

**Barter and Non-Monetary Transactions in Transition Economies:
evidence from a cross-country survey¹**

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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. Secondly, the use of these mechanisms is not significantly related to the restructuring and performance of firms that use them in most countries except Russia. Thirdly, in Russia 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 but not elsewhere the findings are consistent with the hypothesis that economic disorganisation, in the sense of Blanchard & Kremer (1997), means that barter and other non-monetary transactions are both more likely to occur and more damaging when they do occur.

¹ Forthcoming in Paul Seabright (ed): *The Vanishing Rouble: Barter networks and non-monetary transactions in former Soviet societies*, Cambridge University Press. The views in this paper are solely those of the authors and not necessarily those of the EBRD or other institutions with which they are affiliated.

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% of the 1936 level in mid 1945 to 50% by the end of 1947.

But whenever barter has been observed in such situations of crisis it has been short-lived. In mid 1948, there was a currency reform 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 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 postwar 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 & Kremer 1997). The collapse is greater where new entrants and foreign suppliers are unable to play a substantial role.

Marin & 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 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.

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 & 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 twenty 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 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%, 11-25%, 26-50%, 51-75%, 76-100%). 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 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% employ more than 500. Half the firms in the sample are newly established private firms, 10% were privatised to insiders, 25% were privatised to outsiders, and 15% remain state-owned. Firms in the industrial and service sectors are roughly equally represented, each accounting for 40-45% of the sample, with agricultural firms making up the remainder (14%). Most firms were located in either large cities or national capitals (30%) or in medium-sized cities (32%), with the rest in towns and rural areas (38%). 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%. The response rate for the use of barter three years previously was significantly lower, at 85%.

For just under one-third of the firms in the survey, barter and non-monetary transactions make up more than 10% of their “sales” and for nearly one-fifth of firms, it accounts for over 25%. Barter is more prevalent in Russia and Ukraine than elsewhere: just over one half of firms report using barter for 10% of their business transactions and just over one-third conduct 25% 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 then 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 Eastern 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% 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% in Estonia to 90% in Hungary.

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% of sales) across countries, sectors and size class of firm. To illustrate the patterns in the data, we show the predicted probability that barter and non-monetary transactions account for more than 25% 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.

Table 1. Percentage of firms in sample reporting each level of barter and non-monetary transactions, by country
(EBRD enterprise survey, 1999)

Country	Percentage of sales accounted for by barter and non-monetary transactions						No. 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
Other CIS							
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
Non CIS							
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 Rep.	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
Slovakia	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

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 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.

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 disproportionately found in the services sector. There is also no uniform finding of a higher prevalence of barter in large than in small firms. Amongst 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).

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

This table shows the predicted probability that barter accounts for more than 25% 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.

Country	Size of firm	Industry	Services	Agriculture	Percentage of firms reporting >25% sales as barter and non-monetary transactions
Russia	small	15.6	10.6	51.4	35.7
	large	22.9	13.1	53.3	
Ukraine	small	18.7	7.9		34.0
	large	27.1	10.6		
Other CIS					
Armenia	small	2.9	1.7		2.4
	large	3.8	0.6		
Azerbaijan	small	0	0.1		1.6
	large	0.2	0.3		
Belarus	small	5.5	13.2	5.1	15.2
	large	7.7	11.5	7.1	
Georgia	small	8.5	0.9		4.7
	large	7.4	1.2		
Kazakhstan	small	10.5	4.2	59.5	14.5
	large	16.3	7.9	57.1	
Kyrgyzstan	small	28.2	4.1	12.8	23.2
	large	27.2	4.6	17.9	
Moldova	small	9.6	8.1	68.6	44.0
	large	17.4	12.4	68.6	
Uzbekistan	small	9.1	25.2	13.6	66.0
	large	10.6	19.5	6.2	
<i>CEE+Baltics (excl. Croatia & Slovenia)</i>					
Czech Rep.	small	0.8	2.0		3.0
	large	1.2	2.1		
Estonia	small	3.0	2.0		2.3
	large	2.9	1.9		
Hungary	small	0	0		0
	large	0	0		
Lithuania	small	0.1	2.9		2.7
	large	0.2	1.8		
Poland	small	1.4	0.3	0.2	4.5
	large	2.4	0.5	0.2	
Slovakia	small	10.1	17.0		22.5
	large	17.8	16.6		

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 be in part a product of limited trading networks, or “informational islands” (Seabright, 1999).

The sample size for Ukraine is substantially smaller than that for Russia (205 as 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

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%

Location effects	Russia	Ukraine	CEE excl. Croatia & Slovenia
big city	-6.39 (2.54) **	.21 (4.42)	-1.02 (1.23)
Town	10.88 (3.47) ***	4.68 (3.97)	.10 (1.11)
Number of firms	524	205	840

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. 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.

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.

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

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%

Ownership effects	Russia	Ukraine	CEE excl. Croatia & Slovenia
(1)Ownership type			
insider ownership	4.36 (3.16)	-5.29 (5.99)	-2.59 (2.54)
State	1.01 (5.29)	-10.70 (7.28)	-5.64 (1.58) ***
ab initio private firm	-7.28 (2.87) **	-10.37 (5.77) *	.03 (1.29)
(2) Foreign stake	.96 (8.11)	-18.86 (8.89) **	-.59 (1.58)
(3) Export	-.14 (.10)	.10 (.11)	.03 (.02)
Number of firms	524	205	840

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).

Table 5. Financing problems and barter and non-monetary transactions

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%

Financing problems	Russia	Ukraine	CEE excl. Croatia & Slovenia
Financing problems in general	4.66 (1.12) ***	5.14 (1.97) ***	.78 (.43) *
Access to long term bank credit	1.91 (.93) **	-.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

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.

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.

Table 6. Product market competition and barter and non-monetary transactions

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%

Product Market Competition	Russia	Ukraine	CEE excl. Croatia & Slovenia
(1) No. of competitors:			
one to three	-10.12 (5.28)*	-.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	.82 (2.91)	-4.97 (4.48)	-.65 (1.22)
demand slightly lower	-.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)

The questionnaire used two approaches to eliciting 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% (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% price test were not significant.

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% price test. Compared with the omitted category in which customers switch to alternative suppliers if the firm puts its price up by 10%, it seems that firms with market power do less barter.

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 whilst 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 region.

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.

Table 7. Correlates of barter and of the change in the use of barter

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.

	Russia	Ukraine	CEE excl. Croatia & Slovenia
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