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Russia's Regions: Income Volatility, Labor Mobility, and Fiscal Policy

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Abstract

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Russia's regions are heavily exposed to regional income shocks because of an uneven distribution of natural resources and a Soviet legacy of heavily skewed regional specialization. Also, Russia has a limited mobility of labor and lacks fiscal instruments to deal with regional shocks. We assess how these features influence the magnitude and persistence of regional income shocks, through a panel vector autoregression, drawing on extensive and unique regional data covering last decade. We find that labor mobility associated with regional shocks is far lower than in the United States yet higher than in the EU-15, and that regional expenditures tend to expand in booms and contract in recessions. We discuss institutional factors behind these outcomes and policy implications.

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I. INTRODUCTION

Russia's regions differ substantially from each other in their economic environment.

The Russian territory is the largest in the world, spanning 11 time zones and providing a unique and crucial backdrop for regional diversity. Also, natural resources are distributed highly unevenly across the territory. Moreover, the industrial structures of the regions still carry the Soviet legacy—political and military considerations often overrode economic rationales in building factories, towns, and infrastructure across the vast territory (Hill and Gaddy, 2003).

This diversity in geography, natural resource endowment, and pattern of industrialization has led to huge income disparities across regions.

Figure 1 illustrates the income disparity across regions in Canada, China, the EU-15, Russia, and the United States, defined as the standard deviation of regional real income per capita.² This figure shows that Russia has one of the largest regional disparities, second only to China. Moreover, Russia and China, unlike advanced economies, show no convergence in regional incomes over time.

More important, the regional heterogeneity has increased the volatility of regional incomes, exposing regions to very large idiosyncratic economic shocks. Figure 2 shows that Russia's regional income shocks, measured by the standard deviation of detrended regional

Figure 1. Regional Income Dispersion
(standard deviation of real regional income)

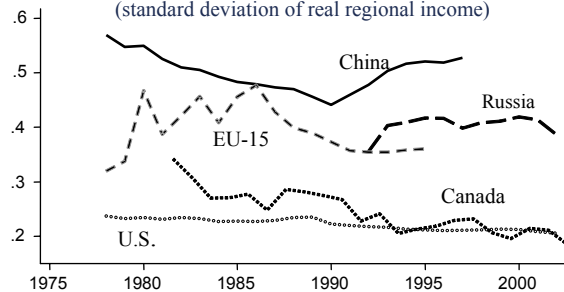
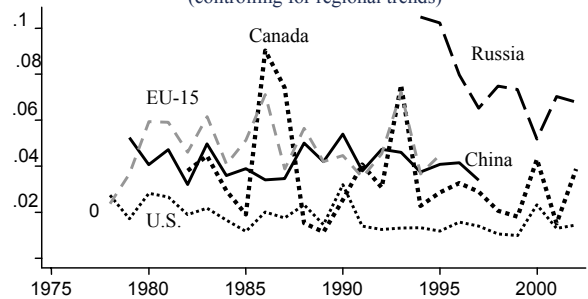


Figure 2. Size of Regional Shocks
(controlling for regional trends)



² Regions within each country or economic area are defined as the largest subnational administrative unit. They correspond to 78 regions for Russia (inclusive of 11 autonomous districts), 50 states and the District of Columbia in the United States, 11 provinces for Canada, 30 provinces for China, and 178 regions for the 15 countries of the European Union (EU-15). Data for Russia, the United States, Canada, and China come from the respective domestic statistical agencies; data for the European Union come from Eurostat. Economic and social indicators for Russia's regions are mostly from the State Statistical Services. Regional real output data for the early 1990s are IMF staff estimates based on sectoral data of the State Statistical Services and the Ministry of Economy and Trade. The primary source of regional fiscal data is the Ministry of Finance. In calculating real variables for Russia's regions, price differences across regions have been incorporated drawing on extensive regional price indices. We use the NUTS2 classification of Eurostat to define European regions on the grounds that using the NUTS1 classification would exclude too many regions from our sample and lead to insufficient regional disparity. While some of these regions have a very limited number of inhabitants, our findings on disparity and shocks are sustained if regions with less than a million inhabitants are excluded from the sample.

growth, are about three times bigger than those of the United States, Canada, China, and the EU-15. While the size of the shocks has declined sharply from the early period of market economy reform, it is still persistently high.

The large magnitude of Russia's regional shocks highlights the importance of shock-absorption mechanisms in the regions, including labor mobility and fiscal policy. In this paper, we assess how labor forces react to regional income shocks; analyze how fiscal policy affects the level and volatility of regional incomes; and discuss their policy implications. We start by analyzing Russia's regional income shocks and their consequences for labor markets in comparison with those of the United States and the EU-15, and discuss their economic implications. We proceed with investigating whether regional fiscal policies and federal transfers to regions have helped mitigate regional shocks, and discuss institutional factors behind the outcomes. In the concluding section, we discuss policy implications of these findings.³

II. TALE OF THREE ADJUSTMENT MECHANISMS

An economy can deal with regional shocks in a variety of ways. First, the government can help absorb negative regional shocks on household incomes through budgetary transfers and expenditure programs. Second, people can move away from stagnating regions to booming regions. The labor mobility depends on many institutional and economic factors, including moving costs, housing markets, and regulations, which are in part determined by historical and geographic factors.

The shock absorption mechanisms have been studied widely. Eichengreen (1993) stresses different roles played by migration in absorbing regional shocks in the United States compared with Europe. Blanchard and Katz (1992) have studied how labor markets in U.S. regions respond to demand shocks, applying panel vector-autoregression. Their panel includes logarithmic changes in regional employment, employment rates, and participation rates. The main conclusion is that out-migration is the main mechanism through which states absorb idiosyncratic shocks. Using the same framework, Decressin and Fatás (1995) have found that labor participation plays a more prominent role in absorbing regional shocks in Europe relative to the United States. Obstfeld and Peri (1998) use the same approach to compare the United States and Europe and, contrary to Decressin and Fatás (1995), find that employment responses are noticeably more persistent in Europe than in the United States.⁴

While this approach is appropriate for developed economies, we do not extend it to Russia. First, the richness of the structure of the Blanchard-Katz (1992) approach requires long-term

³ Russian regional shocks remain large even using alternative definitions of shocks, such as the simple coefficient of variation or regional income growth without controlling for region-specific income trends. The terms "regional shocks" and "local shocks" are used interchangeably in this paper, unless noted otherwise

⁴ Obstfeld and Peri (1998) speculate that the difference between their results and those of Decressin and Fatás (1995) is due to the difference in the identification of region-specific shocks. As explained in the previous footnote, our results are not dependent on the definition of regional shocks.

time-series data. Given the availability of Russian data only up to early periods of economic transition of the mid-1990s, a parsimonious specification should be preferred. Second, the Blanchard-Katz (1992) approach assumes that the regional labor markets are at or near to equilibrium at the time of regional shocks. This assumption may be realistic for industrial countries, but it is unwarranted for transition economies (Bornhorst and Commander, 2004; Boeri and Scarpetta, 1996).

As an alternative, we propose a simpler bivariate panel vector autoregression (VAR) consisting of regional per capita income and regional population.⁵ Main motivations for this specification are that our primary interests lie in the extent of required fiscal adjustment of one economy relative to others rather than labor market dynamics in each economy and that labor market data are limited in Russia's regions.⁶ In panel VARs undertaken separately for Russia, the United States, and the EU-15, each equation contains income and population variables with three-year lags. It also contains regional dummies and time dummies in order to control for fixed effects and national business cycles.⁷

The specification is as follows:

$$\ln(\text{income})_{it} = \sum_{j=1}^3 \alpha_{1j} \ln(\text{income})_{it-j} + \sum_{j=1}^3 \beta_{1j} \ln(\text{population})_{it-j} + \text{year dummies} + \text{regional dummies} + \varepsilon_{1it}$$
$$\ln(\text{population})_{it} = \sum_{j=1}^3 \alpha_{2j} \ln(\text{income})_{it-j} + \sum_{j=1}^3 \beta_{2j} \ln(\text{population})_{it-j} + \text{year dummies} + \text{regional dummies} + \varepsilon_{2it}.$$

Corresponding impulse-response functions in Figures 3 and 4 show how regional incomes and populations respond over time to positive regional income shocks. The identification is based on a Cholesky decomposition in which income is followed by population.⁸ Figure 3 shows the response of regional incomes to a positive income shock, with the size of the shock equivalent to one standard deviation of regional income growth. Similarly, Figure 4 shows the reactions of regional population to a surprise income rise.

⁵ Income and population are expressed in logarithms, unless otherwise noted. Even though the Blanchard-Katz (1992) specification is extensively used, different authors have used various specification to study regional adjustments depending on data availability and motivation for the study (see, for instance, Obstfeld and Peri, 1998).

⁶ In transition economies the number of employed can be misleading because the phenomenon of hidden unemployment is quite common (see, for example, Johnson, Kaufmann, and Shleifer, 1997)

⁷ We do not perform standard unit root tests because the power of the test is severely limited by the limited time dimension of the sample and the existence of structural breaks. Moreover, the results of the panel VAR are valid even if one or both variables have a unit root, since cross-country effects dominate possible distortions from non-stationary time series.

⁸ The 90 percent confidence intervals are shown.

The panel VAR regressions show several interesting outcomes:

- The magnitude of the standard income shock is much larger in Russia than in Europe and the United States;
- the shocks are far less persistent in Russia than in other economies, in the sense that they essentially disappear after four years; and
- regional populations respond to a regional economic shock more mildly in Russia and Europe than in the United States. In the United States, the number of regional residents increases by 0.4 percent in about five years in response to a surprise income boost of about 2 percent. In Russia, regional populations remain stagnant, even with a surge in regional income of 8 percent. In Europe, the response is counterintuitively negative.

This analysis illustrates three different types of adjustment to shocks:

- (i) *The U.S. type.* Labor is highly mobile. Even with relatively modest regional income shocks, the population moves rapidly to other regions.⁹
- (ii) *The European type.* Labor mobility is sluggish. Even in the presence of large and persistent shocks, people hardly move. This is explained partly by rigid labor markets and partly by fiscal policy (Mauro, Prasad, and Spilimbergo, 1999). As a primary remedy to regional shocks, several European countries have fiscal transfer programs to poor regions. In addition, the European Union provides structural funds to relatively poor regions within the Union.
- (iii) *The Russian type.* Russia's regions face very large, but relatively short-lived, shocks. The population responds in the first year, but there is no lasting movement. The Russia-type of adjustment is typical of transition economies. Fidrmuc (2004) has shown that migration is not very efficient in reducing regional unemployment and wage disparities in the Czech Republic, Hungary, Poland, and the Slovak Republic. Bornhorst and Commander (2004) confer similar results for Bulgaria, the Czech Republic, Hungary, Poland, Romania, and Russia.

The consequences of the different adjustment mechanisms are evident in the labor markets. If labor does not move despite negative regional shocks, regional unemployment increases above the national average. The coefficients of variation of regional unemployment rates would thus likely be higher in countries with lower labor mobility than in those with higher labor mobility. Indeed, Figure 5 shows that Russia's and Europe's variations in regional

⁹ The U.S. type of adjustment has been documented by Blanchard and Katz (1992), while Decressin and Fatás (1995) have documented the European type of adjustment.

Figure 3. Annual Evolution of Regional Incomes
(Orthogonalized impulse response functions to a positive income shock;
grey area represents 90-percent confidence interval)

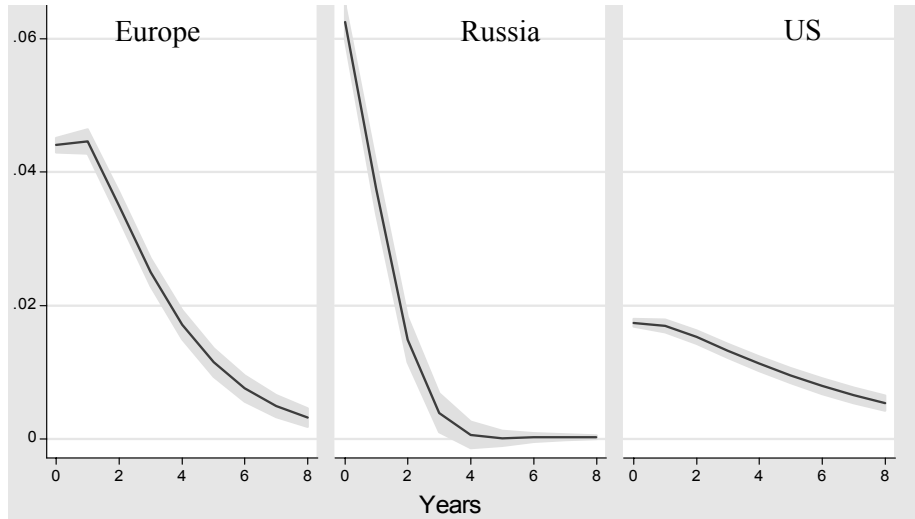
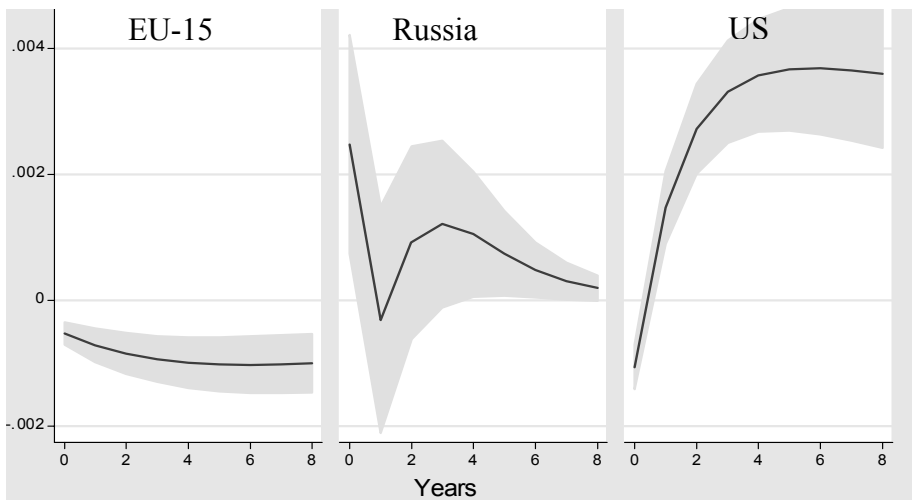


Figure 4. Annual Evolution of Regional Populations
(Orthogonalized impulse response functions to a positive income shock;
grey area represents 90-percent confidence interval)



unemployment rates are significantly higher than in the United States. Moreover, recent economic growth in Russia seems to have increased imbalances in the national labor market, reducing unemployment in booming regions yet without much spillover to stagnating regions. This finding is consistent with Andrienko and Guriev (2003) and Bornhorst and Commander (2004), who argue that labor mobility in Russia is severely constrained because of underdeveloped housing markets, a host of regional regulations inhibiting movements of labor, and high search and moving costs. According to Andrienko and Guriev (2003), internal migration in Russia is merely 2 percent of the total population, significantly lower than in most OECD countries.¹⁰

Figure 5. Coefficient of Variation of Regional Unemployment Rates

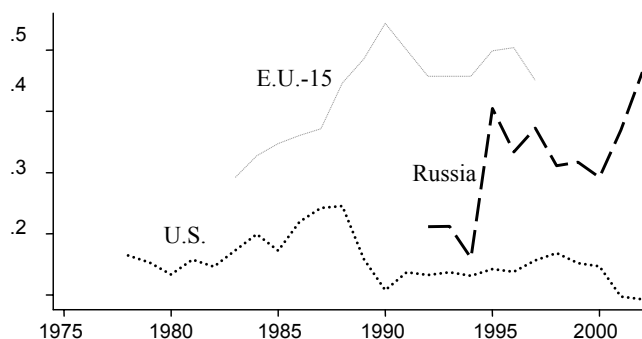


Table 1. Internal Migration in Selected OECD Countries and Russia (In percent of population, 1998)

Korea	Finland	Australia	Norway	Switzerland	Japan	Netherlands	Hungary	Czech Rep.	Russia
11.8	10.0	7.9	6.5	6.1	4.9	4.0	4.0	1.9	1.8

Source: Andrienko and Guriev (2003)

III. EMPIRICAL EVIDENCE OF FISCAL IMPACT OF REGIONAL INCOME SHOCKS

The large magnitude of regional shocks and the lack of labor mobility in Russia raise an important issue of whether fiscal policy in Russia's regions has been moderating or exacerbating the adverse impact of regional income shocks. In this section, we analyze the impact of regional income shocks on regional expenditures, in particular whether regional expenditures tend to expand in booms and contract in recessions (i.e., whether regional fiscal policy is procyclical). For this exercise, we use an extensive regional fiscal database covering the period 1992 to 2002.

The empirical analysis of relationships between income and fiscal policy faces two technical problems: simultaneity bias and the possibility of frequent structural breaks. The first problem occurs because fiscal policy is not only affected by income but also affects income. This simultaneity bias makes the interpretation of any regression of fiscal variables on income difficult and problematic. The second problem of frequent structural breaks is potentially serious in Russia, which went through sweeping structural changes during the past decade of economic transformation that affected regions unevenly. Such diverse structural breaks would weaken the explanatory power of a single panel regression that imposes parametric constancy over time even if allowing for fixed regional effects.

¹⁰ The labor mobility may be higher than indicated by changes in permanent residents, if adjusted for illegal immigrant flows and unregistered interregional labor migration.

As regards the first problem of simultaneity bias, various authors have adopted different identification strategies to deal with it. For instance, Blanchard and Perotti (2002) relied on high-frequency data to identify the effects of fiscal spending on income. Poterba (1994) constructed an ad-hoc measure of fiscal shocks based on the state forecast of fiscal revenues. Another possible solution is the use of instrumental variables.

We use an alternative strategy to deal with the simultaneity bias. The available information on the industrial structure of Russia's regions and the panel structure of our data allows us to identify explicitly the source of regional shocks. We construct two shock variables, an oil shock and an industrial shock, which are meant to reflect the peculiarities of Russia's regions as discussed in the introduction. The oil shock variable for each region i is defined as:

$$(\text{oil shock})_{it} = (\text{oil share in regional income})_{it-1} * (\text{oil price})_t,$$

where the oil share variable refers to the share of regional income coming from the hydrocarbon sector in year $t-1$.¹¹ In this construction, regions specializing in the fuel sector will have a positive shock when oil prices are high. Similarly, the industrial shock variable is defined as the share of regional income originating from the manufacturing sector in year $t-1$ multiplied by the real exchange rate. The real exchange rate is meant to capture competition from foreign companies—a rise in the real exchange rate creates a negative shock to regions, engaged in the production of tradable goods. Both shock variables are exogenous to the fiscal policy of any region, given that they depend on the industrial structure of the previous year, the real exchange rate, and the price of oil.

We run two types of panel regressions to test whether these shock variables have any significant effects on regional growth. The results are reported in Table 2. A regression allowing for fixed effects, which capture unobserved region-specific factors, confirms that regional growth is significantly correlated with regional shocks with the expected signs. We get the same results when we introduce dynamic effects by including lagged dependent variables.¹²

Table 2. Regional Growth and Regional Shocks

	Fixed effects	Arellano-Bond
Oil shock $_t$	1.64 ***	
Industrial shock $_t$	-0.11 **	
Difference in gdp growth $_{t-1}$		-0.04
Difference in oil shock $_t$		2.28 ***
Difference in industrial shock $_t$		0.23 ***
Constant	2.85	1.98 ***
Number of observations	760	608
Number of regions	76	76

** p<.05; *** p<.01

¹¹ We use the lagged value of the income composition to avoid the problem that nominal income could grow mechanically when the oil sector expands.

¹² In the second panel regression, we use the Arellano-Bond methodology, which avoids problem of inconsistency in dynamic panels with fixed effects (Arellano and Bond, 1991).

As regards the second problem of structural breaks, the economic literature on Russian reforms indicates that the issue warrants special attention. The sources of regional revenues and the patterns of expenditures have varied greatly over time because of frequent changes in the de jure and de facto institutional arrangements over the past decade (Lavrov and others, 2000; Martinez-Vazquez and Boex, 2000). In particular, the fiscal effects of oil and industrial shocks are most likely to have changed substantially. For this reason, it is problematic to proceed with a panel regression that constrains the parameters to be constant over time. In addition, the span of time under analysis is too short for standard time-series techniques.

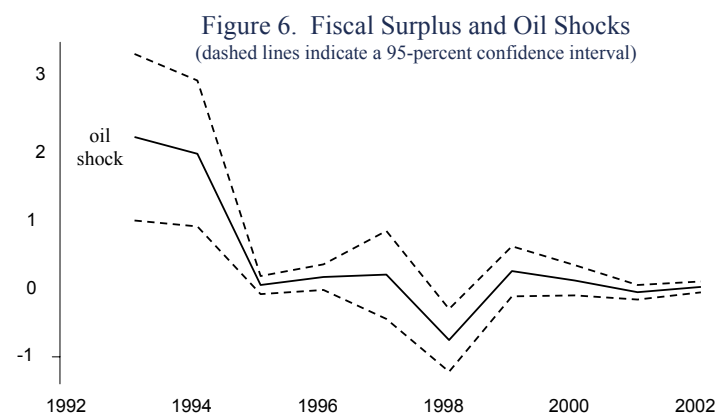
We address this problem by running several cross-section regressions for every year under analysis. Having identified two exogenous shock variables above, we proceed with a reduced-form regression as follows:

$$\left(\frac{\text{fiscal surplus}}{\text{income}} \right)_i = \text{constant} + \alpha (\text{oil shock})_i + \beta (\text{industrial shock})_i.$$

This specification is used in ten cross-section regressions—one for each year.

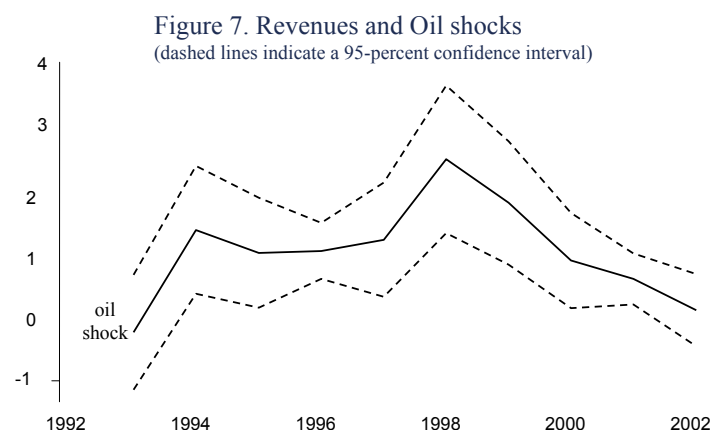
We test the cyclical behavior of regional fiscal surpluses as follows. Suppose that regional governments run a countercyclical fiscal policy, saving revenue windfalls. Then, the coefficient α , which captures the impact of oil shocks on regional fiscal surpluses, should be positive, reflecting savings of revenue windfalls by oil-rich regions. Similarly, the coefficient β should be negative under a countercyclical policy, reflecting deteriorating fiscal balances of highly industrialized regions in the case of real appreciation of the ruble.

The regression outcomes strongly suggest that regions have not been pursuing a countercyclical fiscal policy. Figure 6 reports the coefficients α for the years 1993 to 2002; in the same graph we report the two-standard-deviation band. Except for the first two years, and for the crisis year of 1998, the coefficient α is never significantly different from zero, except possibly the crisis year of 1998, indicating that oil-rich regions did not change their overall fiscal balances significantly during the reference period despite volatility in oil prices. A similar pattern is observed in the fiscal reaction to the industrial shocks.



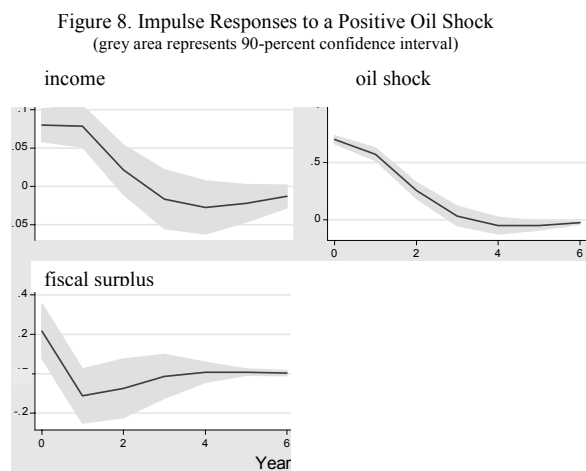
The extent of the procyclicality is evident from the revenue side. We ran the same regression as above, this time

using regions' own revenues as a dependent variable. The results show that regions' own revenues were highly sensitive to oil prices (Figure 7).¹³ The unit value in the regression coefficient indicates that a two-dollar rise in oil prices in an oil-rich region where the oil sector accounts for a quarter of total regional income raises more than a percentage point of regional income in 1998 and more than half of a percentage point in 2000. Our findings are consistent with changes in oil tax-sharing rules between the center and regions in the post-crisis period. Since these sensitivity coefficients measure both direct and indirect effects of oil prices on regional revenues, they are not directly comparable with outcomes of a study measuring their direct effects on revenues of consolidated government (Kwon, 2003).



We also looked at the response of regions to an oil shock in a dynamic form. To capture the dynamic adjustment to an oil shock, we estimate a structural panel VAR comprising oil shock, income, and fiscal surplus, with regional dummies and two annual lags. In this structural VAR, we do not allow any feedback from the first two variables to the oil shock.¹⁴ Moreover, the ordering of the variables (oil shock, income, fiscal surplus) assumes that fiscal policy has no contemporaneous impact on income, although it could affect itself with a lag.

The corresponding impulse response functions are shown in Figure 8. A typical oil shock has an immediate effect on both income and fiscal surplus. However, already in the second year after the shock, the fiscal surplus disappears, while the effect on income is more persistent. These results indicate that oil-rich regions, especially before 2000, used their



¹³ Region's own revenues are defined as total revenues minus federal cash transfers. Noncash settlements between the federal government and regional governments, which were often substantial in the pre-crisis period, have not been deducted in the calculation of regions' own revenues since they are in essence an accounting reflection of earmarked federal expenditures of highly uncertain value.

¹⁴ Note that our previous analysis has shown that there are important structural breaks in the sample. Moreover, the data allows only 10 years of analysis. The results of this section need to be interpreted with a great caution.

revenues to finance local expenditure, with negligible net effects of oil prices on their overall budget balances. This is consistent with an unreported finding that regional expenditure tracks regional revenues very closely.

Our finding that regional governments use procyclical fiscal policy is consistent with the institutional setup. In Russia, most regions have limited discretion in the formulation and conduct of fiscal policy (Lavrov, Litwack, and Sutherland, 2001; and OECD, 2001). Their tax autonomy is lacking, and their borrowing authority is severely constrained. Mandates, mostly imposed by the federal government, exceed available resources in most regions by a wide margin, with the gap only partly covered by federal transfers. An implication is that regions do not have sufficient incentives to improve their fiscal situation—they risk losing federal assistance or being burdened with extra expenditure responsibilities (Zhuravskaya 1998, Martinez-Vazquez and Boex, 2000, Litwack 2002). As a result, regional expenditures are driven primarily by the availability of revenues, with regions usually spending windfall revenues in booms rather than saving them. A corollary is that spending is cut in recessions.¹⁵

The ongoing reform of intergovernmental fiscal relations may help to make regional fiscal policy less procyclical. The reform aims to allow more fiscal autonomy to subnational governments while strengthening their accountability. The reform started in a full scale by the passage of two main governing laws in late 2003, which created legislative frameworks for lower levels of government.¹⁶ Subsequently, the tax and budget codes were amended in 2004 in accordance with a new principle of strengthened local fiscal autonomy. The amendments envisage streamlining of expenditure authority among different levels of government; formulation of rules and procedures for spending assignment; clarification of tax-sharing arrangements among federal, regional, municipal, and submunicipal or settlement levels; clarification of rules and procedures for a temporary takeover of local administration by regional governments; and formulation of modalities for financial transfers between lower levels of government.

IV. THE ROLE OF CENTRAL GOVERNMENTS IN ABSORBING REGIONAL SHOCKS

One major policy instrument available for the mitigation of income shocks is social benefit entitlements. These entitlements, such as unemployment benefits and means-tested minimum benefit programs, automatically rise in recessions and fall in booms. In the United States, for example, unemployment-sensitive programs, such as unemployment compensation and food subsidies, represent the bulk of countercyclical components of public spending. These countercyclical expenditures are usually substantial in advanced economies; on employment

¹⁵ The lack of autonomy in subnational fiscal policy was probably fully justified for earlier years, when fiscal sustainability and anti-inflation policy were top policy priorities and the “soft-budget constraint” of subnational governments was an overriding concern.

¹⁶ They are the Law on General Principles in the Organization of Local Self-Government (No. 121-FZ) and the Amendment to the Law on General Principles in the Organization of Judiciary and Executive Bodies of Government Bodies of Subjects of the Russian Federation (No. 95-FZ).

programs alone, industrial countries spend over 2 percent of GDP on average, although their sensitivity to business cycles differs by country and nature of program.¹⁷

However, in Russia, these expenditure-based stabilizers have an insignificant impact, if any, on regional economies. First, unemployment benefits are de facto discretionary spending rather than mandatory, largely predetermined by the availability of revenues. Second, the total benefit spending is small, less than a third of 1 percent of GDP, much lower than in industrial countries and even lower than in advanced transition economies (World Bank, 2002). It is, thus, not surprising that registered unemployment eligible for unemployment benefits is estimated at less than 15 percent of total unemployment measured under the standard ILO definition. Third, other social benefit programs are even less sensitive to regional business cycles since such benefits, often paid in kind, are usually based on age, occupation, and other special criteria (in particular, disability) rather than income levels.

Other shock-absorption instruments include tax arrangements and federal transfers. For instance, in the United States, state governments have independent taxing power and do impose their own taxes and set the rates. Personal income tax, one of the most common and important state taxes, provides an automatic stabilizing force because citizens of states experiencing a downturn pay less income taxes. In the European Union, explicit transfers from Brussels provide some stabilizing effects in the long run.

In comparison, not much countervailing force is provided by the tax system in Russia. The corporate income tax and personal income tax, major sources of regional revenues, are federal taxes, of which rates, bases, and sharing rules are set by the federal authorities. Moreover, intense tax competition among regional governments, especially over corporate incomes, together with weak tax administration have undermined the ability of regional authorities to collect income taxes fully in booms. Capital gains and property income taxes, which are highly cyclical in nature, are negligible, given underdeveloped real estate markets and inadequate tax administration. Oil taxes, the most cyclical ones, are assigned mainly to the federal budget.

These institutional arrangements leave federal transfers as potentially the most effective instrument for absorbing regional shocks. In fact, the federal government has provided a substantial amount of financial assistance to regions since 1994 through a formula-based system, although other channels of assistance were often used as well, exceeding the formula-based channel in some years (Trounin, 2001). However, it is doubtful that federal transfers, in their current form, could play an important role in reducing the volatility of regional economies. The formula, despite the merits of transparency and fiscal discipline, is based on notional tax capacity and expenditure needs, which in turn reflect historical data with considerable lags and unrealistic statutory norms. A more fundamental challenge is posed by a gap-filling nature of federal transfers and their annual adjustment schedule, both of which discourage regions from intensifying tax efforts.

¹⁷ The literature of regional redistribution and stabilization in industrial countries is quite vast. For a recent review, see Mélitz and Zumer (2002).

There are three main economic reasons why a central government may wish to provide transfers to subnational authorities:

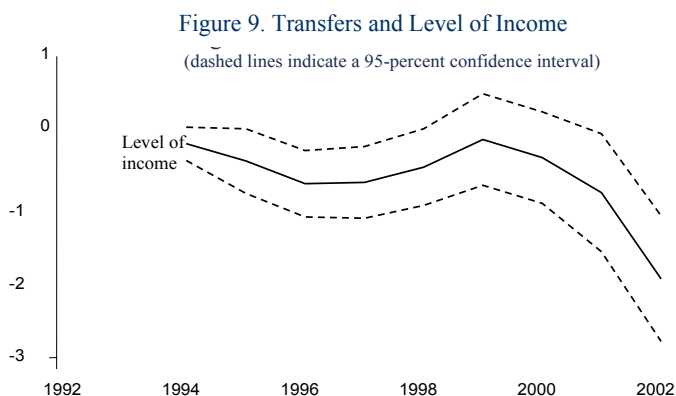
- *Equalization transfers.* If there is a substantial gap in per capita incomes between regions, the central authority may consider financing structural funds to help the development of the less-rich regions. An example of these equalization transfers are the Structural Funds in the European Union;
- *Insurance transfers.* If a region experiences a temporary shock, such as a natural disaster or the closure of an important industry, the central government could decide to compensate this region as a form of “insurance.” Examples of such transfers are the emergency federal funds in the United States. These transfers are equivalent to an insurance policy for local authorities and administered by the central government.
- *Permanent transfers.* If there is a discrepancy between local expenditure mandates and local financing, the central government could cover the gap with transfers. These transfers are present even in the absence of regional shocks or regional income disparities. An example of these transfers are the bloc grants given by the U.S. federal government to U.S. states in order to allow them to fulfill their mandated social expenditure after the welfare reform in 1996.

To investigate the determinants of transfer policy in Russia, we estimate the following specification:

$$\left(\frac{\text{net transfers}}{\text{income}} \right)_i = \text{constant} + \alpha \ln(\text{income per capita})_i + \beta \ln(\text{oil shock})_i + \gamma (\text{net revenues per capita})_i$$

The parameter α is meant to capture the extent of the equalization transfers. Poor regions should receive more transfers in order to finance local investment projects. The parameter β should capture the insurance transfers; a region experiencing a negative oil shock should receive more transfers. Finally, the parameter γ is meant to capture the third reason for transfers; regions with less revenues to cover their expenditure obligations should receive more transfers. This last coefficient is only a very rough approximation of the last reason for transfers, given that it supposes that expenditure mandates per capita are the same across regions. As before, we estimate several cross-sectional regressions.

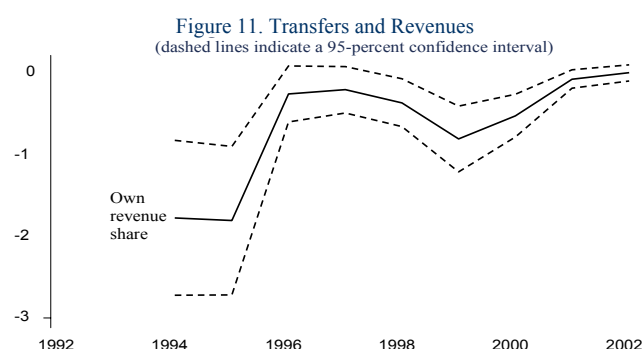
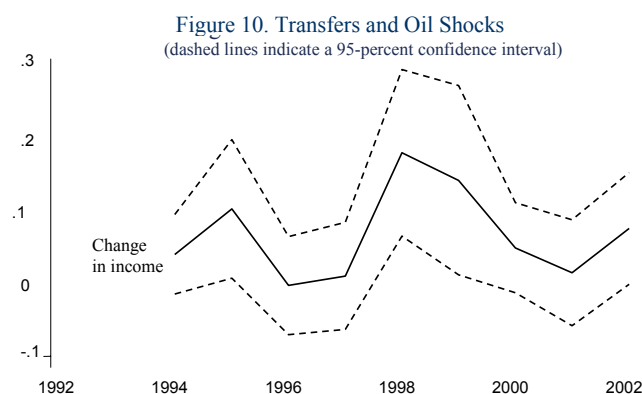
Figure 9 plots the estimated parameter α for each year. It shows that the sensitivity of regional transfers to regional income per capita has increased; that is, poorer regions have been receiving proportionally more transfers over time. It is notable that the equalization effects captured in α are becoming stronger in



the later period. This is consistent with the improvement in the operation of the Fund for Financial Support of the Regions (FFSR) after the 1998 crisis (Martinez-Vazquez and Boex, 2000).

Figure 10 shows the results for parameter β . If there is an insurance motivation to transfers, this coefficient should be significantly negative. However, if, for political economy reasons, oil-rich regions with more bargaining power receive additional transfers during oil booms, then the coefficient should be positive. Figure 10 does not provide firm evidence for either explanation. If anything, transfers seem positively correlated to oil shocks in periods in which the central government was weak, such as 1998.

Finally, Figure 11 illustrates the coefficient γ over time. The coefficient γ is almost always significantly negative, indicating that regions with less revenues are receiving more transfers even controlling for the level of income and oil shocks.



V. CONCLUSIONS

The paper has presented empirical evidence that Russia's regions are vulnerable to regional shocks due to low labor mobility, procyclical fiscal policy in regions, and inadequate transfer policy. In Russia, regional income shocks are severe, but the population reacts very slowly to the shocks, making countercyclical regional fiscal policy all the more important for economic stability of the country. Our panel data study, drawing on both static and dynamic regressions, however, shows that fiscal policy in Russia's regions has largely been procyclical, exacerbating rather than moderating regional shocks. Specifically, regional revenues and expenditures are highly correlated with oil shocks, while federal transfers do not seem to play much of a role in shock absorption. Such a pattern of procyclical policy in regions reflects an underdeveloped tax system, the lack of countercyclical welfare spending, and rigid intergovernmental fiscal arrangements in which subnational governments have little discretion and incentive to react to regional shocks

Several policy implications can be drawn. The federal government needs to offset the procyclical regional fiscal policy, should the government aim at a neutral fiscal stance at the general government level. Also, given that regional procyclical fiscal policy reflects the lack of fiscal autonomy in regions, an ongoing reform of intergovernmental fiscal relations, which intends to promote regional fiscal autonomy while strengthening accountability, is a step in the right direction. In addition, the evidence of low labor mobility highlights the need for structural reforms, including deregulation and housing reform.

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