism: Ten Years Later. - *Ekspert*, August 28, 2000, No 31; Rogov S. Government and Market American Style. - *Nezavisimaya Gazeta*, February 8, 2000; Ulyukaev A. Liberalism and Socialism. - *Otkrytaya Politika*, 1999, No 7-8; Ulyukaev A. The Monistic Perspective of Economic Freedom. - *Ekspert*, April 17, 2000, No 15; Friedman L., Vidyasov M., Melyantsev V. Government Expenditures and Economic Growth. - *Mirovaya Ekonomika I Mezhdunarodniye Otnosheniya*, 1999, No 10 and 11; Khandruyev A. The Default Need not Have Happened. - *Versty*, August 16, 2001; Cherkovets O. Now We've Done It! - *Sovetskaya Rossiya*, September 22, 1998; Yakobson L. Iceberg on the Way to Portugal. - *Finansovyye Izvestiya*, July 2, 2002.

⁶ Gavrilentov E. The Main Threat to the Russian Economy is Slow and Inconsistent Reform. - *Izvestiya*, August 1, 2002; Gaydar E. The Tactics of Reform and the Economic Burden of Government. - *Voprosy Ekonomiki*, 1998, No 4; Mau V. Post-Communist Russia in the Post-Industrial World: The Challenges of Catch-Up Development. - *Voprosy Ekonomiki*, 2002, No 7; Ustinov A.V. The Effect of Structural Reforms on the Fiscal Budget of the Russian Federation in the Long-Term. In: *Instruments of Macroeconomic Policy for Russia*. Moscow: TEIS, 2001; Sharipova E. Effectiveness of Government Expenditures in Russia. Special Report 4. Review of Russian Economy, 2001; Yasin E. The Functions of Government in a Market Economy. - *Voprosy Ekonomiki*, 1997, No 6; Yasin E. Defeat or Retreat? (Russian Reforms and the Financial Crisis). - *Voprosy Ekonomiki*, 1999, No 2.

⁷ E.g.: Barro R. Economic Growth in a Cross-Section of Countries. - *Quarterly Journal of Economics*, 1991, vol. 106, No 2; Barro R. Determinants of Economic Growth. MIT Press, 1997; Barro R., Sala-I-Martin X. *Economic Growth*. McGraw Hill, 1995.

represents only a small fraction of government expenditures. The scope of activities pursued by a modern government are more fully (albeit not exhaustively) reflected by the aggregate redistribution of financial resources through the fiscal budget. This is the reason why in this paper we have selected the *share of government spending in GDP* as the measure of the relative size of government. Government spending is defined as spending by the general government. Therefore, it takes into account all fiscal spending in the economy, including central government, regional and local governments, and extra-budgetary funds.

The relevant estimations were made by the Institute for Economic Analysis using IMF data⁸ and national statistics data for a number of countries. Most of the estimations were done in 1996 and in 1998-1999. In 2002 the statistical database for the research was updated, some additional estimations were made, and the criteria for country groupings and descriptions of previously identified relationships were revised.

The Size of Government Model

The most robust statistical patterns evidencing the negative association between rates of economic growth and size of government, as identified in various research papers, were obtained for the OECD countries.⁹ In this paper the pattern is reproduced for the OECD countries in 1960-2000¹⁰ (Figure 1). Observations which are characterized by a lower share of government spending in GDP, as a rule, display higher rates of economic growth. And the reverse is true for observations with larger sizes of government, where weaker rates of economic growth are registered. *Ceteris paribus*, a 1 percentage point increase in the share of government spending in GDP in the OECD countries over the last four decades was accompanied by about a 0.1% decline in average annual GDP growth rates.

Figure 1

Government Spending and Economic Growth in OECD Economies, 1960-2000

(24 economies, 94 observations)
Average annual GDP growth rates, in %
Government spending, in % of GDP

When considering a wider range of observations, we see how the robustness of the pattern under discussion declines, and how its explanatory ability becomes weaker with impaired quality of the statistical parameters of the equation underlying the trend line, even though the latter's slope continues to remain negative (Figure 2). Obviously, some researchers who had seen these models have reached the conclusion that there was no robust relationship between size of government and rates of economic growth. We find these conclusions to be premature. The impaired quality of the pattern in question can be explained by large irregularities within the statistical data range we are reviewing. It needs to be made more consistent. For this we need to define the factors which affect the size of government, and use these factors to subdivide the range into more uniform groups, and then check the latter for any evidence of the desired association between size of government and rates of economic growth.

Figure 2

Government Spending and Economic Growth, 1991-2000

⁸ IMF International Financial Statistics, various issues; IMF Government Finance Statistics, various issues; IMF World Economic Outlook, various issues; IMF WEO Statistical Database.

⁹ E.g., Gwartney J., Lawson R., Holcombe R. *The Size and Functions of Government and Economic Growth*. Prepared for Joint Economic Committee, US Congress. Washington, 1998, April.

¹⁰ Each observation is an annual average for one of the 24 initial OECD members over one of the decades: 1961-1970, 1971-1980, 1981-1990, and 1991-2000. Within the overall set each country may be represented by four observations. Sources: OECD Database; OECD Economic Outlook, various issues.

(166 Economies)
 Average annual GDP growth rates, in %
 Government spending, in % of GDP

The general government fiscal budget metrics – share of total government revenues in GDP and share of total government expenditures in GDP – were examined as a dependent variable in the size of government model. Independent variables included 46 potential predictors (see Appendix). Relevant statistical data were collected for 1991-2000 for 172 countries around the world. Data ranges for 1992-2000 were used for countries which emerged within the territories of the former USSR and former Yugoslavia. Appropriate transformations were used vis-à-vis data with obvious asymmetries (logarithm transformations and involution). Regression analysis was made using the SPSS 10.1 statistical application.

The Appendix contains the parameters for paired regression equations, which define the effect of predictors on the relative size of government. Obtained findings indicate that the size of government does not significantly depend on such indicators as exit to and from open seas, availability of agricultural land, population density, religious diversity of the population, absolute size of GDP, exports and imports of oil, administrative geography of the country, rate of the inflation tax, or the terms of trade index.

Figure 3
Level of Economic Development and Government Revenues, 1991-2000
 (166 Economies)
 Government Revenues, in % of GDP
 Lg (per capita GDP, in USD at PPP in 1993 prices)

Size of government is best described by the level of economic development (logarithm of per capita GDP at purchasing power parity) (Figure 3), which is consistent with Wagner's Law.¹¹ Close correlation with size of government is also demonstrated by some demographics, including, among others, the share of population above the age of 65 in total population. However, for the latter indicator the normal probability of residuals was weaker. For this reason the level of economic development was selected as the first predictor ($R^2 = 0.416$). Other predictors with significant impact on size of government (distance to the equator, climate, demographics, share of services in GDP, share of employment in the services sector in total employment, rate of urbanization, relative price levels, rate of government centralization, diversity indices) displayed close correlation to the level of economic development. They lost their significance once the level of economic development was incorporated into the model.

Of the remaining set of variables any improvements in the parameters of the model were only caused by the inclusion of the population size (logarithm of average annual size of population). The negative sign preceding this factor indicates the scale effect. Eventually we arrived at the following regression model for the share of government expenditures in GDP:

$$REV = -15.300 + 6.723 \times LnGDPpc - 1.357 \times LnPOP + \varepsilon, \quad (1)$$

(-2.541) (11.081) (-4,013)

where: *REV* is share of government revenues in GDP; *LnGDPpc* is the logarithm of average annual per capita GDP at purchasing price parity in 1993 prices; *LnPOP* – the logarithm of average annual population sizes, ε defines residuals; *t*-statistics in parenthesis.

The model is statistically significant at 99% confidence interval. Multiple $R^2 = 0.47$. Standard

¹¹ Wagner A. Three Extracts on Public Finance. In: Classics in the Theory of Public Finance. Ed. by R.A. Musgrave, A.T. Peacock. New York, St. Martin's Press, 1967, p. 1-15.

error of estimation = 8.33. Therefore, one may claim that about 47% of the variability of the share of government revenues in GDP is caused by the variability of two factors: level of economic development and size of population.

When the model was reproduced for the share of government expenditures in GDP the features of the regression disimproved:

$$EXP = -0.935 + 5.398 \times LnGDPpc - 1.311 \times LnPOP + \varepsilon, \quad (2)$$

(-0.141) (8.097)
(-3.527)

where: *EXP* is the share of government expenditures in GDP; *LnGDPpc* is the logarithm of average annual per capita GDP at purchasing power parity in 1993 prices; *LnPOP* is the logarithm of average annual size of population; ε defines residuals; *t*-statistics in parenthesis.

The model is statistically significant at 99% confidence interval. Multiple $R^2 = 0.33$. Standard error of estimation = 9.16.

The study of how each of the 46 predictors affects the share of government expenditures in GDP revealed that these relationships on all counts prove to be weaker than in the government revenues model. The reviewed indicators, which offer a multi-faceted description of how government exists and operates, have failed to produce any indicators allowing for the development of a model which would provide for a more accurate description of the level of government expenditures compared to the model for the level of government revenues. This is, obviously, not surprising, because government expenditures and government revenues are apart by a whole fiscal deficit. The size of the latter is to a greater extent determined by the features of policies pursued by the authorities, rather than the indicators under review. It follows that the objective endogenous parameters, i.e. level of economic development of a country and the size of its population, offer a more accurate prediction of the share in GDP of government revenues, rather than government expenditures. In view of this we decided to use the model for the share of government revenues in GDP.

The values obtained by using the model were assumed as model levels of government expenditures. During the formulation of the model the parameters for 6 countries¹² were recognized to be outliers and the countries were removed from further research.

The 166 economies remaining in the set were ranked according to how much their actual share of government expenditures in GDP deviates from the values generated by the model, and were then pooled into three country groups with the same number of countries each (Table 1). Group 1 includes economies with the least deviation between actual and modeled values for government expenditures, Group 2 includes economies with medium-sized deviations, while Group 3 includes countries with the largest deviations. This grouping helps identify a visible negative association between the values of derived deviations and the rates of economic growth. The average of the share of government revenues in GDP for Group 1 is 37.5% lower than in Group 3, and the share of government expenditures in GDP is 41.5% lower. At the same time, rates of economic growth in economies within Group 1 are almost 3.5-fold higher (4.06 and 1.19%, respectively), than for economies in Group 3. The chart for this pattern is shown in Figure 4. Whenever actual government expenses deviate from modeled values by 1 percentage points (all others being equal), this is accompanied by a 0.14% decline in average annual GDP growth rates.

¹² Angola, Brunei, Lesotho, Sao-Tome and Principe, Equatorial Guinea and Eritrea. The aggregate population of these countries accounts for 0.3% and their aggregate GDP accounts for 0.05% of the population and GDP of the 172 countries in the reference set.

Table 1

Size of Government and Economic Growth, Based on Deviation between Actual and Modeled Government Expenditures (for 166 countries)

Country Groups, based on extent of deviation between actual and modeled values	Deviation between actual and modeled expenditures	Government revenues, in % of GDP	Fiscal deficit, in % of GDP	Government expenditures, in % of GDP	GDP growth rates, in %	Memoranda:		
						Population, millions	Per capita GDP, in USD, PPP in 1993 prices	Number of countries
Total	3.7	28.9	-3.7	32.7	2.53	33.4	7,092	166
Group 1	-6.6	23.2	-1.5	24.7	4.06	48.5	9,361	55
Group 2	4.0	26.6	-4.4	31.0	2.35	17.4	4,658	56
Group 3	13.8	37.1	-5.2	42.3	1.19	34.5	7,300	55
Ratio of Group 1 to Group 3, %	-48.0	62.5	29.6	58.5	340.9	140.3	128.2	

Figure 4

Rates of Economic Growth Depending on Deviation between Actual and Modeled Government Expenditures in 1991-2000

(for 166 economies)

Average annual GDP growth rates, %

Deviation between actual and modeled government expenditures, percentage points

Dissection of Original Set into Homogenous Groups

In order to dissect the set of observations into more homogenous groups it was required to identify quantitative criteria for each of the factors included in the size of government model. Two quantitative criteria were selected for the level of economic development (per capita GDP at purchasing power parity), i.e. USD 3,000 and USD 9,000 in 1993 prices; and three criteria for population size: 1 million, 5 million, and 20 million. A consistent application of these quantitative criteria to the general set consisting of 166 economies helped arrive at the following groupings - in terms of *economic development* three groups were identified: under-developed countries (with per capita GDP of less than USD 3,000), less developed countries (between USD 3,000 and USD 9,000), and developed countries (above USD 9,000); in terms of *population size* four groups were identified: extra-small countries (with populations below 1 million), small countries (1 to 5 million), medium-sized countries (5 to 20 million), and large countries (above 20 million).

Simultaneous application of quantitative criteria for both factors allowed to break the set down into 12 groups: under-developed extra-small economies, under-developed small economies, under-developed medium-sized economies, under-developed large economies, less developed extra-small economies, less developed small economies, less developed medium-sized economies, less developed large economies, developed extra-small economies, developed small economies, developed medium-sized economies, developed large economies (Table 2). Each group includes between 6 and 30 economies.

Table 2

Size of Government by Country Groups, Depending on Level of Economic Development and Size of Population (20 groups, 166 countries)

No.	Countries grouped by:	Population Size				Total
		Below 1 million	Between 1 and 5 million	Between 5 and 20 million	Above 20 million	

Per capita GDP, in USD, at PPP in 1993 prices					
Below USD 3,000	1	2	3	4	13
Government Revenues, in % of GDP	33.2	24.6	18.9	19.7	21.8
Fiscal Deficit, in % of GDP	-5.5	-8.0	-4.7	-4.5	-5.5
Government Expenditures, in % of GDP	38.6	32.6	23.6	24.2	27.3
Number of Countries	6	16	30	14	66
Between USD 3,000 and USD 9,000	5	6	7	8	14
Government Revenues, in % of GDP	34.0	30.2	29.8	26.2	29.8
Fiscal Deficit, in % of GDP	-3.4	-3.0	-3.4	-3.3	-3.2
Government Expenditures, in % of GDP	37.4	33.1	33.2	29.5	33.0
Number of Countries	13	16	10	17	56
Above USD 9,000	9	10	11	12	15
Government Revenues, in % of GDP	35.4	38.1	41.2	37.8	38.7
Fiscal Deficit, in % of GDP	-2.4	1.2*	-2.4	-2.8	-1.7
Government Expenditures, in % of GDP	37.8	36.8	43.6	40.5	40.3
Number of Countries	8	10	16	10	44
Total	16	17	18	19	20
Government Revenues, in % of GDP	34.3	29.9	27.2	26.8	28.9
Fiscal Deficit, in % of GDP	-3.5	-3.9	-3.8	-3.6	-3.7
Government Expenditures, in % of GDP	37.8	33.8	31.0	30.4	32.7
Number of Countries	27	42	56	41	166

* Surplus

Note: figures in upper left corners indicate group number.

An analysis of the mean values of fiscal burden for these groups confirms the effectiveness of patterns identified during the formulation of the size of government model. *The size of government tends to increase as an economy graduates to a higher level of economic development.* The share of government revenues in GDP increases from an average of 21.8% in under-developed economies, to 29.8% in less developed and 38.7% in developed economies. In a similar but more gradual fashion the share of government expenditures in GDP increases from 27.3% to 33.0% and 40.3%, respectively. The slower growth in expenditures is caused by the contraction, rather than ballooning of fiscal deficits, from 5.5% of GDP in under-developed economies, to 3.2% in less developed, and 1.7% of GDP in developed countries. In other words, *with higher levels of economic development fiscal policy adopts a more responsible stance, and its quality, as a rule, improves.*

The size of government tends to decrease as the size of population increases. The share of government revenues in GDP decreases from an average of 34.3% in extra-small economies to 29.9% in small economies, 27.2% in medium-sized countries and 26.8% in large countries. In a similar fashion the share of government expenditures in GDP declines from 37.8% to 33.8%, 31.0% and 30.4%, respectively. There is no robust trend to represent how the size of the budget deficit relates to the size of the population.

In view of the patterns formulated above the smallest size of government is found in under-developed countries with medium-sized and large populations (share of government revenues in GDP is 18.9-19.7%, share of government expenditures in GDP is 23.6-24.2%), and the largest is found in developed economies (35.4-41.2 and 36.8-43.6% of GDP, respectively).

The existence of these patterns allows us to predict with a certain degree of accuracy the size of government in an economy with one or another level of development and one or another size of population, and, therefore, to calculate the deviation of actual values of size of government from values derived from the model. We can now focus on the relationship between size of government and rates of economic growth within the groups of countries with more or less uniform qualitative characteristics.

The results of a linear regression analysis (indicated in Table 3) show that this relationship does exist for some of the country groups. It does, however, manifest certain very specific peculiarities.

1. The complete set of countries is divided into two unequal parts comprising countries with populations below 1 million (27 countries)¹³ and above 1 million (139 countries). The patterns which apply to each of the two groups are rather diverse and need to be approached separately.

Table 3

Parameters of Regressions Linking rates of GDP Growth to Size of Government, by Country Groups (20 groups, 166 countries)

No.	Countries grouped by:	Population Size					Total
		Below 1 million	Between 1 and 5 million	Between 5 and 20 million	Above 20 million		
Per capita GDP, in USD, at PPP in 1993 prices							
Below USD 3,000		1	2	3	4	13a	
Constant, <i>a</i> (<i>t</i> -statistics)		-3.4 (-0.5)	3.53 (0.71)	6.5 (2.68)	11.0 (5.54)	7.84 (5.23)	
Slope of Curve, <i>b</i> (<i>t</i> -statistics)		0.16 (0.91)	-0.12 (-0.79)	-0.2 (-2.03)	-0.32 (-4.11)	-0.24 (-4.37)	
Coefficient of Determination, <i>R</i> ²		0.17	0.04	0.13	0.58	0.25	
Number of Countries		6	16	30	14	60	
Between USD 3,000 and USD 9,000		5	6	7	8	14a	
Constant, <i>a</i> (<i>t</i> -statistics)		3.29 (1.54)	6.2 (1.94)	8.29 (4.7)	7.31 (3.9)	7.15 (5.59)	
Slope of Curve, <i>b</i> (<i>t</i> -statistics)		0.01 (0.11)	-0.11 (-1.22)	-0.18 (-3.56)	-0.16 (-2.65)	-0.15 (-3.83)	
Coefficient of Determination, <i>R</i> ²		0.00	0.10	0.61	0.32	0.26	
Number of Countries		13	16	10	17	43	
Above USD 9,000		9	10	11	12	15a	
Constant, <i>a</i> (<i>t</i> -statistics)		-2.1 (-0.5)	7.23 (3.02)	6.47 (4.15)	8.05 (5.06)	7.39 (7.42)	
Slope of Curve, <i>b</i> (<i>t</i> -statistics)		0.17 (1.56)	-0.07 (-1.16)	-0.08 (-2.33)	-0.12 (-3.23)	-0.1 (-4.12)	
Coefficient of Determination, <i>R</i> ²		0.29	0.14	0.28	0.57	0.33	
Number of Countries		8	10	16	10	36	
Total		16	17	18	19	20a	
Constant, <i>a</i> (<i>t</i> -statistics)		1.01 (0.51)	3.89 (1.57)	3.77 (3.54)	7.46 (6.63)	4.93 (6.12)	
Slope of Curve, <i>b</i> (<i>t</i> -statistics)		0.07 (1.28)	-0.06 (-0.83)	-0.05 (-1.58)	-0.15 (-4.25)	-0.08 (-3.41)	
Coefficient of Determination, <i>R</i> ²		0.06	0.02	0.04	0.32	0.08	
Number of Countries		27	42	56	41	139	

Note: figures in upper left corners indicate group numbers.

2. For countries with populations below 1 million we observe an overall positive relationship between size of government and rates of economic growth. For Group 9 (extra-small developed countries) the relationship proves to be statistically significant (even with 8 observations within the group). In general, for all extra-small economies (Group 16) the relationship is positive, but statistically insignificant.

3. For countries with populations above 1 million we observe an overall negative relationship between size of government and rates of economic growth.

4. This negative relationship is most clearly evident for groups located in the lower right corner of Table 3 and those gravitating towards it, i.e. Group 7, Group 8, Group 11, Group 12, and also in Group 4 (background shaded in gray). In other words, there exists a negative relationship between economic growth and size of government in all large economies, and also in medium-sized economies with medium and high levels of development.

5. As we move from the lower right corner of Table 3 to the upper left corner of its right-hand side (disregarding extra-small countries) the negative association between size of government and rates of economic growth gradually becomes weaker. We see no statistically robust relationship within groups located in the upper left corner of the right-hand side of the table and within those gravitating towards it, i.e. Group 2, Group 3, Group 6, and Group 10,

¹³ Total population of 27 extra-small nations is 9.4 million and total GDP is USD 83.4 billion, or 0.16% and 0.24%, respectively, of total population and GDP for the 166 countries covered.

that is, in all small and medium-sized underdeveloped countries. Nevertheless, in these groups as well the trend line displays a downward slope.

6. In addition to the aforementioned groups a statistically significant negative relationship between rates of economic growth and size of government is observed for all groups of countries with populations above 1 million, grouped by level of development: underdeveloped countries (13a), less developed countries (14a), and developed countries (15a), and also within the group which includes all countries with large populations (19).

7. An important feature of the pattern under discussion is how the rate of growth/size of government elasticity ratio (slope of the trend line) changes by groups of countries. The maximum value of the elasticity ratio (-0.32) is observed in Group 4 (large poor countries). As we move away from this group in both directions (with increases in levels of development and population sizes) its value decreases. With increasing levels of development it declines to -0.16 in Group 8 (large less developed countries), and to -0.12 in Group 12 (large developed countries). As the size of population decreases it contracts to -0.20 in Group 3 (medium-sized under-developed countries), and to -0.12 in Group 2 (small under-developed countries). When the levels of development increase and population sizes decline both at the same time, it contracts to -0.18 in Group 7 (medium-sized less developed countries), and to -0.07 in Group 10 (small developed countries). Within the groups of extra-small countries the ratio takes on positive values, and Group 9 (extra-small developed countries) the positive relationship, as already noted above, becomes statistically significant.

8. Similar trends in the rate of growth/size of government elasticity ratio changes are evident for other sub-groups as well. The elasticity ratio contracts as follows: within small and medium-sized countries – when levels of development improve, and within less developed countries and developed countries – when population sizes decline.

9. It follows then, that the relationship between size of government and rates of economic growth across the full set of observations displays a very distinct non-linear nature. Group 4 and Group 9 find themselves at the two extremes: Group 4 shows the strongest negative relationship, while Group 9 shows the strongest positive relationship. As we move from the upper right corner of the table (Group 4) to its lower left corner, that is, as the level of economic development improves and the size of population becomes smaller, the negative association grows weaker. In Group 9 the relationship adopts a positive sign.

10. Calculations also show that in general for countries with populations above 1 million rates of economic growth become more dependent on the share of government expenditures in GDP, rather than the share of government revenues in GDP.

Changes in the fiscal burden within qualitatively uniform groups result in tangible changes in rates of economic growth. For those groups where we have identified a statistically robust relationship, its significance increases with lower levels of economic development and higher population sizes. Whereas in developed countries a 1 percentage point increase in the size of government, *ceteris paribus*, implies a 0.08-0.12% decline in average annual rates of economic growth, in less developed nations it implies a reduction of 0.16-0.18%, and a full 0.32% contraction in under-developed countries. Consequently, one may claim that from the perspective of economic growth rates any deviation between actual and predicted size of government has positive implications for extra-small developed countries, moderately negative implications for small developed nations, and most negative implications for large poor countries. Our analysis proves that the strong negative relationship between rates of economic growth and size of government within the OECD group of countries (Figure 1) is explained by the strong homogeneity within this set.

Optimal Size of Government

The existence of a statistical connection between size of government and rates of economic growth allows us to estimate the size of government for each of the groups under review, including its minimum size, maximum size, critical size, excessive size, and optimal size, and also to determine economic growth rates, which correspond to these values.

Minimum size of government is defined as the mean value of the share of government expenditures in GDP in countries, which show the smallest values for this indicator within the

group and comprise one fifth (quintile) of the overall number of countries in the group. *Maximum size of government* is defined as the mean value of the share of government expenditures in GDP in countries, which show the highest values for this indicator within the group and comprise one fifth (quintile) of the overall number of countries in the group. *Critical size of government* is defined as the value of government expenditures in GDP when the rate of economic growth derived from the growth/size of government linear regression model for the given group equals zero. *Excessive size of government* is defined as share of government expenditures in GDP above critical values. *Optimal size of government* is defined as the mean value of the share of government expenditures in GDP in countries, which comprise one fifth (quintile) of the overall number of countries in the group ranked according to share of government expenditures in GDP, and showing the highest rates of economic growth compared to any other quintiles within the group. The derived numbers (Table 4) allow us to formulate a number of observations.

1. The general patterns for fiscal development, which have been formulated above, retain their significance vis-à-vis all derived indicators. Minimum, maximum, critical, mean, and optimal sizes of government, as a rule, increase with higher levels of economic development and decline with higher sizes of population. E.g., as the level of development increases the minimum size of government also increases from 15.0% of GDP in under-developed economies to 17.1% in less developed economies, and to 24.0% of GDP in developed economies. With stronger population sizes they decline from 27.3% of GDP in extra-small countries to 20.2% in small countries, and to 15.7-15.8% of GDP in medium-sized and large countries.

2. In terms of the impact which the size of government has on rates of economic growth, the division of the overall set into two parts, i.e. countries with populations below 1 million and countries with populations above 1 million, is reaffirmed.

3. Within the group of extra-small countries (Group 16) countries with the largest size of government show higher rates of economic growth (4.2% per annum, on average), than the countries with the smallest size of government (1.9%).

4. In countries with populations above 1 million and irrespective of how robust is the statistical relationship between size of government and economic growth rates within one or another group, its actual rates in countries with minimum size of government are higher than in countries with maximum size of government. E.g., within the overall set of observations for 139 countries (Group 20a) the average annual economic growth rates in countries with minimum size of government were 4.3%, in countries with maximum size of government – 1.5%, with 4.4% and -1.0% in under-developed countries (Group 13a), 4.5% and 1.7% in less developed economies (Group 14a), and 5.8% and 2.4% in developed countries (Group 15a), respectively.

5. In country groups based on size of population criteria the sign of the relationship reverses as population grows. The group of extra-small countries (Group 16) with minimum size of government shows higher growth rates than countries with maximum size of government (4.2% and 1.9% on average per annum). Within the group of small countries (Group 17) growth rates are the same for countries with minimum and maximum size of government (3.1% and 3.1%). Within the group of medium-sized countries (Group 18), countries with minimum size of government enjoyed growth at twice the rate of countries with maximum size of government (3.9% and 1.9%). Finally, within the group of large countries (Group 19), countries with minimum size of government displayed growth rates by an order of magnitude greater than in countries with maximum size of government (5.2% and 0.4%).

6. For those groups of countries where robust statistical relationships have been observed, the following size of government proves to be *critical*: around 35% of GDP for poor countries, approximately 46% of GDP for less developed countries, and about 73% of GDP for developed nations. In most cases, whenever the actual size of government exceeds its critical size (size of government becomes excessive), rates of economic growth turn negative.

7. For groups of countries which display statistically significant relationships the *optimal size of government* in 1991-2000 was: about 15% of GDP for under-developed countries, around 17% of GDP for less developed countries, and about 24% of GDP for developed economies. These findings are generally consistent with optimal size of government calculations done by J. Scully.¹⁴

¹⁴ According to J. Scully, tax to GDP ratios which resulted in maximization of economic growth rates in 1927-1988

8. The values for optimal size of government in all country groups (with the exception of extra-small economies) are significantly below both the maximum size and the average size of government by group. This suggests a substantial inflation of the actual size of government compared to its optimal size. As a result the actual rates of economic growth for the set of 139 countries on average turned out to be about half of the growth rates in countries with optimal size of government (2.3% and 4.3%, respectively). In some groups the difference between the average growth rates for a group and the rates of growth in countries with optimal size of government is even greater. In all the poor countries (Group 13a) growth rates averaged 1.6% per annum, with 4.4% in those, which maintained an optimal size of government; large poor countries (Group 4) displayed 7.1 and -2.2%. It is obvious that a substantial inflation of the actual size of government compared to its optimal size was one of the reasons behind the generally low rates of economic growth in these countries.

9. The significant gap between actual and optimal rates of economic growth caused by the difference in the actual and optimal size of government provides an indication of the room for potential acceleration of economic growth in many countries of the world.

were: in Denmark - 18.5%, in Great Britain – 25.2%, in Italy – 20.8%, in Sweden – 16.6%, in Finland – 18.9%, in the USA – 21.8% (in 1929-1989), in New Zealand – 19.7 (in 1927-1994). Scully J.W. Taxation and Economic Growth in New Zealand. Revised IRD Working Paper, March, 1996, No 14, Inland Revenue Department, Wellington.

Table 4

Size of Government and Economic Growth in 1991-2000 (20 country groups, 166 countries)

No.	Country Group			Average		Size of Government (Government Expenditures, in % of GDP)					GDP Growth Rates for Given Size of Government, %				
	By Per Capita GDP at PPP, USD in 1993 prices	By Population	Number of Countries in Group	Per Capita GDP at PPP, USD in 1993 prices	Population, million	(defined by quintile)		Critical	Average	Average-Minimum Deviation	(defined by quintile)		Critical	Average	Average-Minimum Deviation
						Min.	Max.				Min.	Max.			
1	Below 3,000	Below 1 mn	6	1,857	0.4	27.1	46.6	-	38.6	11.6	1.3	3.0	0.0	2,6	1,3
2		Between 1 and 5 mn	16	1,562	3.2	20.8	40.2	30.0	32.6	11.8	-0.5	-5.0	0.0	-0,3	0,2
3		Between 5 and 20 mn	30	1,453	10.1	15.1	32.2	32.4	23.6	8.5	3.9	0.4	0.0	1,8	-2,1
4		Above 20 mn	14	1,732	208.8	11.8	38.2	35.1	24.2	12.3	7.1	-2.2	0.0	3,5	-3,7
5	Between 3,000 and 9,000	Below 1 mn	13	5,353	0.3	28.3	50.8	-	37.4	9.1	2.3	3.5	0.0	3,5	1,3
6		Between 1 and 5 mn	16	4,629	3.0	17.3	42.9	54.7	33.1	15.8	4.5	2.7	0.0	2,4	-2,0
7		Between 5 and 20 mn	10	5,282	10.6	14.9	49.7	47.0	33.2	18.3	5.0	0.1	0.0	2,4	-2,6
8		Above 20 mn	17	5,680	65.7	18.2	41.5	44.8	29.5	11.3	4.1	-0.7	0.0	2,5	-1,6
9	Above 9,000	Below 1 mn	8	17,524	0.4	27.3	44.9	98.2	37.8	10.4	3.4	6.3	0.0	4,1	0,8
10		Between 1 and 5 mn	10	16,993	2.5	23.8	48.7	-	36.8	13.1	6.3	4.2	0.0	4,5	-1,8
11		Between 5 and 20 mn	16	17,096	10.9	21.4	58.5	80.9	43.6	22.2	6.0	2.1	0.0	3,0	-3,0
12		Above 20 mn	10	19,654	78.1	25.5	53.3	65.5	40.5	15.1	6.3	1.7	0.0	3,1	-3,2
13a	Below 3,000	All above 1 mn	60	1,547	54.6	15.0	38.4	32.8	26.1	11.2	4.4	-1.0	0.0	1,6	-2,8
14a	Between 3,000 and 9,000	All above 1 mn	43	5,197	29.5	17.1	38.6	48.4	31.7	14.7	4.5	1.7	0.0	2,5	-2,0
15a	Above 9,000	All above 1 mn	36	17,778	27.2	24.0	55.6	76.4	40.9	16.9	5.8	2.4	0.0	3,4	-2,3
16	All	Below 1 mn	27	8,182	0.3	27.3	48.8	-	37.8	10.5	1.9	4.2	0.0	3,5	1,6
17	All	Between 1 and 5 mn	42	6,404	3.0	20.2	44.0	65.7	33.8	13.6	3.1	3.1	0.0	1,9	-1,2
18	All	Between 5 and 20 mn	56	6,606	10.4	15.7	52.4	75.7	31.0	15.3	3.9	1.9	0.0	2,2	-1,7
19	All	Above 20 mn	41	7,740	117.6	15.8	47.7	50.4	30.4	14.6	5.2	0.4	0.0	3,0	-2,2
20a	All	All above 1 mn	139	6,880	39.8	16.7	48.6	60.4	31.7	15.0	4.3	1.5	0.0	2,3	-1,9
Memorandum: Russia in 1992-2001				4,736	146,9	33,3	51.9	37.9	40.2	6.9	7.2	-13.6	0.0	-2.8	-10.0

The nature of the relationship between the size of government and rates of economic growth is clearly visible when using data for Group 8: this group comprises less developed countries with large populations, and includes Russia. Rates of economic growth for this group are rather strongly dependent on size of government (Figure 5). Adjustments in the structure of the group, with the removal of an obvious outlier (Poland), make the negative relationship even more pronounced. By selecting a set of trend curves, which best describe the scatter of observations (ex Poland), we arrive at a second degree polynomial equation resembling an up-turned Latin *U* (Figure 6).

Figure 5

Size of Government and Economic Growth in Less Developed Countries with Large Populations in 1991-2000

(17 economies)

Average annual GDP growth rates, %

Government Expenditures, in % of GDP

Figure 6

The Economic Growth-Size of Government Curve in Less Developed Countries with Large Populations in 1991-2000

(16 economies)

Average annual GDP growth rates, %

Government Expenditures, in % of GDP

By solving the equation for maximum growth rates we arrive at a share of government expenditures in GDP equal to 20.9%. This *fiscal burden associated with maximum growth rates for the selected group may be defined as the optimal size of government for less developed countries with large populations*. The parameters of the curve are such that whenever the value for the share of government expenditures in GDP falls below 20.9% its expansion is, as a rule, associated with higher rates of economic growth (the ascending section of the curve). This *level of the size of government, when its expansion is accompanied by stronger rates of economic growth may be defined as necessary*.

As the size of government expands beyond its optimal range we see a consistent decline in the rates of economic growth (descending section of the curve). Within this range (between 21% and 36% of GDP) this size of government for less developed countries with large populations may be defined as *irrational*. When the share of government expenditures in GDP approaches 36% the average annual rates of economic growth become nil. This size of government may be defined as *critical*. Further increases in the size of government produce consistently negative values for average annual growth rates. This can be defined as *excessive size of government*.

It is easy to see how Russia with its significantly excessive fiscal burden stands out among other countries. Given that the critical values for size of government, which were determined based directly on Russian data (37.9% of GDP), are close to the critical values for size of government derived using Group 8 country data (36%-38% of GDP, respectively), all the actual metrics for the size of government in Russia appear to be substantially inflated. In 1992-2001 the average values for the fiscal burden were higher than for countries within Group 8 by 36% (40.2% and 29.5% of GDP, respectively), maximum values were 25% higher (51.9 and 41.5% of GDP), and minimum values were 83% higher (33.3% and 18.2% of GDP, respectively). The average values for Russia over the last decade are more than twice as large as the optimal size of government in Group 8 countries (40.2% and 18.2% of GDP, respectively). It is of little surprise, for this reason, that the deviation in the rates of economic growth also happened to be quite significant: minus 2.8% per annum on average for Russia, 2.5% per annum on average for Group 8 countries, and 4.1% on average for large less developed countries with optimal size of government.

Economic Growth Model

Square regression equations were developed for each of the country groups. Their parameters turned out to be more statistically significant, compared to the parameters of linear regression equations. Some trend curves produced by the square equations resembled the regular letter *U*, while others resembled an up-turned letter *U*. At first sight one might think that the trend curves indicate a lack of any uniform pattern. This, however, is wrong. The extrema of curves which resemble an up-turned *U* (maximum values), fall within the 6% to 29% of GDP range vis-à-vis size of government. Conversely, the extrema of the curves shaped like a regular *U* (minimum values), fall within the 38% to 65% of GDP range for the fiscal size of government. In other words the extrema of the up-turned *U*-like curves correspond to the maximum rates of economic growth and optimal size of government, while the extrema of the regular *U*-like curves correspond to minimum growth rates and critical size of government. The curves themselves for individual groups of countries represent particular components of a more general curve, which describes the relationship between rates of economic growth and size of government for all the countries within the set under discussion. This curve is shown in the upper part of Figure 7. The *X*-axis reflects values for relative size of government (share of government expenditures in GDP), and the *Y*-axis represents GDP growth rates. *The curve describing the relationship between economic growth rates and the relative size of government* consists of an unbroken line reproduced on the basis of observed trend lines and of several broken lines plotted by the authors, which are its rational continuation. Visually the curve resembles the letter *S* rotated around its vertical axis and positioned horizontally.

Figure 7

Economic Growth-Size of Government Curve and the Laffer Curve

Economic Growth (GDP growth rates, %)

Economic growth-size of government curve

Relative Size of Government (Government Expenditures, in % of GDP)

Absolute Size of Government (Government Expenditures, in Currency Units)

Maximum

Optimal

Laffer Curve (absolute size of government to relative size of government)

Necessary

Optimal

Irrational

Critical

Excessive

Relative Size of Government (Government Expenditures, in % of GDP)

It is useful to complement the analysis of this curve with a parallel review of the well-known Laffer curve (lower part of Figure 7). The latter is known to be a curve, which describes the relationship between tax revenues in absolute terms and tax burden in relative terms. In this case it may be interpreted as the *relationship between the absolute size of government (absolute size of government expenditures) and its relative size*. *Absolute size of government* may be presented as the maximum size of financial resources collected by the government through all known means (both regular taxation, as well as non-tax revenue, borrowings, money creation, and confiscation). The share of government expenditures in GDP serves as the measure of the relative size of government.

One may offer the following interpretation of this curve. Point *A* represents a case not captured statistically, when both the *relative* and the *absolute* size of government equal zero (in other words, there is no government). This is quite realistic, because historically government is a much younger phenomenon compared to economic activity. At point *A* the long-term rates of economic growth carry a positive sign, albeit, they remain quite low (e.g., evolution of humanity

before the advent of government)¹⁵. Therefore, the relative size of government equals zero ($X_A = 0$), the absolute size of government equals zero ($G_A = 0$), and rates of economic growth are positive ($Y_A > 0$).

The emergence of government and its increased activity is accompanied by its expansion in size, both relative and absolute. Initially, the provision of government services to the private sector generates a positive impact on rates of economic growth. As a result, rates of economic growth move along the curve to the right and upwards (from point A to point B). The size of government at point B may be described as *necessary*: $X_B > 0$, $G_B > 0$, $Y_B > 0$.

Further expansion in the relative size of government is accompanied by higher absolute rates of economic growth; however, the pace of their increase gradually slows down. The marginal yield from every additional one per cent of increase in the share of government expenditures in GDP declines until it becomes nil at point C . Here the rates of economic growth reach their maximum value, while the size of government (both in relative and absolute terms) becomes *optimal from the perspective of maximizing economic growth rates* ($Y_C = \max$). At the same time, the size of government (both in absolute and relative terms) still has a long way to go before it reaches its potential maximum: $X_C > X_B$, $G_C > G_B$.

In an attempt to increase the size of resources available to it (absolute size), the government continues to expand its share in GDP: $X_D > X_C$, $G_D > G_C$. However, its further expansion is accompanied by an absolute reduction in growth rates (these move along the curve to the right and downwards). The marginal yield from any additional increase in the fiscal burden becomes negative. Nevertheless, in absolute terms, rates of economic growth continue to remain positive: $Y_D < Y_C$, but $Y_D > 0$. Point D , hence, indicates the *irrational* size of government.

Declining growth rates do not stop the government in its efforts to expand its size: $X_E > X_D$. The expansion of government in relative and absolute terms causes economic growth rates to fall to zero at point E : $Y_E = 0$. This implies that the size of government has become *critical*. The absolute size of government reaches its maximum: $G_E = \max$.

The continued expansion of government in relative terms (notwithstanding the fact that economic growth rates have become negative) indicates a shift of growth rates along the curve to the right and downwards from point E to point F : $Y_F < 0$. The time comes when the increases in resources, which the government withdraws from the private sector, become insufficient to offset their reduction in absolute terms caused by declining output in the private sector. The absolute size of government begins to decline ($G_F < G_E$), even though it may continue to expand in relative terms: $X_F > X_E$. Now, at point F , the size of government becomes *excessive*.

History has seen cases when, despite the economic disaster caused by the unchecked expansion of the government, it would continue to increase the share of what it was withdrawing from the economy, and to consume with monstrous speed the frantically dwindling resources of the economy. At a certain point a crisis in an economy goes into free-fall. The continuing expansion in the relative size of government aggravates the economic and social decline. The size of government takes on *catastrophic* proportions.

Economic disasters, as a rule, prompt governments to review their policies. A time comes when the government launches reforms to reduce its involvement in the economy. In this case the reduction in the size of government is accompanied by growth rates moving to the left and upwards along the curve. First, the rates of economic decline subside, and later the growth rates return into positive territory.

¹⁵ It is by definition impossible to obtain a statistical recording of this activity, because statistical services are part of government. Hence, the existence of statistical records per se indicates that the size of government is other than zero.

Depending on a number of causes (including how ambitious the pursued policies are) the leftward and upward movement of economic growth rate along the curve may cease at any point along the *CF* interval. When a consistent policy is pursued the size of government may be reduced to its optimal level, and rates of economic growth would then move towards point *C*, reaching its maximum values. This path was followed by, among others, by China, Ireland, Kazakhstan and a number of other countries.

When an inconsistent policy is pursued (the relative size of government contracts at an inadequate rate) the rates of economic growth may move into the *EF* interval. In this case the economy will continue to decline, albeit at a somewhat slower pace. This is similar to developments in Russia in 1992-1998 (Figure 8). In case of a more significant contraction in the relative size of government the rates of economic growth may move into the *DE* interval, which happened in Russia, for example, in 1999, or into the *CD* interval, which was the case in 2000. However, there may be incidences of reversal, when the relative size of government would begin to expand again after a short period of contraction. Then the rates of economic growth would move from the *CD* interval into the *DE* interval, which was the case in Russia in 2001-2002.

Figure 8

Government Expenditures and Economic Growth in Russia in 1992-2002

GDP growth rates, %

Government Expenditures, in % of GDP

A comparison of the two curves in Figure 7 clearly shows that the task of maximizing rates of economic growth (rates of growth in private and national wealth, rate of improvement in the level of economic development and standards of living) is not identical to the task of increasing the volume of resources available to the government (its relative and absolute size). In other words, *the interests of the national economy and the national government do not necessarily coincide at all times. In general, they do not contradict each other along the AC interval, when economic growth rates increase, among other things, through increased government activity and the expansion of its size (necessary), and along the EF interval, when the same impact on economic growth is produced by a contraction in the size of government (excessive).*

The greatest difficulty in pursuing a responsible economic policy arises when a country finds itself within the *CE* interval. *National authorities are facing opposing and effectively incompatible challenges. On the one hand, the maximization of resources available to the government (moving from G_C to G_E) requires an expansion in the relative size of government (from X_C to X_E). However, the price of this would be a decline in rates of economic growth (from Y_C to Y_E and even to Y_F). On the other hand, the maximization of the rates of economic growth requires a contraction of the relative size of government (from X_E to X_C). And this leads to an inevitable contraction in the absolute size of resources available to the government from G_E to G_C , and, respectively, to a reduction in programs pursued by the government. In general, the pursuit of such policies is a challenging exercise, even more so in a representative democracy.*

There is no solution to this dilemma in the short-term. It is impossible to simultaneously maximize two different functions when their extrema do not match. A possible solution may lie within a model with longer time horizons. Then the maximization of economic growth rates would allow for the increase of the overall volumes of resources it produces within the medium-term and long-term time-frame. The volume of resources may be increased in such proportion, that a relatively lower share of resource withdrawal by the government may, nevertheless, allow for their higher absolute size.

A classic example of this kind is the strategic move made by China in 1979-1996. A contraction

in the share of government expenditures from 36% to 13% of GDP was accompanied by an increase in average annual economic growth rates to 9.6%. This resulted over a span of 17 years in both a five-fold expansion in real GDP and a doubling of government expenditures. In later years government expenditures in China were increased to 20% of GDP, and, apparently, this has not had any pronounced negative impact on the rates of the country's economic growth yet.

Table 5

**Scenarios for the Development of the Russian Economy until 2015
(assuming changes in size of government)**

Indicator	2002 (expected)	Projected Values for Macroeconomic Indicators in 2015, assuming:		
		Increased size of government	Same size of government	Lower size of government
Reference Conditions:				
Government Expenditures, in % of GDP	34.9	40.0	34.9	25.0
Private Sector Expenditures, in % of GDP	65.1	60.0	65.1	75.0
Average Annual GDP Growth Rates, %	4.0	0.2	2.9	8.9
Absolute Values in 2015				
<i>In trillions of RUR in 2002 prices:</i>				
GDP	10.9	11.2	15.7	33.0
Government Expenditures	3.8	4.5	5.5	8.3
Private Sector Expenditures	7.1	6.7	10.3	24.8
Per Capita,				
<i>In thousands of RUR in 2002 prices</i>				
GDP	76.0	86.9	116.5	237.9
Government Expenditures	26.5	34.8	40.6	59.5
Private Sector Expenditures	49.5	52.2	75.8	178.4
Growth Indices (2002 = 100%):				
GDP	100.0	103.1	144.5	303.1
Government Expenditures	100.0	118.2	144.5	217.2
Private Sector Expenditures	100.0	95.0	144.5	349.1
Per Capita Growth Indices				
<i>(2002 = 100%):</i>				
GDP	100.0	114.4	153.3	313.2
Government Expenditures	100.0	131.2	153.3	224.4
Private Sector Expenditures	100.0	105.4	153.3	360.8
Cumulative Values in 2003-2015				
<i>In trillions of RUR in 2002 prices:</i>				
GDP		151.9	173.7	251.6
Government Expenditures		57.2	60.6	69.8
Private Sector Expenditures		94.7	113.1	181.8

A possible option for applying this approach to Russia is shown in Table 5. The projections for the Russian economy until 2015 are made using the parameters for the rates of economic growth-size of government in Russia equation for 1992-2001 (Figure 8).

With a consistent increase in the share of government expenditures in GDP from the current 34.9% to 40% by 2015 the average annual growth rates for the Russian economy are expected to be slightly above zero. Notwithstanding the 18% increase in the absolute size of government spending, real GDP would remain at almost the same level, while private sector expenditures would contract by 5%. If the size of government remains at its current level until 2015, the average annual growth rates of the economy might reach about 3% over the next 13 years. Over this period GDP and both government and private sector expenditures would increase at an equal pace of about 45%. If some action resembling what China had done is taken, reducing the share of government expenditures in GDP to, say, around 25% by 2015, then the average annual growth rates for the Russian economy may increase to 8-9%. In this case over a 13 year period

real GDP might increase three-fold, private sector expenditures would increase 3.5-fold, and government expenditures would increase 2.2-fold.

* * *

There exists a non-linear pattern linking the size of government to rates of economic growth. In small countries (with populations below 1 million) increases in the size of government are, as a rule, associated with increased rates of economic growth, although this association is not always statistically significant.

In countries where population exceeds 1 million expansion in the size of government, as a rule, leads to a slowing down in economic growth. In small under-developed countries the negative relationship between size of government and rates of economic growth is least robust, and it is weakest in small developed countries. As the level of economic development increases, the robustness of the relationship improves, but it becomes weaker. With higher population sizes both the robustness and strength of the relationship improve. The most robust negative relationship between economic growth and size of government is displayed for large developed countries, and the strongest relationship is evident for large countries with low level of economic development.

The non-linear nature of the relationship allows for the derivation of critical and optimal sizes of government for country groups and individual economies. *For Russia, the critical value of the size of government expenditures, above which sustained economic growth would cease and economic decline would begin, is 36-38% of GDP. The optimal size of government, which provides for the maximization of economic growth rates in Russia, falls within the range of 18-21% of GDP.* The nature of advice regarding adjustments in the actual size of government to a large extent depends on where any particular country stands with respect to its critical and optimal levels. The current actual level of the fiscal burden in Russia is significantly inflated both in terms of comparisons with other countries with comparable level of development and population sizes, and in terms of maximizing rates of economic growth in Russia. *International comparisons and recent domestic experience both confirm the opportunity for sustained medium-term GDP growth in Russia at 8-9% per annum. A necessary (but not sufficient) condition for this is the contraction of the current size of government by at least 10-15 percentage points of GDP.* Such a contraction might be exercised in the next 10-15 years. If this scenario is realized, a three-fold increase in the size of Russia's GDP may be realistically achieved by 2015.

Impact of Various Factors on Government Revenues: Regression Equation Parameters
(*t*-statistics in parenthesis)

No.	Independent Variables	<i>a</i>	<i>b</i>	<i>R</i> ²	Number of Countries
Geography					
1	Area of Territory, <i>sq. km</i>	39.92 (9.312)	-2.17 (-2.614)	0.040	166
2	Length of Land Borders, <i>km</i>	30.94 (27.747)	0.00 (-2.831)	0.047	166
3	Territorial Density (ratio of length of land borders to square root of area of territory)	32.03 (17.441)	-1.71 (-1.91)	0.022	166
4	Exit to and from Open Seas Наличие (<i>yes, no</i>)	27.41 (14.464)	1.95 (0.911)	0.005	166
5	Length of Coastline, <i>km</i>	27.71 (6.221)	0.54 (0.381)	0.001	130
6	Distance from Open Seas ¹	27.97 (28.123)	0.16 (2.052)	0.025	166
7	Distance from Equator, degrees latitude	22.70 (23.237)	0.01 (9.37)	0.349	166
8	Neighboring Countries (<i>yes, no</i>)	30.67 (14.771)	-2.10 (-0.918)	0.005	166
9	Number of Neighboring Countries	30.22 (20.888)	-0.38 (-1.11)	0.007	166
Climate					
10	Average Annual Temperature, °C	40.60 (19.348)	-0.60 (-6.012)	0.181	166
11	Maximum Temperature at Maximum Humidity, °C	38.11 (25.508)	-0.46 (-7.166)	0.238	166
12	Typical Climate Index ²	42.99 (15.941)	-0.55 (-5.463)	0.154	166
13	Extreme Climate Index ³	41.45 (21.185)	-0.46 (-6.967)	0.228	166
14	Integrated Climate Index ⁴	43.05 (18.788)	-0.53 (-6.557)	0.208	166
Natural Resources					
15	Share of Arable Land in Total Area of Territory, %	31.00 (17.649)	-0.05 (-1.355)	0.011	166
16	Exports of Oil, <i>in % of GDP</i>	28.32 (29.835)	0.13 (1.411)	0.012	165
17	Imports of Oil, <i>in % of GDP</i>	28.82 (32.446)	0.00 (0.163)	0.000	165
18	Balance of Oil Exports and Imports, <i>in % of GDP</i>	28.83 (32.563)	0.00 (-0.04)	0.000	165
19	Surplus of Exports and Imports of Oil (<i>yes, no</i>)	28.65 (28.798)	1.39 (0.641)	0.003	166
Demography					
20	Size of Population, <i>millions</i>	42.47 (10.676)	-3.57 (-3.482)	0.069	166
21	Population Density, <i>persons per sq. km</i>	29.14 (21.551)	-0.27 (-0.197)	0.000	166
22	Share of Persons between 0 and 14 Years of Age in Total Population, %	51.27 (20.81)	-0.67 (-9.467)	0.353	166
23	Share of Persons above 65 Years of Age in Total Population, %	17.90 (14.681)	1.66 (10.876)	0.419	166
24	Age Load, % ⁵	50.38 (17.233)	-31.28 (-7.595)	0.260	166
Population Diversity					
25	Ethnolinguistic Diversity of the Population, % ⁶	32.49 (24.513)	-13.50 (-4.53)	0.129	141
26	Share of Largest Ethnic Group in Total Population, %	18.62 (7.249)	0.15 (4.251)	0.099	166

No.	Independent Variables	<i>a</i>	<i>b</i>	<i>R</i> ²	Number of Countries
27	Share of Largest Language Group in Total Population, %	18.12 (7.292)	0.15 (4.621)	0.115	166
28	Share of Largest Religious Group in Total Population, %	28.53 (10.325)	0.01 (0.156)	0.000	166
29	Diversity Index, <i>X</i> ⁷	34.24 (21.332)	-0.17 (-3.884)	0.084	166
30	Share of Votes Won by Largest Party, % of all votes cast	33.60 (15.287)	-0.08 (-2.307)	0.031	166
Administrative System of Government					
31	Government Centralization ⁸ (centralized government - 0, decentralized - 1)	24.51 (21.633)	9.09 (5.606)	0.161	166
32	Degree of Centralization (share of central government expenditures in all general government expenditures), %	51.97 (12.764)	-0.26 (-5.77)	0.169	166
33	Number of Administrative Units One Level below Central Government	28.85 (20.575)	0.01 (0.089)	0.000	166
34	Size of Population Residing within One Administrative Unit, <i>million</i>	40.12 (13.44)	-4.25 (-3.904)	0.085	166
Economy					
35	GDP at Purchasing Price Parity, <i>USD billion in 1993 prices</i>	27.46 (17.182)	1.05 (1.113)	0.007	166
36	Per Capita GDP at Purchasing Price Parity, <i>USD in 1993 prices</i>	-28.18 (-5.294)	15.77 (10.817)	0.416	166
37	Share of Services in GDP, %	7.20 (2.18)	0.41 (6.773)	0.221	164
38	Share of Employment in Services Sector in Overall Employment, %	14.16 (7.721)	0.32 (8.751)	0.321	164
39	Urbanization (share of urban population in total population), %	14.65 (7.962)	0.27 (8.477)	0.305	166
40	Relative Prices (<i>domestic prices in % of prices in USD</i>)	18.03 (13.377)	0.21 (9.507)	0.357	165
41	Terms of Trade Index, % ⁹	28.82 (32.049)	0.01 (0.068)	0.000	165
42	Inflation Tax, in % of <i>GDP</i> ¹⁰	28.88 (21.608)	0.02 (0.059)	0.000	166
Trade					
43	Exports, in % of <i>GDP</i>	23.69 (14.956)	0.13 (3.838)	0.083	165
44	Imports, in % of <i>GDP</i>	25.02 (13.661)	0.08 (2.361)	0.033	165
45	Trade, in % of <i>GDP</i>	24.08 (13.905)	0.06 (3.159)	0.058	165
46	Trade Balance, in % of <i>GDP</i>	30.72 (30.802)	0.31 (3.623)	0.075	165

¹ Exit to and from open seas: ratio of length of coastline to square root of area occupied by country's territory.

² Typical climate index: average annual temperatures (in Centigrade) + 0.1 x [average daytime humidity of air (%)].

³ Extreme climate index: maximum temperature at maximum humidity (in Centigrade) + 0.1 x [maximum daytime humidity of air (%)].

⁴ Integrated climate index: arithmetic mean of typical climate index and extreme climate index.

⁵ Age load: ratio of non-employable persons to employable persons in a population.

⁶ Ethnolinguistic diversity of the population: arithmetic mean of the following five indices:

- the likelihood of two randomly selected persons from the country not belonging to the same ethnolinguistic group;

- the likelihood of two randomly selected persons from the country speaking different languages;

- the likelihood of two randomly selected persons from the country not speaking the same language;

- share of population not speaking the official language;

- share of population not speaking the most-widely used language.

⁷ Diversity index: one hundred minus the arithmetic mean of the three following indicators:

- share of largest ethnic group in total population;
- share of largest language group in total population;
- share of largest religious group in total population.

⁸Government centralization: absence (presence) of revenue (and/or expenditure) powers at lower levels of administrative authority.

⁹Terms of trade index: average annual change in ratio of export and import prices.

¹⁰Inflation tax in % of GDP: product of average annual size of monetary base in % of GDP multiplied by the inflation tax rate, the latter equal to the average annual consumer price growth rate.

Sources: CIA, The World Factbook, 1997-98. Washington-London, Brassey's, 1997; Clements J. Clements' Encyclopedia of World Government, 1998-1999. Dallas, Texas, Political Research, vol. 13; ILO, World Employment Report, 1998-99. Employability in the Global Economy. Geneva, ILO, 1998; IMF. Government Finance Statistics Yearbook. Washington, 1992-2001; IMF, World Economic Outlook Database. Washington, 2001; Kidron M., Segal R. The State of the World. Atlas, 5th Edition. Penguin Books. February 1998; Parker P.M. National Cultures of the World, Statistical Reference. Cross-Cultural Statistical Encyclopedia of the World. London, Greenwood Press, 1997, vol. 4; La Porta R., Lopez-de-Silanes F., Shleifer A., Vishny R. The Quality of Government. - The Journal of Law, Economics, & Organization, 1999, April; World Bank, World Development Indicators. Washington, 1997-2001.