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# Barter and non-monetary transactions in transition economies: Evidence from a cross-country survey

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## Abstract

This paper reports the findings of a survey of more than 3,000 firms in 20 transition countries. It shows that barter and other non-monetary transactions (including the use of bills of exchange, debt swaps, barter chains, and the redemption of debt in goods) are an important phenomenon in Russia and Ukraine. Contrary to what is commonly believed, they are not negligible in central and eastern Europe. The causes and consequences vary significantly between countries, but several conclusions emerge strongly. First, barter and other non-monetary transactions are associated in all countries with financing difficulties for firms. They appear to be helping to assure liquidity in an environment in which contract enforcement (including tax enforcement) is uncertain. Second, the use of these mechanisms is not significantly related to the restructuring and performance of firms that use them in most countries except Russia. Third, in Russia and Ukraine the nature of non-monetary transacting is importantly different from elsewhere. It is much more associated than elsewhere with market power and limited trading networks. It is also more costly in terms of restructuring and performance. Firms that barter are less likely to improve their existing products, probably because barter enables them to dispose of otherwise unsaleable goods. They are also more likely to engage in internal reorganisation of a kind designed purely to service existing barter chains. Internal reorganisation is strongly associated with improved performance for firms that do not barter, but is unrelated to performance for firms that do. Overall, in Russia and to a lesser extent in Ukraine (but not elsewhere) the findings are consistent with the hypothesis that economic disorganisation, in the sense of Blanchard and Kremer (1997), means that barter and other non-monetary transactions are both more likely to occur and more damaging when they do occur.

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## 1. INTRODUCTION

The persistence of barter transactions over a number of years in complex industrialised economies has been one of the most puzzling paradoxes of the transition from central planning to market organisation. Historically, barter has characterised relatively simple societies with a comparatively undifferentiated division of labour. It has also been observed in more complex societies in the aftermath of serious crises such as wars. For example, complex chains of bilateral exchanges of goods between firms and payment in kind to workers were prevalent in the western zones of post-war Germany between 1945 and mid-1948. In the context of a high level of uncertainty about the future of the economy, with the collapse of the Nazi command economy, the freezing of prices and wages at their 1936 levels and extensive controls over interregional trade, there was an extreme shortage of goods. An assessment at the time captured the essential role of barter in this episode:

*“Where neither trading for money nor redistribution of goods by political authority, alone or in combination, can ensure a reliable division of labour, bilateral exchange seems to be the safest line of economic retreat”* (Mendershausen, 1949, pp. 657–8).

The improved functioning of the costly and cumbersome barter mechanism enabled production to recover from less than 20 per cent of the 1936 level in mid-1945 to 50 per cent by the end of 1947. In post-war Germany, output recovery in a barter-dominated economy before the currency reform was often seen as remarkable (Abelshauser, 1975). It is nevertheless very clear that only when the functioning of market processes was fully restored did dynamic future-oriented restructuring take place.

But whenever barter has been observed in such situations of crisis, it has been short-lived. In mid-1948, there was a currency reform in Germany combined with the lifting of price and wage controls. Barter and side-payments in kind vanished. There was also a clear shift in the nature of recovery to a dynamic process of growth vividly displayed in the jump in investment, the radical reorganisation of production processes and the introduction of new products (Carlin, 1989). By the time of the currency reform, it was clear that recovery was to be encouraged, a market economy was to be restored and that private ownership of firms would remain largely intact. The episode of large-scale barter was ended abruptly by the introduction of functional money and price and wage liberalisation. The “normal” incentives of a market economy took over.

This episode raises the question of why barter has persisted and indeed expanded in transition economies after prices were liberalised, and why it has continued even in the context of reasonable macroeconomic stability. Presumably other characteristics of transition economies have interfered with the rapid establishment of “normal” market economy incentives and practices. Marin and Schnitzer’s (1999) analysis suggests that a key differentiating characteristic may be that the nature of the output collapse in post-war Germany and in the transition countries was different.

The degree of “disorganisation” in terms of the disjunction between the relationships of suppliers and purchasers of inputs in the planned economy and those sustainable in a market economy appears to have been much greater in the transition economies than in post-war Germany. The pattern of trades in post-war Germany seems to have been motivated by producers trying to maintain supplier and customer relationships (Stamp, 1947). In transition economies major changes in supplier/customer relationships were required. When planning collapses and leaves behind bilateral monopoly relationships between input suppliers and purchasers, there is great scope for “hold-up” problems and stalemates. As a result, production chains collapse (Blanchard and Kremer, 1997). The collapse is greater where new entrants and foreign suppliers are unable to play a substantial role.

Marin and Schnitzer argue that trade credit expands in transition economies to help offset the bargaining power of the input supplier. However, in the context of uncertain contract enforcement, trade credit is highly risky. Barter may therefore help the process of output recovery by allowing trade credit to be collateralised in the form of the borrower's own output. This will allow output to be maintained in a world of disorganisation, though it may have other more long-term costs. Normally these costs include the fact that firms find themselves having to accept and re-sell products in the trading of which they have no comparative advantage. But this particular cost may be lower when – as a symptom and by-product of disorganisation – trading networks are limited and firms operate in informational “islands” (Seabright, 1999); trading partners may be able to pool search costs without sacrificing comparative advantage. In these conditions, barter may have fewer drawbacks than other responses to the problem of limited creditworthiness.

In understanding the prevalence of this expansion of barter in transition countries and particularly in Russia, Ukraine and other CIS countries, it is important to bear in mind that what is commonly referred to as “barter” in the Russian and Western literature on these countries is not “barter” as conventionally defined. The *New Palgrave Dictionary of Economics*, for example, defines barter as “a simultaneous exchange of commodities ... without using money. It is thus a form of trade in which credit is absent or weak ....” (Hart, 1987). The Russian term *barter*, however, encompasses not only the exchange of goods for goods, but also the exchange of goods for debt. If, for example, a firm pays for a purchase of inputs with a bill of exchange (Russian *veksel*, from German *Wechsel*), then this is *barter* (Russian), but it is certainly not barter as conventionally defined in the English-language economics dictionaries. Indeed, Commander and Mummsen (1999) show that most of what Russian firms refer to as *barter* is *not* in fact what economists would term barter, i.e. the exchange of goods for goods; it is rather payment for goods using non-monetary methods and instruments, i.e. debt.

There is, however, an important difference between the use of bills of exchange and other debt instruments in capitalist economies and the countries of the CIS. When a bill of exchange is redeemed in the CIS, typically the holder of the claim on the issuing firm is not the customer that initially accepted the bill as payment. It is a different firm that has purchased or otherwise acquired the bill (though precisely how often this occurs is unclear). Furthermore, the bill of exchange may often be redeemed by the issuing firm not in cash or equivalent, but in goods produced by the issuing firm. It is this last feature that most clearly distinguishes the use of bills of exchange in CIS countries from the way they have been used in capitalist economies. The use of debt offsets in CIS countries, the third main form of *barter* (along with bills of exchange and “barter” in the standard sense of goods-for-goods) is conceptually similar. In the multilateral debt swaps observed in CIS countries, by contrast, debts are essentially redeemed in goods, not cash. This is not barter as conventionally defined, but it is a close cousin.

This paper analyses the transactions of firms conducted using non-monetary methods and instruments: exchange of goods for goods, payment using bills of exchange, debt swaps, redemption of debt in goods, etc. – “barter” as understood in the Russian sense of the word.

## 2. EMPIRICAL FINDINGS

### 2.1 THE NATURE OF THE SURVEY

A large survey of enterprises in 20 transition countries was conducted in the early summer of 1999 by the EBRD and the World Bank, and its provisional findings have been published in the EBRD *Transition Report* 1999. The aim of the survey was to investigate how enterprise restructuring behaviour and performance were related to competitive pressure, the quality of the business environment, and the relationship between enterprises and the state. The survey included approximately 125 firms from each country, with the exceptions of Poland and Ukraine (over 200 firms) and Russia (over 500 firms).

One question on barter was included: “What share of your firm’s sales are now (and were three years ago) conducted in barter, offsets or bills of exchange (money surrogates)?” The six possible answers were one point (exactly zero) and five intervals of varying size (1–10 per cent, 11–25 per cent, 26–50 per cent, 51–75 per cent, 76–100 per cent). The econometric technique we use when this is our dependent variable is interval regression (StataCorp, 1997). The advantage of interval regression is that the coefficients on the exogenous variables can be interpreted as if ordinary least squares were being applied to a continuous dependent variable; e.g. the coefficient on a dummy variable will give the impact in percentage points on the share of barter.

Since only this question was asked, we have no way of checking if “barter, offsets and bills of exchange (money surrogates)” were interpreted in the same way by different firms and in different countries. There may be substantial cross-country differences of interpretation (for instance, whether trade credit is included in the definition). While this places some limits on the interpretation of the findings from the survey, the breadth of other information collected presents an unparalleled opportunity for exploring the causes and consequences of barter.

The full sample size was 3,125 firms. Sampling was random from the population of firms in each country, with the exception of minimum quotas for state-owned firms and large firms. We omitted from the analysis those firms with missing information, leaving us with 3,079 firms. The sample is dominated by small and medium-sized enterprises; almost half the sampled firms employ fewer than 50 persons, and less than 10 per cent employ more than 500. Half the firms in the sample are newly established private firms, 10 per cent were privatised to insiders, 25 per cent were privatised to outsiders, and 15 per cent remain state-owned. Firms in the industrial and service sectors are roughly equally represented, each accounting for 40–45 per cent of the sample, with agricultural firms making up the remainder (14 per cent). Most firms were located in either large cities or national capitals (30 per cent) or in medium-sized cities (32 per cent), with the rest in towns and rural areas (38 per cent). Out of the full sample of 3,000-odd firms, only 12 failed to answer the question on their current use of barter, a response rate of over 99.5 per cent. The response rate for the use of barter three years previously was significantly lower, at 85 per cent.

For just under one-third of the firms in the survey, barter and non-monetary transactions make up more than 10 per cent of their “sales” and for nearly one-fifth of firms, it accounts for over 25 per cent. Barter is more prevalent in Russia and Ukraine than elsewhere: just over one half of firms report using barter for 10 per cent of their business transactions and just over one-third conduct 25 per cent of their business this way (see Table 1). Other studies of barter and non-monetary transactions in Russia and Ukraine are in line with the order of magnitude reported in the EBRD survey.

Here we explore the data in several stages. To begin with, we look at size, sectoral and locational effects. Next, using these as controls, we look at the extent to which the level of barter and non-

monetary transacting reported by firms is related to ownership, to financing problems and arrears and to competition in the product market. After looking for firm-level correlates of barter, we examine whether some country level variables are relevant: inflation, a measure of the softness of the budget constraint and of the quality of the business environment. Finally we examine the consequences of barter and non-monetary transactions for firm restructuring and performance.

## 2.2 WHERE DOES BARTER HAPPEN?

Table 1 shows the distribution of reported levels of barter and non-monetary transactions by country. Barter is widespread in Russia and Ukraine. Elsewhere in the CIS its incidence varies greatly, with high levels in Belarus, Moldova and Kazakhstan and very low levels in some other countries. More surprisingly, barter and non-monetary transactions appear in the central and east European countries (where they have often been assumed to be absent). While there are relatively small proportions of firms reporting barter at the level of 25 per cent of sales or more, barter is non-negligible except perhaps in Hungary. Croatia and Slovenia look quite out of line with the other non-CIS countries in terms of the proportion of firms reporting no involvement in barter. This suggests that the question may have been interpreted differently in those countries from elsewhere. In the rest of the non-CIS countries (central, eastern and south-eastern Europe plus the Baltic states), the proportion of firms reporting no barter transactions ranges from 49 per cent in Estonia to 90 per cent in Hungary.

**Table 1: Percentage of firms in sample reporting each level of barter and non-monetary transactions, by country**

Country	Percentage of sales accounted for by barter and non-monetary transactions						Number of firms
	None	1–9	10–25	26–50	51–75	76–100	
Russia	28.4	19.1	16.8	15.3	12.6	7.8	524
Ukraine	28.6	21.4	16.1	11.6	11.2	11.2	224
<i>Other CIS</i>							
Armenia	82.3	10.5	4.8	0.8	1.6	0	124
Azerbaijan	78.0	8.7	11.8	0.8	0	0.8	127
Belarus	32.8	30.4	21.6	8.8	5.6	0.8	125
Georgia	72.1	10.8	12.4	3.9	0.8	0	129
Kazakhstan	36.2	21.3	18.1	7.9	11.0	5.5	127
Kyrgyzstan	47.2	11.2	18.4	11.2	8.0	4.0	125
Moldova	23.2	16.8	16.0	20.8	16.0	7.2	125
Uzbekistan	68.0	8.0	10.4	7.2	3.2	3.2	125
<i>Non CIS</i>							
Bulgaria	64.8	24.8	7.2	1.6	1.6	0	125
Croatia	9.5	18.2	23.0	23.0	19.8	6.3	126
Czech Republic	74.8	17.0	5.2	3.0	0	0	135
Estonia	49.2	42.2	6.1	2.3	0	0	132
Hungary	89.8	8.6	1.6	0	0	0	128
Lithuania	75.7	17.1	4.5	2.7	0	0	111
Poland	65.8	21.6	8.1	3.6	0.9	0	222
Romania	72.8	10.4	8.8	4.0	0.8	3.2	125
Slovak Republic	56.6	13.2	7.8	3.9	3.9	14.7	129
Slovenia	13.6	40.8	26.4	15.2	3.2	0.8	125

Source: EBRD enterprise survey, 1999.

Across all countries, large firms are more likely to be engaged in barter than are small ones. This suggests that there are economies of scale in barter and non-monetary transactions (see Guriev & Ickes, 1999). However, as Table 2 shows, there are both sectoral and country variations to this pattern. This table provides a method of comparing the likelihood of a firm being involved in barter (to the extent of at least 25 per cent of sales) across countries, sectors and size class of firm.

**Table 2: Prevalence of barter and non-monetary transactions: firm size and sectoral effects**

Country	Size of firm	Industry	Services	Agriculture
Russia	small	15.6	10.6	51.4
	large	22.9	13.1	53.3
Ukraine	small	18.7	7.9	
	large	27.1	10.6	
<i>Other CIS</i>				
Armenia	small	2.9	1.7	
	large	3.8	0.6	
Azerbaijan	small	0	0.1	
	large	0.2	0.3	
Belarus	small	5.5	13.2	5.1
	large	7.7	11.5	7.1
Georgia	small	8.5	0.9	
	large	7.4	1.2	
Kazakhstan	small	10.5	4.2	59.5
	large	16.3	7.9	57.1
Kyrgyzstan	small	28.2	4.1	12.8
	large	27.2	4.6	17.9
Moldova	small	9.6	8.1	68.6
	large	17.4	12.4	68.6
Uzbekistan	small	9.1	25.2	13.6
	large	10.6	19.5	6.2
<i>CEE and Baltics</i>				
Croatia	small	58.4	25.7	
	large	58.4	30.3	
Czech Republic	small	0.8	2.0	
	large	1.2	2.1	
Estonia	small	3.0	2.0	
	large	2.9	1.9	
Hungary	small	0	0	
	large	0	0	
Lithuania	small	0.1	2.9	
	large	0.2	1.8	
Poland	small	1.4	0.3	0.2
	large	2.4	0.5	0.2
Slovak Republic	small	10.1	17.0	
	large	17.8	16.6	
Slovenia	small	7.1	6.2	
	large	10.3	7.9	

Notes: This table shows the predicted probability that barter accounts for more than 25 per cent of sales of a small firm (with 50 employees) or a large firm (with 500 employees). In countries in which too few agricultural enterprises were included in the survey, results are shown for industry and services only. The predicted probabilities are calculated from an ordered logit regression for each country in which the regressors are the log of employment, sector dummies and interactive terms in size and sector.

To illustrate the patterns in the data, we show the predicted probability (in percentage terms) that barter and non-monetary transactions account for more than 25 per cent of sales for a small firm (with less than 50 workers) and for a large firm (with more than 500 workers). For many countries there are not enough agricultural firms in the sample to form the basis for predicted probabilities. In these cases, the results for industry and services only are shown in the table.

From Table 2, the size and sectoral distribution of barter looks quite similar for Russia and Ukraine. Firms in industry are more likely to be engaged in barter than are service sector firms, and in both cases it is large firms that are more heavily involved. It is clear that in Russia barter is much more prevalent in agriculture than in the rest of the economy. Small enterprises in Russian agriculture are just as likely to be involved in barter as large ones. A possible explanation for the widespread use of barter in Russian agriculture is that Russian agriculture receives subsidies of various sorts, including subsidies delivered using non-monetary methods (delivery of goods written off against taxes, write-offs of energy costs, etc.).

Table 2 shows that there are wide differences between the other CIS countries in the size and sectoral patterns of barter and non-monetary transactions, as well as in their prevalence. In Kazakhstan and Moldova there appears to be a lot of barter in agriculture – but this is not true of Uzbekistan, where barter seems to be found disproportionately in the services sector. There is also no uniform finding of a higher prevalence of barter in large than in small firms. Among the more advanced reformers in central and eastern Europe including the Baltics, large firms in industry are more involved in barter but there do not appear to be size effects for services firms.

The patterns in the group of CIS countries look too disparate for the analysis of the pooled results to be very meaningful. We therefore omit the other CIS countries from the more detailed examination of the correlates of barter, and we concentrate henceforth on Russia and Ukraine. For similar reasons, we limit our analysis of the non-CIS countries to the more advanced CEE reformers, excluding Croatia and Slovenia because of doubts about data comparability (see above).

In addition to the size of firm and the sector, we also check for any association between location and tendency to barter. The barter variable is regressed on two location dummies, “big city” and “town”, (small city is the omitted category). The size, sector and size-sector interaction terms are included as controls. For Russia, the location dummies are highly significant – barter is much more prevalent in the more rural locations. For example, in a firm in a town (the most rural location), barter as a share of sales is estimated to be 11 percentage points higher than in a small city. In turn, barter in a big city is estimated to be 6 percentage points lower than in a small city (see Table 3). This is consistent with the idea that barter and non-monetary transacting in Russia may in part be a product of limited trading networks, or “informational islands” (Seabright, 1999).

The sample size for Ukraine is substantially smaller than that for Russia (205 compared with 524). This will tend to pull down the significance levels of the coefficients in the Ukraine regressions. Even keeping this in mind, the clear location effects characteristic of Russia do not seem to be present in Ukraine. The signs on both big city and town are positive, and the coefficients insignificant. Location also does not appear to play a part in barter in the advanced reform countries.

**Table 3: Location effects on barter and non-monetary transactions**

Location effects	Russia	Ukraine	CEE excl. Croatia and Slovenia
Big city	-6.39 (2.54) **	0.21 (4.42)	-1.02 (1.23)
Town	10.88 (3.47) ***	4.68 (3.97)	0.10 (1.11)
Number of firms	524	205	840

Notes: The table reports the coefficients on the location dummies (the omitted category is “small city”) in an interval regression with the percentage share of barter in sales as the dependent variable (see text). Coefficients can be interpreted as the effect of location in percentage points on the share of barter in sales. Size, sector and size-sector interaction variables are included in all regressions. The standard error is shown in parentheses. Significance levels are indicated as follows: \* indicates significance at 10%, \*\* at 5% and \*\*\* at 1%.

### 2.3 THE CAUSES OF BARTER AND NON-MONETARY TRANSACTIONS

The next step is to analyse in turn a series of possible correlates of barter and non-monetary transactions. For example, do state firms do more or less barter than new private firms; is barter more prevalent where the product market is less competitive; is barter higher in firms reporting financing problems? In the regression analysis, we control for size, sector – and in Russia, also for location – and allow for country-fixed effects within the central European region. The omitted ownership category is privatised firms that are not insider-owned. In Russia and Ukraine, new entrants make less use of barter than do other firms (see Table 4). There is a clear tendency for state-owned firms in the CEE region to do less barter – there is no sign of this in Russia and the effect in Ukraine although large and positive is not significant. There is no indication that insider versus outsider ownership of privatised firms makes any difference to involvement in barter.

**Table 4: Ownership and exporting effects on barter and non-monetary transactions**

Ownership effects	Russia	Ukraine	CEE excl. Croatia and Slovenia
(1) Ownership type			
Insider ownership	4.36 (3.16)	-5.29 (5.99)	-2.59 (2.54)
State-owned	1.01 (5.29)	-10.70 (7.28)	-5.64 (1.58) ***
<i>ab initio</i> private firm	-7.28 (2.87) **	-10.37 (5.77) *	0.03 (1.29)
(2) Foreign stake	0.96 (8.11)	-18.86 (8.89) **	-0.59 (1.58)
(3) Export	-0.14 (.10)	0.10 (.11)	0.03 (.02)
Number of firms	524	205	840

Notes: The regression results for three regressions for each region are reported. The first part of the table reports the coefficients on the ownership dummies (the omitted category is “privatised but not insider-owned”). The second part reports the coefficients on the dummy variable for whether or not the firm has a foreign owner. The third part reports the coefficients on a dummy variable for whether the firm exports or not. Interval regression with the percentage share of barter in sales as the dependent variable is used in all cases (see text). Size, sector and size-sector interaction variables are included in all regressions. For Russia, location dummies are also included. The standard error is shown in parentheses. Significance levels are indicated as follows: \* indicates significance at 10%, \*\* at 5% and \*\*\* at 1%.

It might have been expected that a foreign ownership stake would make involvement in barter less likely by providing access to the parent company’s suppliers elsewhere. However, this effect is only found in Ukraine – the presence of a foreign owner reduces the share of barter in sales by just under

one-fifth. In neither Russia nor Ukraine, nor in the CEE group, was there a correlation between engagement in exporting and the presence of barter.

There is a strong relationship between perceived financing problems and the role of barter in the firm. This is clearly true in Russia and CEE, and true for some measures though not all in Ukraine. Managers were asked to give a score to the seriousness of financing problems in general, problems of access to long-term bank credit and difficulties caused by high interest rates. In each region, there is a very strong positive correlation between the seriousness with which financing problems are rated by managers and their involvement in barter. When asked specifically about problems with accessing long-term bank credit, managers' ratings again showed a strong correlation with barter except in Ukraine. High interest rates seem to capture a feature of financing problems relevant to barter although the effect is not significant in Ukraine (see Table 5).

Given the findings for the correlation between barter and financing problems, it is not surprising that there is a strong correlation in all three regions between managers' reports of the extent of barter and both payments overdue to suppliers and overdue receivables from customers (see Table 5).

The usefulness of barter and non-monetary transactions as devices to avoid taxation has been much discussed in the literature. In the survey, firms were asked about their overdue tax payments and there was a strong positive correlation between this measure and barter in all regions.

**Table 5: Financing problems and barter and non-monetary transactions**

Financing problems	Russia	Ukraine	CEE excl. Croatia and Slovenia
Financing problems in general	4.66 (1.12) ***	5.14 (1.97) ***	0.78 (.43) *
Access to long-term bank credit	1.91 (.93) **	-0.51 (1.53)	1.94 (.41) ***
High interest rates	3.17 (1.10) ***	2.63 (1.93)	1.51 (.45) ***
Payments overdue to suppliers	7.08 (1.03) ***	6.86 (1.64) ***	1.27 (.46) ***
Receivables overdue from customers	5.17 (1.03) ***	5.79 (1.59) ***	2.16 (.45) ***
Tax arrears	8.00 (.99) ***	8.11 (1.67) ***	1.84 (.52) ***
Frozen bank accounts	12.90 (2.67) ***	13.18 (4.88) ***	N/A
Tax offsets	12.79 (2.51) ***	21.94 (4.54) ***	N/A

Notes: Each row in the table reports the results from a separate regression for each region. Interval regression with the percentage share of barter in sales as the dependent variable is used in each case (see text). The scaling of the independent variable measuring financing problems runs from 1 to 4, with the exception of "frozen bank accounts" and "tax offsets", which are 1/0 dummies. Size, sector and size-sector interaction variables are included in all regressions. For Russia, location dummies are also included. The standard error is shown in parentheses. Significance levels are indicated as follows: \* indicates significance at 10%, \*\* at 5% and \*\*\* at 1%.

When the EBRD survey was implemented in Russia and Ukraine, two specific questions were asked concerning tax arrears. Managers were asked to respond to the following: (i) "Did your firm have your primary bank account blocked for non-payment of taxes at any time in 1998?" and (ii) "The Federal, *oblast* and municipal governments sometimes pay for their purchases from enterprises by reducing the tax liabilities of the selling firm. During 1998, did your firm receive such a tax offset from any level of government?" As is clear from Table 5, there is a very large and significant connection. Barter and non-monetary transactions go together with the presence of frozen bank accounts and of tax offsets arising out of non-payment of taxes. The correlation with tax offsets is, of course, not

surprising, since such offsets are included in “barter, offsets or bills of exchange (money surrogates)” by definition.

The questionnaire used two approaches to elicit information about market power. Managers were asked whether the firm faces no competitors, one to three or more than three competitors in the market for its main product. They were also asked to predict what would happen to demand for their main product if they raised their price by 10 per cent (relative to inflation and to the prices of their competitors).

The correlation between each of these measures and the extent of barter and non-monetary transactions is reported in Table 6. There is no uniform pattern across the three regions when the relationship between competition and barter is examined. In Ukraine, there seems to be no particular link between competition in the product market and barter. We therefore concentrate on Russia on the one hand, and the CEE countries on the other. In Russia, firms facing competitors in the product market were engaged in less barter than were monopolists. The indicators of monopoly power from the 10 per cent price test were not significant.<sup>1</sup>

**Table 6: Product market competition and barter and non-monetary transactions**

Product market competition	Russia	Ukraine	CEE excl. Croatia and Slovenia
(1) No. of competitors:			
One to three	– 10.12 (5.28)*	– 0.64 (7.55)	1.76 (2.07)
More than three	– 9.85 (4.39)**	– 2.67 (5.92)	4.98 (1.67)***
(2) Response to 10% increase in own price			
Demand lower	0.82 (2.91)	– 4.97 (4.48)	– 0.65 (1.22)
Demand slightly lower	– 0.051 (2.91)	– 2.35 (4.16)	– 2.42 (1.15) **
No change in demand	– 2.32 (3.47)	– 1.72 (6.71)	– 1.98 (1.42)

Notes: The results of two regressions for each region are shown. Interval regression with the percentage share of barter in sales as the dependent variable is used in each case (see text). The omitted category in the first regression is ‘no competitors’ and in the second regression, ‘many customers would switch to our competitors’. Size, sector and size-sector interaction variables are included in all regressions. For Russia, location dummies are also included. The standard error is shown in parentheses. Significance levels are indicated as follows:

\* indicates significance at 10%, \*\* at 5% and \*\*\* at 1%.

But in the countries of central and eastern Europe, competition and barter are related in the opposite way: firms with more than three competitors report more barter and non-monetary transactions than do monopolists. There is some support for this kind of effect from the second regression – i.e. using the 10 per cent price test. Compared with the omitted category in which customers switch to alternative suppliers if the firm puts its price up by 10 per cent, it seems that firms with market power do less barter.

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<sup>1</sup> There are a number of theoretical reasons why we might expect barter and monopoly power to be related, including the ‘information islands’ discussed in Seabright (1999) and the use of barter for price discrimination as discussed in Prendergast & Stole (1999) and Guriev & Ickes (1999). Kranton (1996, esp. p.833) suggests that the viability and enforceability of reciprocal exchange arrangements are increased by the absence of thick market alternatives.

The top panel of Table 7 brings together the correlates of barter and non-monetary transactions into one regression. One variable is used to reflect financing constraints (arrears to suppliers) and the number of competitors is used to reflect competitive conditions. The sample sizes are somewhat smaller here because we want to compare this baseline regression with a regression that includes lagged barter. It seems that while there are a number of common features of firms engaged in barter across the three regions (size, financing problems and arrears, including tax arrears), there are also important differences. In Russia, barter is a rural phenomenon but there is no locational aspect in Ukraine or the CEE. In Ukraine, product market competition and barter are not related whereas there are effects going in opposite directions in Russia as compared with the CEE. Ownership effects are also quite different across the regions.

**Table 7: Correlates of barter and of the change in the use of barter**

	Russia	Ukraine	CEE excl. Croatia and Slovenia
<b>(1) Benchmark</b>			
insider ownership	5.57 (3.27) *	-11.13 (6.46) *	ns
state-owned	ns	ns	-4.94 (1.67) ***
<i>ab initio</i> firm	-7.53 (3.15) **	ns	ns
payments overdue to suppliers	7.66 (1.14) ***	7.06 (1.88) ***	1.39 (.49) ***
one to three competitors	-9.22 (5.48) *	ns	ns
more than three competitors	-11.73 (4.49) ***	ns	2.84 (1.78) (sign. at 11%)
Number of firms	404	174	741
<b>(2) Change in barter</b>			
lagged barter	0.64 (0.04) ***	0.77 (0.06) ***	0.75 (0.02) ***
sales growth	ns	ns	ns
insider ownership	4.18 (2.54) *	-14.99 (4.50) ***	ns
State	ns	-16.64 (5.18) ***	-2.65 (0.81) ***
<i>ab initio</i> firm	ns	-10.21 (4.40) **	ns
payments overdue to suppliers	4.83 (0.90) ***	4.43 (1.35) ***	0.62 (0.23) ***
one to three competitors	ns	ns	ns
more than three competitors	ns	ns	ns
Number of firms	404	174	741

Notes: The results of two regressions for each region are shown. Interval regression with the percentage share of barter in sales as the dependent variable is used in each case (see text). In (1), the right-hand side variables are a measure of financing problems (arrears to suppliers), product market competition (number of competitors) and ownership dummies. In (2), the level of barter three years ago and a performance measure (sales growth) are added. Size, sector and size-sector interaction variables are included in all regressions. For Russia, location dummies are also included. The standard error is shown in parentheses. Significance levels are indicated as follows: \* indicates significance at 10%, \*\* at 5% and \*\*\* at 1%. ns mean not significant at the 10% level.

A fairly similar picture emerges when the change in barter over the past three years is investigated. In all three regions, the presence of liquidity problems is strongly correlated with the growth of barter. In Ukraine, there was a sharp increase in the use of barter in outsider-owned privatised firms that is reflected in the highly significant and large negative coefficients on the other ownership types.

Country-level correlates of barter and non-monetary transactions were also investigated (see Table 8). For this exercise, a pool comprising all 20 countries in the EBRD survey was used. Only

industrial firms were included. There was no correlation at all between inflation (over the preceding three years) and the extent of barter; nor was there any correlation between either real or nominal lending rates (also over the preceding three years) and the extent of barter. A country-level measure of the softness of budget constraints constructed from managers' responses to the question on tax arrears was also insignificant.

However, a country-level composite measure of managers' perceptions of the investment climate indicated that in countries with a poor investment climate, there was more barter. This composite measure (discussed in more detail in the EBRD *Transition Report 1999*) aims particularly to capture variations in the rule of law and access to formal sources of finance. Its strong association with barter at the country level is very much what would be expected from the Marin/Schnitzer and the "information islands" hypotheses discussed above.

**Table 8: Country-level correlates of barter and non-monetary transactions in Industry (20 countries)**

Inflation (log, 1997–99)	–5.30 (9.45)
Nominal lending rates (log, 1997–99)	10.50 (19.60)
Real lending rates (log, 1997–99)	9.44 (10.24)
Softness of budget constraint	10.41 (8.75)
Investment climate	–19.70 (6.96) ***
Number of firms	1,239

Notes: The results of three regressions for the pool of 20 countries are shown. In each case, the dependent variable is the midpoint of the barter/sales interval; interpretation is the same as for interval regression. Estimation is by a generalised least squares random effects model. The size variable is included in all regressions. The soft budget constraint and investment climate variables are normalised so that the minimum country score is 0 and the maximum country score is 1. The standard error is shown in parentheses. Significance levels are indicated as follows: \* indicates significance at 10%, \*\* at 5% and \*\*\* at 1%.

To sum up, there is substantial variation between countries in the correlates of barter and non-monetary transactions. Nevertheless, a few clear messages emerge from the survey:

Financing problems are strongly linked to the presence of barter and non-monetary transactions in all countries;

- Large firms are more likely to engage in barter than small firms;
- Difficulties with tax payments are strongly associated with barter;
- There is a strong degree of persistence of barter over time;
- There is more barter in countries with a poor investment climate;
- State-owned firms are less likely to engage in barter in central and eastern Europe, but there is no systematic relationship with ownership in Russia and Ukraine;
- The phenomenon of barter in Russia is different from that in other countries in a number of respects, and is much more linked to monopoly power and rural location than it is elsewhere.

## 2.4 THE CONSEQUENCES OF BARTER

Is there a connection between barter, restructuring actions taken by managers and performance at the level of the firm? The survey allows us to examine several dimensions of restructuring: the introduction of new products, upgrading of existing ones and changing the organisational structure of the firm. For each type of restructuring in turn, we examine the probability that the firm has undertaken restructuring of that type. As explanatory variables, we include the usual controls for size, industry and location. In addition, we include ownership variables and the two kinds of competition variables discussed above. To avoid problems of two-way causation, our barter variable is the firm's level of barter sales three years prior to the survey. This allows us to interpret the results as indicating whether involvement in barter three years ago was a significant predictor of subsequent restructuring actions.

In most countries there is no significant relationship between restructuring and barter. But Russia is different, as Table 9 illustrates. Here there is a strong tendency for firms engaging in barter and non-monetary transactions to undertake more organisational change than other firms. However, they are less likely to upgrade their existing products than other firms (a firm, 50 per cent of whose sales are conducted in barter, is about 50 per cent less likely to upgrade its existing products than one that does no barter at all). The introduction of new products is unrelated to barter.

**Table 9: Influence of barter and non-monetary transactions on restructuring in Russia**

	(1) New product development	(2) Product upgrading	(3) Firm reorganisation (Scale 1–4)
Lagged % of barter in sales	0.002	−0.013**	0.011***
Standard error	0.005	−0.005	0.004
No. of observations	425	425	424

Notes: The table shows the results of logit regressions that control for size and industry effects as well as ownership, urbanisation and the degree of competition faced by firms. The third equation is an ordered logit where the dependent variable takes the values 1–4. Significance levels are indicated as follows: \* indicates significance at 10%, \*\* at 5% and \*\*\* at 1%.

Without more information, the interpretation of these findings remains somewhat speculative. But the results on organisational change are consistent with the evidence from Russian microstudies (Ledeneva and Seabright, 1999) that barter deals frequently involve significant diversion of managerial effort and the construction of ingenious chains of transactions. The negative impact of barter on actions to upgrade existing products in Russia fits the notion that barter and non-monetary transactions allow otherwise unsaleable goods to be traded. The fact that there is no observed negative impact on decisions to introduce new products may be due to the need for firms engaged in barter to bring in new products purely to satisfy the needs of the barter chain (a possibility documented also in the microstudies); this offsets what would otherwise be a negative impact of barter on new product development.

If this interpretation of the results on organisational change is accurate, it implies something about the *kind* of organisational change that is undertaken by firms heavily involved in barter and non-monetary transactions – namely, that it will be less effective than similar reorganisations undertaken by firms that do not do barter. Table 10 tests this suggestion by examining to what extent barter is associated with firm performance (interpreted in terms of growth in sales over the three years prior to the survey). In the regressions for Russia we have included a direct effect of barter, a direct effect of

reorganisation on performance, plus an effect of barter for those firms that have reorganised. The results confirm the hypothesis to a striking degree. Firm reorganisation in Russia is very strongly associated with improved performance. In the basic equations, firms that have reorganised have 36 percentage points higher sales growth over three years than those that have not. But this effect is much weaker for Russian firms that barter significantly, to the extent that a restructured firm bartering 58 per cent of its output performs no better than a non-bartering firm that has not restructured at all. The results are even stronger when we control for the endogeneity of the restructuring decision and for the fact that other kinds of restructuring take place simultaneously. Here internal reorganisation in Russian firms is associated with a 76 percentage point improvement in performance over three years, an effect that disappears once a firm barter 55 per cent or more of its output.

**Table 10: The influence of barter and non-monetary transactions on firm sales growth in Russia and Ukraine**

	Basic equation (ordinary least squares)		Using instrumental variables and controlling for other restructuring forms	
	Russia	Ukraine	Russia	Ukraine
Major reallocation of responsibilities among departments	0.36***		0.76***	-0.10
Standard error	0.10		0.28	0.29
Introduction of new products		0.36**	0.10	0.70**
Standard error		0.15	0.27	0.30
Lagged % barter in sales	0.0005	0.0042	0.0009	0.0030
Standard error	0.0016	0.0028	0.0027	0.0038
Lagged % barter (firms with major reallocation only)	-0.0062**		-0.0137**	0.0079
Standard error	0.0028		0.0058	0.0056
Lagged % barter (firms with new products only)		0.0002	0.0020	-0.012**
Standard error		0.0040	0.0054	0.0057
No. of observations	324	141	324	141

Notes: The table shows the results of regressions that control for size and industry effects as well as ownership, urbanisation, the degree of competition faced by firms and the perceived pressures from competitors, shareholders and creditors. The barter variable is the level of barter three years ago. Instruments in the second regression are industry dummies, plus industry dummies interacted with barter, plus all the competition variables interacted with barter. Significance levels are indicated as follows: \* indicates significance at 10%, \*\* at 5% and \*\*\* at 1%.

We find similar, but somewhat less strong, results for Ukraine. In Ukraine, the form of restructuring that is strongly associated with sales growth is the introduction of new products. In the basic equation estimated by ordinary least squares, there is no negative effect of barter. When we control for other restructuring and we allow for the endogeneity of restructuring, however, we find that firms that

introduced new products have 70 percentage points higher sales growth over three years, but that this is again offset by bartering activity; a firm that introduced a new product or products that barter 58 per cent of its output grows no faster than a firm that has not innovated in this way.

The results for Russia and Ukraine stand in sharp contrast to those for central and eastern Europe. In central and eastern Europe, all three of our restructuring measures – introduction of new products, upgrading of existing products, and internal reorganisation – are associated with stronger sales performance, but we find no evidence that barter negates the impact of any of these measures.

One reason for particular caution in interpreting these findings is the likely endogeneity of the resort to barter. It is possible that a common set of factors both provokes poor performance and the associated financial problems and liquidity constraints in a subset of firms, and acts as an obstacle to the success of restructuring efforts by these same firms.<sup>2</sup> There may, in other words, be a selection bias at work. Using lagged barter as an explanatory variable may not sufficiently control for this. It is difficult to know how to evaluate this possibility: we have estimated an equation using instrumental variables for *lagged* barter, with the result that neither barter nor restructuring variables were any longer significant. This may indicate that the selection problem is indeed severe, or that our set of instruments for lagged barter is inadequate. Nevertheless, this does not prevent our concluding that firms that resort to barter are less likely to restructure successfully, even while we remain more cautious about whether barter is a cause or merely a symptom of this difficulty.

Overall, therefore, the conclusions of the survey are clear:

- Outside Russia, and to a lesser extent, Ukraine, there is no clear link between the tendency to engage in barter and non-monetary transactions and either firm restructuring activity or subsequent sales performance;
- In Russia there is strong evidence that barter retards the improvement of existing product lines, presumably by enabling firms to trade otherwise unsaleable products;
- There is no clear impact of barter on the development of new products in Russia or elsewhere, probably because what would otherwise be a negative impact on product development is offset by a tendency to create new product lines to satisfy the demands of partners in a barter chain;
- Barter is definitely associated with significant organisational change in Russia. But unfortunately it also tends to make such change comparatively ineffective in yielding performance improvements. In Ukraine, barter has a similar negative impact on the benefits of introducing new products. These findings are consistent with the view of barter as a significant diversion of managerial energy and initiative.

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<sup>2</sup> We owe this point to Dan Treisman.

### 3. CONCLUSIONS

- How much does the survey tell us about why barter is happening and whether it matters? Not only the extent of barter but also its nature, its causes and effects vary to an important degree from country to country. What are the overall lessons to be learned?
- Barter and non-monetary transactions are everywhere associated with financing difficulties. This strongly supports the view that barter assures liquidity in a trading environment in which credit is scarce and the enforceability of loan contracts is uncertain.
- The overall economic costs associated with using barter for this purpose vary significantly from country to country. In central and eastern Europe the costs appear to be low, perhaps because what firms are reporting as “barter and other non-monetary transactions” refers principally to bills of exchange and other debt instruments that do not distort firm behaviour to an important degree (and may often be redeemed in cash).
- In Russia and Ukraine, however, barter *does* distort firm behaviour, perhaps because firms find it difficult or costly to redeem their bills of exchange and other debts in cash. Firms that barter are less likely to devote their energies to improving their products. They are more likely to engage in internal reorganisation purely to keep their barter chains in being rather than to conquer new markets and transform their future prospects.
- In Russia and Ukraine but not elsewhere the findings are therefore consistent with the hypothesis that economic disorganisation, in the sense of Blanchard & Kremer (1997), means barter is both more likely to occur and more damaging when it does occur.
- Overall, the evidence suggests that barter and non-monetary transactions are often highly inventive and resourceful responses of firms to difficult business conditions. It is the conditions themselves rather than the responses that are the problem. In a better business environment firms could direct the ingenuity and effort required by barter transactions to more productive ends.

## REFERENCES

- A. Abelshauser (1975), *Wirtschaft in Westdeutschland, 1945–1948*, Stuttgart: Deutsche Verlags-Anstalt.
- O. Blanchard and M. Kremer (1997), “Disorganization”, *Quarterly Journal of Economics*, 112(4), pp. 1091–126.
- W. Carlin (1989), “Economic Reconstruction in Western Germany, 1945–55: the displacement of ‘vegetative control’”, in I. Turner (ed.) *Reconstruction in Post-War Germany: British Occupation Policy and the Western Zones, 1945–1955*, New York: Berg.
- S. Commander and C. Mummsen (1999), “Different Types of Non-Monetary Transaction in Russia”, in P. Seabright (ed.), *The Vanishing Rouble: Barter Networks and Non-Monetary Transactions in Former Soviet Societies*, Cambridge University Press, forthcoming.
- S. Guriev and B. Ickes (1999), “Barter in Russia”, in P. Seabright (ed.), *The Vanishing Rouble: Barter Networks and Non-Monetary Transactions in Former Soviet Societies*, Cambridge University Press, forthcoming.
- K. Hart (1987), “Barter”, in Eatwell, J. M. Milgate and P. Newman (eds.), *The New Palgrave: A Dictionary of Economics*, London and Basingstoke: Macmillan Press.
- R. Kranton (1996), “Reciprocal Exchange: a Self-Sustaining System”, *American Economic Review*, 86, pp. 830–51.
- A. Ledeneva and P. Seabright (1999), “Barter in Post-Soviet Societies: What Does It Look Like and Why Does It Matter?”, in P. Seabright (ed.), *The Vanishing Rouble: Barter Networks and Non-Monetary Transactions in Former Soviet Societies*, Cambridge University Press, forthcoming.
- D. Marin and M. Schnitzer (1999), “Disorganization and Financial Collapse”, Centre for Economic Policy Research (CEPR), Discussion Paper No. 2245, London: CEPR.
- H. Mendershausen (1949), “Prices, Money and the Distribution of Goods”, *American Economic Review*, 39(4), pp. 647–68.
- C. Prendergast and L. Stole (1999), “Barter Relationships”, in P. Seabright (ed.), *The Vanishing Rouble: Barter Networks and Non-Monetary Transactions in Former Soviet Societies*, Cambridge University Press, forthcoming.
- P. Seabright (1999), “Introduction”, in P. Seabright (ed.), *The Vanishing Rouble: Barter Networks and Non-Monetary Transactions in Former Soviet Societies*, Cambridge University Press, forthcoming.
- A. M. Stamp (1947), “Germany without Incentive”, *Lloyds Bank Review*, Vol. 5.
- StataCorp (1997), “cnreg – Censored-normal, tobit, and interval regression”, *Stata Reference Manual: Release Five*, College Station, Texas: Stata Press.