

Growth in Post-Soviet Russia: A Tale of Two Transitions

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Abstract

In the early stages of post-Soviet Russia's economic transition, small-scale entrepreneurial activity appeared to be a strong engine of growth. Moreover, striking regional variations in initial conditions and adopted policy reforms appeared useful in accounting statistically for observed regional variations in entrepreneurial activity. Here, we investigate whether these relationships have persisted as Russia's transition has continued to evolve, and find that they have not. We then document that the emergence of bank-issued credit, virtually non-existent outside of Moscow prior to 2000, has been an important engine of growth since 2000. Thus to date, Russia's post-Soviet development appears as a tale of two distinct transition paths.

JEL Codes: O4, P3, R1

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1. Introduction

In the initial stages of its economic transition, the political and economic climate within post-Soviet Russia varied widely across regions. Many regions, most notably those within Russia's Red Belt (so-called due to their support of the Communist Party in the 1996 presidential election), maintained barriers against inter-regional trade and were generally hostile to the adoption of economic reforms of any type (e.g., see Gardner and Brooks, 1993; DeMasi and Koen, 1996; Berkowitz and DeJong, 1999; and Gluschenko, 2008a,b). In turn, pro-reformist regions often tended to favor alternative reform packages. For example, Magadan aggressively pursued state privatization reforms, but was slow to liberalize prices; the opposite was true in Moscow; while Saratov and Kaliningrad aggressively implemented both types of reforms (e.g., see Berkowitz and DeJong, 2003). Additional dimensions along which striking regional variation was evident include the quality of regulatory environments (Slinko, Yakovlev and Zhuravskaya, 2005), the implementation of bankruptcy laws to protect creditors (Lambert-Mogliansky, Sonin and Zhuravskaya, 2007), and the quality of commercial courts (Shvets, 2005).

Along with this rich inter-regional diversity in political and economic climates, Russia also experienced tremendous regional diversity in entrepreneurial activity and temporal patterns of economic activity in the early stages of its transition. Exploiting this diversity, Berkowitz and DeJong (2003, 2005) studied interregional relationships between regional initial conditions, the adoption of reform policies, the development of entrepreneurial activity, and temporal patterns of economic activity. In so doing, we found that regional differences in reform policies and human capital at the start of transition were valuable in helping to account for regional differences in entrepreneurial activity. In turn, controlling for potential simultaneity between entrepreneurial activity and changes in economic activity, we found that while economic activity contracted on average across Russian regions between 1993 and 2000, entrepreneurial activity appeared important for slowing or even reversing this contraction. In particular, using a two-stage least squares (2SLS) analysis, we found that a one-standard-deviation increase in regional entrepreneurial activity (reflecting an additional 2.3 legally registered small-scale enterprises per 1000 inhabitants as of December 1995) was associated with an increase in real economic growth of roughly 2.0 annual percentage points over the period 1993:IV –

2000:IV. This finding was striking, particularly due to the hostile environment small enterprises faced in the early stages of transition. Specifically, their assets were poorly protected; they often had little recourse from courts when the contracts they signed were breached; their taxes were high and generally unpredictable; and they had limited access to credit from banks and equity markets (Frye and Shleifer, 1997; Johnson, McMillan and Woodruff, 2002).

The link between entrepreneurial activity and growth we established complemented national-level evidence indicating the importance of entrepreneurial activity as a source of growth in post-socialist economies. For example, synthesizing a large body of work focusing on the experiences of Poland, China and Russia, McMillan and Woodruff (2002) concluded that the robust economic growth enjoyed by Poland and China prior to 2000 is attributable in large part to the substantial entrepreneurial development they have experienced, while the economic stagnation Russia endured during the early stages of its transition has as a root source its record of relatively sluggish entrepreneurial development.

As the Russian Presidency passed from Yelstin to Putin in 2000, several factors arose that carried clear implications for economic growth both at the aggregate and regional level. Important factors at the aggregate level include surges in oil and gas prices, and a steep devaluation in the ruble exchange rate that made Russian exports more competitive (Desai, 2006). Important factors at the regional level include the federal government's efforts to centralize economic policymaking (e.g., see Martinez-Vazquez and Boex, 2001; Alexeev and Kurlyandskaya, 2003; Andreeva and Golovanova, 2003; and Desai, Freinkman and Goldberg, 2003).

We begin this study by assessing whether the empirical relationship identified previously between policy reforms, entrepreneurial activity and economic growth has persisted into this second phase of transition. Using data on real household income extended through 2007, we find that it has not. In particular, we find that the growth climate within Russia has changed dramatically since 2000, implying in part that the explanatory power of initial differences in the adoption of policy reforms is no longer evident within Russia, and that the previous links between entrepreneurial development and economic growth have disappeared.

Finding this relationship to have disappeared, we then turn to an alternative account of regional variation in economic growth: the emergence of bank-issued credit. Motivation for the study of this alternative account comes in part from Berglof and Lehmann (2009). Based on strong impressions they have formed through their work at the European Bank for Reconstruction and Development, and using aggregated data, they argue that bank-issued credit has been an important engine of growth since 2000. If this is indeed the case, it represents a relatively recent development. For example, earlier work by Berglof and Bolton (2002) established the lack of a discernable empirical relationship between financial development and growth during the first decade of post-socialist transition in the Former Soviet Union and in Eastern Europe. Within Russia, this is due to the fact that bank-issued credit was virtually non-existent prior to 2000, at least outside of Moscow. Instead, banks merely acted as depositories and speculative investors; in consequence, private firms were largely forced to self-finance investment projects from the use of retained earnings or informal sources (e.g., see Shleifer and Treisman, 2001, Chapters 3 and 4; and Karas, Pyle and Schoor, 2009). However, since 2000 bank-issued credit has grown substantially, if unevenly, at the regional level (Karas, Pyle, and Schoor, 2009). Thus we investigate here whether regional patterns of bank-issued credit help account for regional patterns of growth observed since 2000.

Measuring the development of regional credit markets using the stock of credits extended to private borrowers as of September 2001 (in rubles per inhabitant), and controlling for potential endogeneity by instrumenting for this variable using regional variations in attitudes towards the implementation of market reforms, we find a strong relationship between regional patterns of bank-issued credit and economic growth. Specifically, we find that a one-standard-deviation increase in our measure of credit (reflecting an additional 157 rubles lent per regional inhabitant) is associated with an increase in real economic growth ranging from 1.08 to 1.26 annual percentage points over the period 2000:IV – 2007:IV. Thus it appears that the development of a functional banking sector within Russia has served as a significant contributor to economic growth. This intra-national evidence complements cross-country studies that have highlighted the role of financial development in general, and bank-issued credits in particular, in

stimulating economic growth (e.g., see Levine, 2005; and Barth, Caprio and Levine, 2009).

The emergence of bank-issued credit as an important engine of growth within Russia serves as an example of endogenous institutional change, a phenomenon that has been emphasized as critically important for understanding differences in economic performance among economies distinguished in terms of time and space. Detailed characterizations of the endogenous formation and evolution of institutions are provided, e.g., by Schotter (1981), Aoki (2001, 2005), and Greif (2006). The fact that the emergence of bank-issued credit has lagged in regions that have tended to resist the adoption of market reforms in general is a testament to the persistence of the de facto political power and economic influence the communist party has maintained within certain Russian regions. For a theoretical characterization of the tendency towards this persistence, see Acemoglu and Robinson (2008).

In what follows, we begin by characterizing regional patterns of growth between 1993 and 2000; and between 2000 and 2007. We then describe the additional data included in our study, show how the relationship between growth and entrepreneurial activity has been severed in the post-2000 data, and then document the relationship between credit and growth that has emerged since 2000.

2. Economic Growth: Data Definitions and General Characterization

We begin by describing our measure of regional economic growth, and characterizing aspects of its behavior during 1993-2000 and 2000-2007. To measure growth, we first construct a measure of regional income levels that is adjusted to control for price differences across regions at a specific point in time, and that is also adjusted to control for inflation over time. To achieve the former adjustment, we normalize nominal income using an index that measures the relative cost of a basket of 83 consumer goods across regions. For a given region, this normalization is made for a single observation of the index: that corresponding to the fourth quarter of 2007. Thus this normalization yields a nominal measure of purchasing power directly comparable across regions. This nominal measure is then converted to a real measure using monthly CPI data. The reason for this two-step conversion is that the consumer-goods cost index is not available throughout the

sample period. However, for the time periods during which it is available (beginning in June of 2001), its pattern of growth corresponds closely with that observed for the CPI. Thus our income measure provides a direct real measure of regional differences in average household income.

We use this measure of income to construct regional measures of growth (computed as annual averages) between 1993:IV – 2000:IV (coinciding with the time span of our previous study), and between 2000:IV – 2007:IV. The use of 2000 as a cutoff point is natural for several reasons: most importantly, it marks the ascension of Putin to the presidency, as well as the installation of a newly elected federal Parliament. The source of the component variables used to construct growth is the Russian Statistical agency Rosstat (Web site: www.gks.ru.) The data set includes 68 of Russia's 83 regions. We exclude regions for which data are incomplete: this includes, for example, the war-torn regions of Dagestan and Chechniya. Also excluded from the data set are Moscow and the oil-rich Tyumen Oblast, which appear as dramatic outliers in the sample.

Before continuing, it bears noting that we measure growth using household income rather than regional GDP data. The reason for this is that in Russia, GDP measures include the value of output generated by subsidized state enterprises; this output is disconnected from market valuations. Household income data more closely reflects market-driven activities, and thus better reflects regional economic activity.

An overview of regional patterns of growth is provided in Table 1, and Figures 1 and 2. Table 1 provides summary statistics; Figure 1 plots growth in 2000-2007 against growth in 1993-2000; and Figure 2 plots growth in both periods against (logged) initial income. (Table 1 also provides summary statistics for our measures of entrepreneurial activity and bank-issued credit; definitions of these variables are provided in Section 3.)

The most striking aspect of the growth comparisons across periods is in their levels: growth in 1993-2000 averaged -2.2% across regions, with only 17 regions in the sample experiencing positive growth; while growth in 2000-2007 averaged 14.8% , with all regions enjoying growth in excess of 9% . As noted, this dramatic difference across time periods is due in part to aggregate-level shocks realized after 2000, including surges in oil and gas prices, and a steep currency devaluation. Here we do not seek to account

for this change in growth levels, but focus instead on regional differences in growth performance that have remained evident within Russia since 2000.

Beyond the difference in average growth levels across time periods, two additional features of regional growth are notable. First, note from Figure 1 the distinct negative relationship between growth in the two periods. According to the fitted regression line, regions with a 1-percentage-point relative growth-rate advantage between 1993:IV-2000:IV on average experienced a 0.35% relative disadvantage between 2000:IV-2007:IV. Second, note from Figure 2 that the regional tendency towards unconditional convergence apparent between 1993:IV-2000:IV increased dramatically between 2000:IV-2007:IV. With α denoting the coefficient on logged initial income in a regression of growth on a constant and logged initial income, the annual rate of conditional convergence λ solves

$$(1) \quad 1 + \alpha = \exp(-\lambda t),$$

where t denotes the time span over which growth is measured (for details, see Barro and Sala-i-Martin, 2003, p. 111). Between 1993:IV-2000:IV, regional income converged at an average annual rate of 0.57%; between 2000:IV-2007:IV, the speed of convergence approximately doubled to 1.08%.

3. Data Description: Additional Variables

The primary explanatory variables we examine are small-scale entrepreneurial activity and bank-issued credit. Both are measured as stock variables. To quantify the former, we use the stock of small enterprises reported in the region on the last day of a year, and divide this number by thousands of inhabitants (source: Goskomstat Rossii, 1996, 2002). To account for growth between 1993:IV-2000:IV, we would ideally measure entrepreneurial activity as of the end of 1993. However, the earliest reliable measure we can obtain is reported at the end of 1995. To account for growth between 2000:IV-2007:IV, we use the stock of small enterprises reported at the end of 2000. Hereafter we refer to these variables as ENT-95 and ENT-00.

To quantify bank-issued credits (CREDIT), we use the stock of credits issued to private individual borrowers (households and firms) within each region, normalized by the regional population (source: Central Bank of the Russian Federation, 2001). We

exclude legal entities from this measure, because these include large state enterprises and members of financial industrial groups, both of which receive credits in part due to political connections. Credit data aligned with the period 1993:IV-2000:IV are not available, which in part reflects the fact noted above that bank-issued credit was negligible outside of Moscow prior to 2000. To account for growth between 2000:IV-2007:IV, we use the stock of credit per capita measured as of September 30, 2001 (the earliest period for which this measure is available).

In addition to these variables, we measure six variables that quantify regional differences in human capital, physical capital, political culture, and location. These are all stock variables designed to characterize regional differences in initial conditions, to be controlled for in characterizing subsequent growth. We measure human capital using the share of the regional population fifteen years old and greater as of 1994 that completed high school and received at least some post-secondary training (EDU). This variable was collected in the 1994 Russian household micro-census (Goskomstat, 1995).

We characterize physical capital using two variables. The first is a measure of initial production potential (IO); the second is a measure of the regional importance of the defense industry (DEFENSE). IO is designed to measure the profitability at world market prices of the industrial capital stock in place as of 1985. To compute this, we multiplied the industry's labor share (source: Gaddy, 1996) by its value added, net of labor costs as computed by Senik-Leygonie and Hughes (1992); we then summed the resulting products. This measure is limited to industries that produce tradable goods; the oil and gas industries have the highest value added, while food processing has the lowest (in fact, negative) value added. DEFENSE is measured in each region as the number of workers employed in the defense industry per thousand employed workers in 1985 (source: Gaddy, 1996). As emphasized by Gaddy (1996), DEFENSE is a potentially important initial condition that proxies human capital and political connections, since the defense sector attracted some of the most skilled workers, and gave regional elites close connections to powerful defense industries in Moscow.

In order to account for the potential impact of location, we measure the log of a region's transport distance from Moscow (LNDIST). Moscow was the major source of commercial, political, transport, cultural, educational, and financial activity in the Former

Soviet Union. Moreover, during transition, banking and financial-exchange markets were initially located primarily in Moscow. Thus, transport distance is a potentially useful measure of a particular region's access or lack thereof to critical activity within Russia.

In order to measure differences in regional political cultures, we use two different variables. The first is the share of the regional population that voted for pro-reformist candidates in national parliamentary elections. For the period 1993-2000 we use the December 1993 parliamentary elections (REF-93), and for the period 2000-2007 we use the 1999 elections (REF-99; sources: Clem and Craumer, 1993, 2000). Table 2 reports correlation patterns observed between reformist voting in the 1993, 1995 and 1999 parliamentary elections. The correlations are high and statistically significant, suggesting that regional political cultures were relatively stable during the 1990s.

The second measure is of regional voter-participation rates observed in the 1989 Soviet elections (PART). In what is considered to have been the first "semi-competitive elections" in Soviet history, citizens were allowed to vote for some representatives to the Congress of Peoples' Deputies, which was the national legislature in the Former Soviet Union (McFaul and Petrov, 2004). These elections threatened the power of the Communist elites by opening up positions of power to opposition candidates. Thus in regions in which the Communist Party remained strong, turnout in the 1989 elections was relatively high, as the "...less reformed regions continued to mobilize turnout through the still intact party-state apparatus that extended into state farms and enterprises." (Petrov, 2004, p.250; for similar evidence of this, see Berezkin et al., 1989). Table 2 reports the correlation of this measure with the reformist voting patterns described above. The strong negative and statistically significant correlations observed between these measures indicate that among regions in which the Communist Party was relatively strong, anti-reformist sentiments remained strong during the 1990s. This persistence is documented in more detail by Remington (2008).

In order to control for potential endogeneity between small enterprises and growth, and between bank-issued credit and growth, we use the measures of political culture as instruments capturing sources of exogenous variation. Voting patterns observed during 1993 and 1999 were sharply divided between pro-reformist and recidivist candidates, and thus clearly reflect regional preferences for economic reform

(Warner, 2001). Voter-participation patterns observed in the 1989 elections are also plausibly relevant, since as noted above, the Communist Party strongly influenced these patterns, and remained resistant to subsequent reforms pursued during transition. The correlation patterns reported in Table 2 support the relevance of these instruments for ENT-95 and CREDIT. Correlations between PART and ENT-95 and CREDIT are -0.50 and -0.37; the correlation between REF-93 and ENT-95 is 0.55; and the correlation between REF-99 and CRED is 0.41. However, the same is not true for ENT-00, which is negligibly correlated with both REF-99 and PART.

In order to serve as valid instruments, beyond exhibiting correlation with endogenous control variables, the measures of political culture must also satisfy exclusion restrictions in second-stage growth regressions. Assumptions regarding their exclusion require some explanation. In particular, while we have noted that voting patterns are clearly relevant for explaining patterns of small-scale entrepreneurial activity or bank-issued credit, it is not obvious that voting should influence growth exclusively through these channels. Our defense of this assumption is that voting patterns reflect regional preferences towards the implementation of economic reforms. In turn, since the purpose of reforms is to produce local environments conducive to the conduct of business, their implementation should be associated with the emergence of entrepreneurial activity, and the emergence of banks as a source of external finance. In turn, the emergence of these activities is reflected in subsequent economic growth.

Admittedly, there are issues associated with this argument: reform could affect growth through other channels. For example, in our work on market integration in Russia, we showed that Communist-controlled regions often withdrew from internal markets, and this behavior was associated with relatively poor economic performance (Berkowitz and DeJong, 1999). Thus it is plausible that there remains positive covariance between reformist voting patterns and the error term in the growth equation. In this case estimates of the impact of either entrepreneurial activity or credit issuance would be inconsistent and biased upward. Moreover, violation of the exclusion restriction could lead us to over-reject the null that either variable has no influence on growth using a t test (Berkowitz, Caner and Fang, 2008). Likewise, there could remain negative covariance between PART and growth. However, since in this case increased participation is associated with

resistance towards reform, estimates of the impact of either entrepreneurial activity or credit issuance would be biased downward, and we would tend to under-reject the null that either variable has no influence on growth. Given these competing potential biases, use of each instrument in isolation should yield a plausible range of estimates for the impact of credit on growth.

In addition, due to the timing with which REF-93 and REF-99 are measured, it is difficult to argue for their strict exogeneity: there may exist omitted variables that affected both REF and the subsequent economic growth that immediately followed their measurement. However, given the massive social, political and economic upheaval that followed the collapse of the Soviet Union, the exogeneity of PART (measured in 1989) is more difficult to question on these grounds. Thus use of this instrument in isolation carries additional value as a check for robustness.

In sum, while it is important to recognize potential caveats regarding the assumptions underlying the two-stage analysis that follows, there are good *a priori* arguments in their favor, we have a reasonable set of robustness checks to rely upon, and as we shall see, standard diagnostic statistics also support the specifications we employ. Details follow.

4. Policy Reforms, Entrepreneurial Activity, and Growth

Here we present a two-stage least squares analysis of the relationship between entrepreneurial activity and economic growth. Table 3 presents two sets of estimates, one set for growth measured from 1993-2000 (and small enterprises measured in December of 1995), the other for growth measured from 2000-2007 (and small enterprises measured in December of 2000). For each measure of growth, two model specifications are presented: one includes the full set of conditioning variables we consider; another excludes conditioning variables estimated as statistically insignificant in the second stage of the complete specification. Panel A presents second-stage estimates; Panel B presents first-stage estimates.

The results obtained using growth measured from 1993-2000 closely mirror results we reported previously (Berkowitz and DeJong, 2005). Specifically, small enterprises figure significantly in the unrestricted specification at the 10% level, and in

the parsimonious specifications at the 1% level. Moreover, they are measured as having a quantitatively significant relationship with growth. In the unrestricted specification, a one-standard-deviation increase in the measure (which represents an additional 1.7 enterprises per 1,000 inhabitants) is associated with an increase in real economic growth of 2.17 annual percentage points; in the parsimonious specification, this measure drops to 1.95 annual percentage points.¹

Note from Panel B that small enterprises are reasonably well identified in the first-stage regression. Both REF-93 and PART enter as statistically significant at the 10% level in the unrestricted regression, and at 5% in the parsimonious regression. F statistics associated with their joint exclusion are reasonably strong: 8.65 and 6.48 in the respective specifications. Ideally though, these F statistics would clear the threshold of 10 to indicate real instrument strength. In a Table A3 in the Appendix, we report estimates obtained via limited information maximum likelihood (LIML), since LIML estimates are known to be less biased when instruments are weak (Moreira, 2003). The results obtained using LIML are qualitatively and quantitatively similar to those reported here.

Regarding quantitative significance, a one-standard-deviation increase in REF-93 (which represents a 9.8 percentage-point increase in the votes received by reformist-party candidates) is associated with an additional 0.40 small enterprises per 1,000 inhabitants in the unrestricted specification. And a one-standard-deviation increase in PART (which represents an increase in voter participation of 6.1 percentage points) is associated with 0.43 fewer small enterprises per 1,000 inhabitants in the unrestricted specification.

The results obtained using growth measured from 2000-2007 convey an entirely different message. Note in particular that small enterprises are no longer well-identified in the first stage: e.g., F statistics associated with the excluded instruments are less than 0.2 in both model specifications. In addition, the relationship between entrepreneurial activity and growth is estimated as negative and insignificant.

This lack of statistical correspondence does not merely reflect a weak-instrument problem: the correlation between small enterprises and growth is negative during this period (-0.20), and an OLS regression of the second-stage specification also yields a

¹ If we drop the use of REF-93 as an instrument, due to the potential concern regarding omitted-variables bias discussed in Section 3, these measures of quantitative significance actually increase from 2.17 to 2.34 in the unrestricted regression, and from 1.95 to 2.17 in the parsimonious regression.

negative and statistically insignificant coefficient on small enterprises. Moreover, this lack of statistical correspondence is not isolated to small enterprises. Indeed, not a single variable enters the second stage significantly at even the 10% level.

Clearly then, the regional pattern of growth observed in the early stages of Russia's transition was substantially transformed by developments realized since 2000. In particular, the strong link between small-scale economic activity and economic growth is no longer evident in the post-2000 data. This missing link corresponds with additional evidence indicating that the relative importance of small-scale enterprises in comprising aggregate economic activity has diminished as Russia's transition has matured. For example, the share of aggregate investment accounted for by these enterprises fell from 5.4% in 1997 to 2.7% in 2001, then moved to 3.9% in 2007 (source: Goskomstat 1998, 2002, 2008a,b). And according to data that compares the relative profitability of small-versus medium- and large-scale enterprises, small-scale enterprises were roughly equally as profitable as larger enterprises in 1996, one-sixth as profitable in 2000, and one-fifth as profitable in 2007 (source: Goskomstat, 2001, 2008a,b).

A full account for this pattern of decline is beyond the scope of this paper, but it seems attributable in part to a surge in the importance of Russia's export sector (dominated by large-scale firms) that has corresponded with the devaluation of the ruble noted above. In particular, exports as a percentage of GDP surged from 26% in 1996 to 44% in 2000, and has averaged 34% thereafter (source: <http://web.worldbank.org>). More broadly, the decline is consistent with survey evidence gathered in developing economies which indicates that small-scale enterprises tend to be far less productive than their large-scale counterparts, casting doubt on their long-run viability as an engine of growth (LaPorta and Shleifer, 2008).

Having found that the regional pattern of growth observed in the early stages of Russia's transition has been transformed by post-2000 developments, we now analyze the extent to which the emergence of banks as non-trivial sources of credit appears as a significant factor in accounting for regional differences in growth observed since 2000.

5. Accounting for Growth from 2000: the Emergence of Bank-Issued Credit

Table 4 presents two-stage least-squares estimates for the relationship observed between growth measured from 2000-2007, and bank-issued credit measured in September of 2001. Once again, two model specifications are presented: one includes the full set of conditioning variables we consider; another excludes conditioning variables estimated as statistically insignificant in the complete specification. Panel A again presents second-stage estimates; Panel B presents first-stage estimates.

Note first that we obtain a strong identification of credit in the first-stage regressions: e.g., F statistics associated with the excluded instruments are now no less than 15. Note also that the statistical significance of the instruments is sensitive to model specification: PART is significant in the parsimonious specification; REF-99 is significant in the unrestricted specification. Regarding quantitative significance, a one-standard-deviation increase in PART translates into between 40 to 70 fewer rubles of bank-issued loans per regional inhabitant; and a one-standard-deviation increase in REF-99 (which represents a 5.7 percentage-point increase in the votes received by reformist-party candidates) translates into between 30 to 50 additional rubles of bank-issued loans per regional inhabitant.

Turning to the second stage, credit figures significantly at the 10% level in the unrestricted specification, and at the 5% level in the parsimonious specification. Regarding quantitative significance, a one-standard-deviation increase in the measure (which represents an additional 157 rubles of bank-issued credit per regional inhabitant) is associated with an increase in real economic growth of 1.26 annual percentage points in the unrestricted specification, and 1.08 annual percentage points in the parsimonious specification. In addition, when conditioning on credit, education and defense also appear statistically and quantitatively significant: their respective quantitative-significance measures are 0.76 and 0.61 percentage points in the full specification, and 0.65 (for both measures) in the parsimonious specification.

As noted, a major source of growth observed between 2000-2007 has been a surge in oil prices that has provided billions of dollars of export revenues (Desai, 2006). In obtaining the results reported above, we have treated oil prices as a national shock that uniformly influenced growth across regions. However, if we instead include employment

shares in the oil and gas sector (as of 1985) in order to capture potential differential affects, we obtain results similar to those reported here, both qualitatively and quantitatively.

In Section 3, we outlined the case supporting the use of REF-99 and PART as instruments for CREDIT in this context. In so doing, we noted that if the reasoning behind their exclusion in the second-stage growth equation was flawed, then the use of REF-99 ought to impart an upward bias in the measure of the relationship between CREDIT and growth, and the use of PART ought to impart a downward bias. Mindful of this, we re-estimated the relationship between CREDIT and growth using each instrument in isolation in order to obtain upper- and lower-bound approximations of the impact of CREDIT on growth. Using REF-99 in isolation, we obtained a quantitative-significance measure of 1.51 annual percentage points using the complete specification, and 1.63 percentage points using the parsimonious specification (the former is statistically significant at the 10% level; the latter has a p-value of 11%). Using PART in isolation, the measures we obtained were 0.8 and 0.9 percentage points (respective p-values are 29% and 8%). In all cases, F statistics associated with the instrument exclusions are no less than 10. Thus it appears that [0.8 1.6] represents a plausible range for the estimated impact of CREDIT on growth.

Finally, if we augment the specification for growth employed in Table 4 to include small enterprises as an additional endogenous explanatory variable, the quantitative relationship reported between CREDIT and growth reported above is unaffected. In particular, we obtain quantitative-significance measures of 1.16 for CREDIT using both the complete and parsimonious specifications in this case. Moreover, estimates obtained for small enterprises mirror those reported in the last two columns of Table 3: the relationship between small enterprises and growth continues to register as negative and insignificant when measuring growth between 2001 and 2007.

6. Conclusion

We have characterized two distinct stages of post-Soviet Russia's economic transition. Prior to 2000, small-scale entrepreneurial activity appeared to be a strong engine of growth. Moreover, regional variations in initial conditions and adopted policy

reforms appeared useful in accounting for observed regional variations in entrepreneurial activity. Beyond 2000, this relationship ceased to exist. Instead, bank-issued credit has emerged as an apparent growth engine, and in turn, regional variations in attitudes towards the implementation of market reforms appear useful in accounting for regional differences in the extension of credit. This intra-national evidence provides further indication of the importance of credit as an engine of growth in developing economies.

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Table 1
Summary Statistics

| | GROWTH | | SMALL ENTERPRISES | | BANK CREDIT |
|---------------------------|-----------------|-----------------|-------------------|--------------|-------------|
| | 1993:IV-2000:IV | 2000:IV-2007:IV | Dec. 1995 | Dec. 2000 | Sept. 2001 |
| Average | -2.59% | 15.15% | 3.93 | 30.73 | 323 |
| Median | -2.8% | 14.7% | 3.9 | 31.0 | 290 |
| Standard Deviation | 3.11% | 3.07% | 1.62 | 24.75 | 157 |
| Maximum | 4.02% | 24.25% | 12.31 | 154.6 | 786 |
| Minimum | -10.19% | 9.13% | 1.71 | 1.9 | 88 |
| | | | | | |

Notes: Growth is measured in terms of annual averages; small enterprises are number of small-scale firms per 1,000 inhabitants; bank credit is rubles per inhabitant.

Table 2

Correlation Patterns Between Endogenous Controls and Instruments

| | PART | REF-93 | REF-95 | REF-99 | ENT-95 | ENT-00 | CRED |
|--------|----------|---------|---------|---------|--------|----------|------|
| PART | 1.00 | | | | | | |
| REF-93 | -0.65*** | 1.00 | | | | | |
| REF-95 | -0.57*** | 0.79*** | 1.00 | | | | |
| REF-99 | -0.55*** | 0.58*** | 0.51*** | 1.00 | | | |
| ENT-95 | -0.50*** | 0.55*** | 0.61*** | 0.36*** | 1.00 | | |
| ENT-00 | -0.10 | -0.00 | -0.05 | -0.02 | 0.07 | 1.00 | |
| CREDIT | -0.37*** | 0.29** | 0.20* | 0.41*** | 0.12 | -0.51*** | 1.00 |

Note: PART is voter participation in the 1989 Soviet elections; REF-XX is reformist voting in the indicated election year; ENT-XX is the number of small-scale enterprises per 1,000 inhabitants in the indicated year; and CRED is bank-issued credit measured in September of 2001. * denotes statistical significance at 10% level; ** denotes significance at 5% level; *** denotes significance at 1% level.

Table 3

*Panel A: 2SLS Estimates of Structural Equation
for Growth and Small Enterprises*

| Specifications | (1) Unrestricted | (2) Parsimonious | (3) Unrestricted | (4) Parsimonious |
|---|--------------------------------|----------------------------------|-----------------------------------|--------------------------------|
| Dependent Variable | Growth, 93:IV-2000:IV | | Growth, 2000:IV-2007:IV | |
| Initial Income | -3.87* (2.02) | -3.99** (1.77) | -6.05 (4.48) | -6.77 (1.65) |
| IO | 0.08*** (0.02) | 0.08*** (0.02) | -0.05 (0.20) | |
| Defense | 0.08 (0.33) | | 0.60 (0.41) | |
| Distance (log) | 0.23 (0.41) | | 0.50 (0.61) | |
| Education | -0.17 (0.33) | | 0.12 (0.17) | |
| Small Enterprises | 1.34* (0.74) [0.19,3.35] | 1.21*** (0.44) [0.49,2.26] | -0.161 (0.354) [-inf,+inf] | -0.07 (0.15) [-inf,+inf] |
| | Quantitative Significance | | | |
| Initial Income | -0.75 | -0.77 | -1.56 | |
| IO | 1.17 | 1.17 | -0.80 | |
| Defense | 0.11 | | 0.78 | |
| Distance (log) | 0.25 | | 0.54 | |
| Education | -0.50 | | 0.34 | |
| Small Ent. | 2.17 [0.31, 5.59] | 1.95 [0.79, 3.66] | -4.0 [-inf,+inf] | -1.62 [-inf,+inf] |
| | P values for hypothesis tests | | | |
| Parsimonious versus unrestricted reg. | | 0.875 | | 0.233 |
| Over- identification: Hansen J test | 0.814 | 0.617 | 0.237 | 0.024 |

Notes (apply to all subsequent tables): Standard errors accompanying point estimates are given in parentheses. * denotes statistical significance at 10% level; ** denotes significance at 5% level; *** denotes significance at 1% level. “Quantitative significance” indicates the response of the dependent variable implied by the point estimate of a one-standard-deviation increase in the corresponding explanatory variable. In all cases, a constant term has been estimated but is not reported.

Table 3

*Panel B: First-Stage (Reduced-Form) Estimates
Dependent Variable: Small-Enterprise Formation*

| Specifications | (1) Unrestricted | (2) Parsimonious | (3) Unrestricted | (4) Parsimonious |
|---|------------------------------------|--------------------|------------------------------------|------------------|
| Dependent Variable | Small Enterprises, Dec 31, 1995 | | Small Enterprises, Dec 31, 2000 | |
| Initial Income | -0.95 (0.88) | -1.08 (0.89) | 12.47 (13.69) | 6.31 (13.21) |
| IO | -0.02* (0.01) | -0.03*** (0.01) | -0.52*** (0.16) | |
| Defense | 0.01 (0.11) | | 0.55 (3.44) | |
| Distance (log) | -0.13 (0.17) | | -0.81 (3.59) | |
| Education | 0.25*** (0.09) | | -0.16 (1.30) | |
| Reformist Voting, 1993 | 0.04* (0.02) | 0.07** (0.03) | | |
| Reformist Voting, 1999 | | | -0.41 (1.04) | -0.50 (0.95) |
| Voting Participation, USSR | -0.07* (0.04) | -0.07** (0.03) | -0.42 (0.99) | -0.52 (0.99) |
| R ² value | 0.555 | 0.400 | 0.102 | 0.019 |
| | Quantitative Significance | | | |
| Initial Income | -0.19 | -0.21 | 3.21 | 1.63 |
| IO | -0.25 | -0.37 | -7.60 | |
| Defense | 0.01 | | 0.72 | |
| Distance (log) | -0.15 | | -0.88 | |
| Education | 0.72 | | -0.46 | |
| Ref. Voting | 0.40 | 0.66 | -2.35 | -2.85 |
| Voter Partic., USSR | -0.43 | -0.43 | -2.54 | -3.19 |
| F test for Ref Voting and Voter Partic. | 8.65 | 6.48 | 0.09 | 0.15 |

Table 4

*Panel A: 2SLS Estimates of Structural Equation
for Growth 2000:IV-2007:IV and Banking*

| Specifications | (1) Unrestricted | (2) Parsimonious |
|---------------------------------------|-----------------------------------|------------------------------------|
| Dependent Variable | Growth, 2000:IV-2007:IV | |
| Initial Income | -10.0*** (1.48) | -9.48*** (1.46) |
| IO | 0.02 (0.02) | |
| Defense | 0.47* (0.26) | 0.50* (0.26) |
| Distance (log) | -0.04 (0.40) | |
| Education | 0.27* (0.15) | 0.22* (0.13) |
| Bank credit, 2001 | 8.00* (4.32) [-0.90, 24.10] | 6.91** (3.19) [-0.58, 18.18] |
| | Quantitative Significance | |
| Initial Income | -2.59 | -2.44 |
| IO | 0.29 | |
| Defense | 0.61 | 0.65 |
| Distance (log) | -0.04 | |
| Education | 0.76 | 0.65 |
| Bank credit, 2001 | 1.26* [-0.14, 3.79] | 1.08** [-0.09, 2.86] |
| | P-values for hypothesis tests | |
| Parsimonious versus unrestricted reg. | | 0.686 |
| Over-identification: Hansen J test | 0.483 | 0.451 |

Table 4

Panel B: *First-Stage (Reduced-Form) Estimates*
Dependent Variable: Bank Credit, 2001

| Specifications | (1) Unrestricted | (2) Parsimonious |
|---|---------------------------|----------------------|
| Initial Income | 0.13 (0.06)** | 0.13** (0.06) |
| IO | 0.001 (0.001) | |
| Defense | 0.01 (0.01) | 0.002 (0.012) |
| Distance (log) | 0.05*** (0.02) | |
| Education | -0.02*** (0.004) | -0.02*** (0.01) |
| Reformist Voting, 1999 | 0.009** (0.004) | 0.005 (0.004) |
| Voting Participation, USSR | -0.006 (0.004) | -0.011*** (0.003) |
| R ² value | 0.487 | 0.417 |
| | Quantitative Significance | |
| Initial Income | 0.03 | 0.03 |
| IO | 0.01 | |
| Defense | 0.01 | 0.003 |
| Distance (log) | 0.05 | |
| Education | -0.06 | -0.05 |
| Reformist Voting | 0.05 | 0.03 |
| Voter partic. | -0.04 | -0.07 |
| F test for Ref Voting and Voter Partic. | 15.3 | 26.4 |

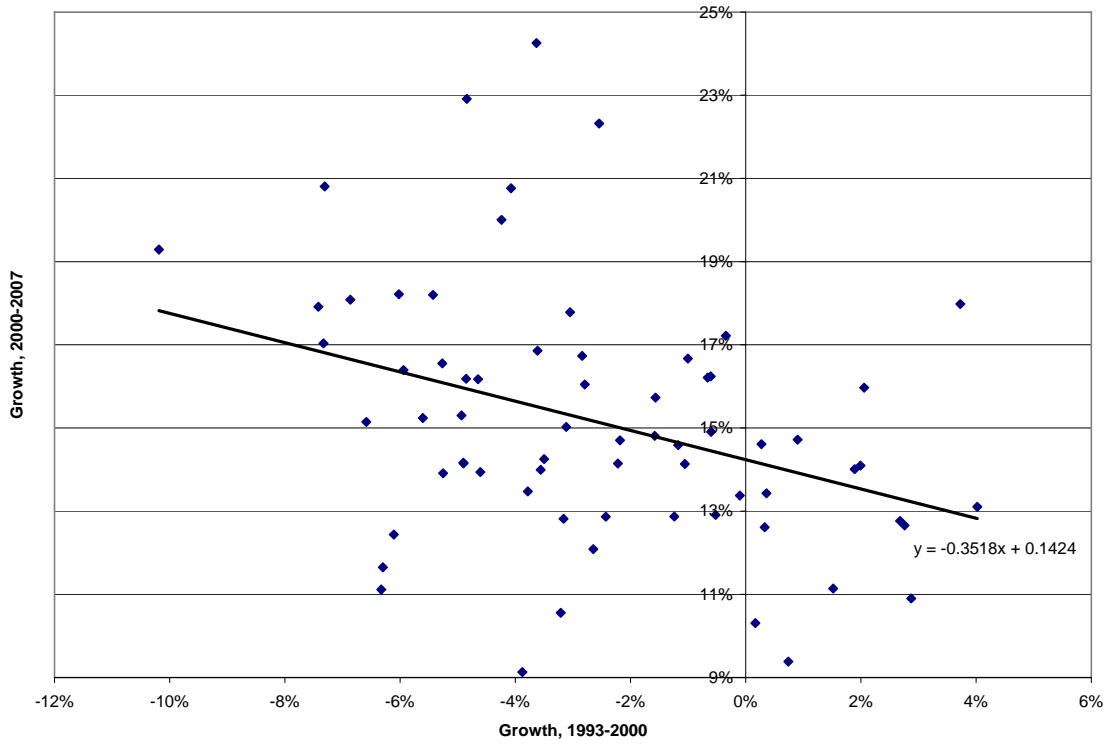


Figure 1. Growth Comparisons, 1993-2000 Versus 2000-2007

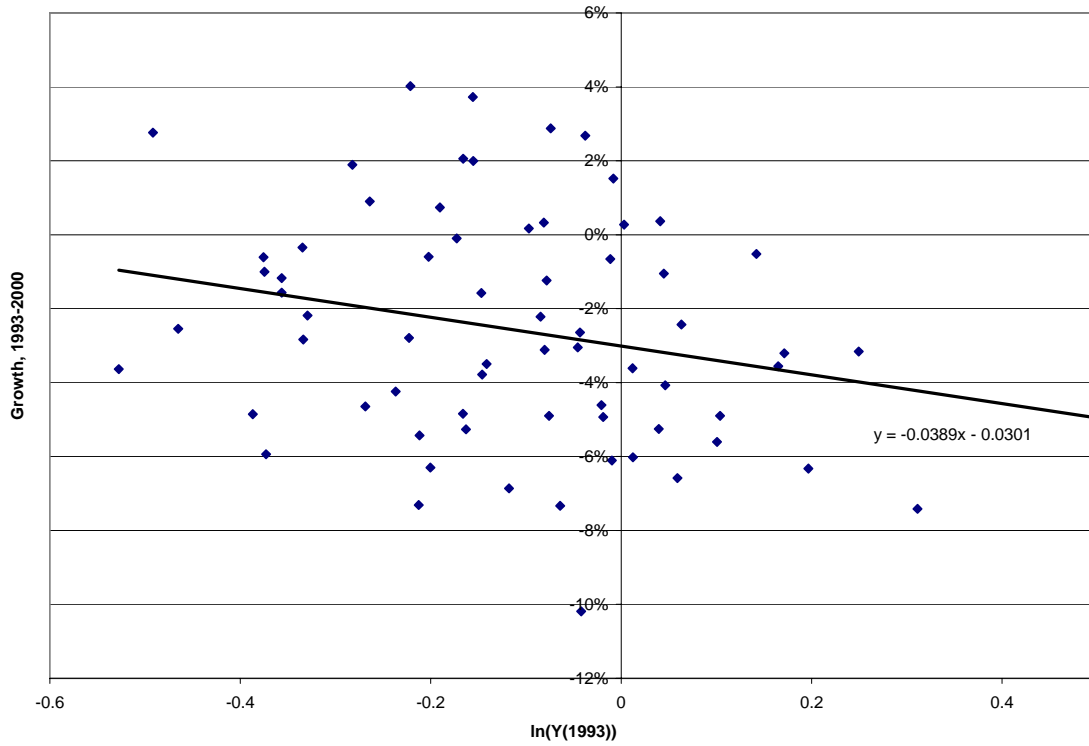


Figure 2a. Regional Convergence, 1993-2000

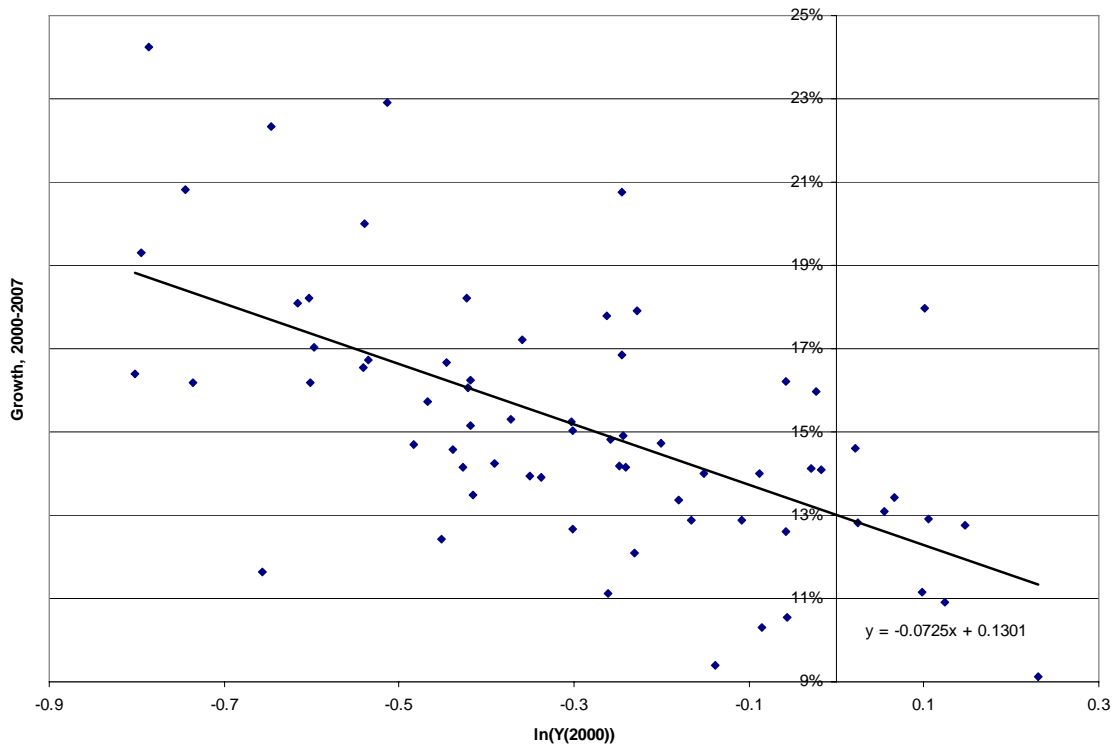


Figure 2b. Regional Convergence, 2000-2007

Appendix

Table A3

*Panel A: LIML Estimates of Small Enterprise in Structural Equation
for Growth and Small Enterprises*

| Specifications | (1) Unrestricted | (2) Parsimonious | (3) Unrestricted | (4) Parsimonious |
|--|---|------------------------------------|---|------------------------------------|
| Dependent Variable | Growth, 93:IV-2000:IV | | Growth, 2000:IV-2007:IV | |
| Small Enterprises | 1.35* (0.64) [0.19,3.45] | 1.22*** (0.40) [0.49,2.26] | -0.49 (1.29) [-inf,+inf] | -1.16 (5.89) [-inf,+inf] |
| | Quantitative Significance | | | |
| Small Ent. | 2.18** (1.04) [0.31, 5.59] | 1.97*** (0.64) [0.79, 3.66] | -12.23 (31.92) [-inf,+inf] | -28.75 (145.75) [-inf,+inf] |
| | Additional Controls | | | |
| | Initial Income, IO, Defense, Distance (log), Education and Constant | Initial Income, IO and Constant | Initial Income, IO, Defense, Distance (log), Education and Constant | Initial Income and Constant |
| F-statistic for exclusion restrictions | 9.32 | 18.29 | 0.21 | 0.44 |

Notes Standard errors accompanying point estimates are given in parentheses. * denotes statistical significance at 10% level; ** denotes significance at 5% level; *** denotes significance at 1% level. “Quantitative significance” indicates the response of the dependent variable implied by the point estimate of a one-standard-deviation increase in the corresponding explanatory variable. In all cases, a constant term has been estimated but is not reported. For small enterprises, we also report the 95% confidence interval in the square bracket in the bottom of the cell. These confidence intervals are derived from the conditional likelihood ratio procedure proposed by Moreira (2003) that is robust to the problems associated with weak instruments.