

1

Inter-Firm Non-Monetary Transactions in Russia: A Literature Review

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Introduction

The study of non-monetary transactions (NMTs) can be defined by three questions: why do they occur, what effect do they have and what policies can reduce their negative economic effects. Knowing why barter and other NMTs occur is necessary to analyse their effects and the policies that will effectively eliminate their use¹. Describing the effects of NMTs on the rest of the economy is useful for determining the immediacy of reducing their use. The answers of why NMTs occur and of their impact, provided in the literature, suggest policies that will reduce the need for their use.

In conventional theory, barter is the system of exchanging goods and services without exchanging money. W.S. Jervons (1875) defined it as “giving what [is] not wanted directly for that which [is] wanted” (Jervons, 1875: 2). In order for such a transaction to occur, both parties must have something desired by the other. Jervons called this the ‘double coincidence of wants’. Because of the necessity of a ‘double coincidence’, as well as the necessity of spending resources searching for a trading partner barter is inefficient. The ‘double coincidence’ may be satisfied, but it is costly for the two parties to find each other, both in time and in resources. However, this inefficiency can be avoided if some are willing to accept goods not useful to them, which requires that they can further exchange them for the goods they desire. Older theory of barter which is an extension of monetary theory developed by Friedman and Simons, simply adds money into a Walrasian general equilibrium model (see Starr (1972) and Banerjee and Maskin (1996) for example), predicting that the switch to using money is used to avoid the inefficiencies of barter. In some of the later literature (Ritter (1995), for example) a monetary equilibrium is only stable if the benefits of using money are greater than the benefits of using barter minus the inefficiencies it causes². This arises whenever inflation is below a certain threshold.

However, inter-firm barter in the transition countries, and Russia in particular, does not always

¹ Throughout the rest of the paper, I will use barter and NMTs interchangeably

² Norman (1987) attempts to quantify the costs of transactions in terms of the mathematical complexity in computing the necessary trades to reach an equilibrium; as expected it is higher in a barter than in a monetary system. He finds that the cost of barter is $\min(n^2H, nH^2)$ versus nH for a monetary economy, where n is the number of goods and H is the number of households.

3

take the classic form (it is often a tool of the unofficial economy³) so new theory has been developed to include other non-monetary transactions. There are four types of non-monetary transactions used by firms in Russia (as well as in other transition countries to a lesser degree⁴) besides direct barter. Firms exchange goods for debt offsets (*zachety*) or swap and cross-cancel debt with other firms and the government. Banks, firms, and the government also issue money surrogates, primarily promissory notes (*veksels*), which are traded for goods and often end up circulating beyond the initial transaction. Finally, some firms just build up permanent arrears of wages, taxes and payments.

The prevailing theories of why barter is used in Russia are to hide liquid assets and cash from the eyes of tax collectors, creditors and criminals, to avoid restructuring, for contract enforcement, and to overcome financial problems, such as lack of cash, credit or liquidity. These theories are accompanied by the classic monetary theory that the presence or future prospect of high inflation will increase the attractiveness of barter. Section I describes the use and abuse of NMTs in Russia, Section II describes the main theoretical literature used in analysing inter-firm barter in Russia, Section III summarises empirical support for the different theories in Russia, and Section IV adds a few concluding remarks and summarises the policy implications of the literature.

I. Use and Abuse of NMTs in Russia⁵

Yakovlev (2000) provides a detailed description of the common uses and abuses of NMTs in Russia during the transition period. The classic form of barter, direct exchange of one good for another, are usually of the forced type in Russia. That is, firms accept payment in kind of goods they have no use for, in exchange for forgiving past dues because if they refused, they would receive no payment at all. This type of NMT is not the type that is the biggest problem in the Russian economy; most direct barter exchanges are one-time and used only occasionally; they are

³ See Kaufmann and Kaliberda (1996) for a survey of the conditions that make an unofficial economy more likely in the transition countries, with some empirical work on Ukraine.

⁴ My focus in this paper is Russia, because NMTs is a more severe problem there than in any other transition economies, with the possible exception of Ukraine. However, I will reference some empirical evidence for other countries in subsequent footnotes.

⁵ See Yakovlev (2000) for a complete description of the use and abuse of NMTs.

not a long-term business strategy. Because of the infrequency of direct barter transactions, it is more important to look at other NMTs. The closest NMT to barter are debt offsets. These are used between the government and firms to settle tax arrears; the government will cancel a firm's tax arrears in exchange for a service to the government. For instance, a bread company might provide bread for the army as payment of back taxes. However, these types of offsets are much less common than inter-firm offsets. Inter-firm offsets are usually a result of mutual dependency; both firms will see the sub-optimality of using offsets, but have no other option. In addition, some firms use *veksels* to pay for goods received if they are short on cash and credit. In this case, sometimes it is more profitable for multiple firms to be involved. If there is a chain of companies $i = 1, \dots, n$ where the i th company requires the output of firm $(i - 1)$ and the 1st firm requires the output of the n th, then if each company supplies goods to firm $(i + 1)$ for $i = 1, \dots, n - 1$ in exchange for a *veksel* and firm n gives firm 1 a *veksel* as well, then each firm will be able to continue production. This simple representation of a chain of NMTs does not provide any explanation as to why firms participate; some could want to avoid restructuring, some could be avoiding taxes, and if the firms are all owned by a common manager, then this system could be used to siphon funds for the use of the manager by choosing non-market prices for firms under his control and market prices in all other transactions. This allows him to divert profits to shadow companies or foreign accounts, out of the reach of the tax collectors. Whatever the motive for engaging in NMTs, the firms' balance sheets will be useless as a signal of the firms' financial position because prices used will differ from cash prices; one estimate puts the barter price of a good at 2-2.5 times its cash price!

II. Theories of Inter-Firm Barter in Transition Countries

While there are many theoretical models showing the inefficiencies of direct barter and the conditions necessary to move from a barter economy to a monetary economy (and some models that include the possibility of moving in the reverse direction), the analysis of transition has seen the exploration of models relating the unique conditions of the Russian transition to the rise of inter-firm barter⁶. One thing almost all the models have in common, is that barter delays the end

⁶ Prendergast and Stole (1996) analyse the causes and consequences of inter-firm NMTs in the West, where its level has been steadily increasing in the last 20-30 years.

of transition⁷.

A. Inflation

Dutta (2000) focuses on barter between individuals who are both producers and consumers, which shows the connection between saving by individuals, inflation, and inter-firm barter. Dutta asserts that an increase in male mortality (the life expectancy for males in Russia fell from 62 to 58 between 1992 and 1996) and a fall in output and productivity (over 20 percent output fall annually in the early transition years) reduced the propensity to save (and the level of savings), and therefore the level of capital investment, as well. He adds that in that period, government revenues were constant but the CPI and PPI grew rapidly, reflecting high inflation, which was the result of seignorage (the ‘inflation tax’). Seignorage was used to compensate for the government’s falling tax revenue (as a result of the output drop and reduced ability to collect taxes) and increasing debt problems. This hyperinflation, spurred by the falling output and male life expectancies, caused the increase in barter among individuals and firms. Dutta lays out a model where there are two goods, x and y , where x is perishable and y is durable, and four producer-consumers, X_0, X_1, Y_0, Y_1 , representing those who produce goods x and y in even and odd periods, respectively. The individual will try to smooth consumption by bartering for a durable good when they produce and selling it when they do not produce. The price of good y in terms of x is q_t :

$$q_t = Z / (Z + (1 - \delta) S_{y,t-1} - S_{y,t}) \quad (1)$$

where Z is the aggregate quantity of each good produced per period, δ is the rate at which the saved durable goods lose their value each period⁸, and $S_{y,t}$ and $S_{y,t-1}$ are the savings in periods t and $t-1$, respectively. Because of the assumptions that an individual produces every other period, either $S_{y,t-1}$ or $S_{y,t}$ will be zero for all i and t . Once money is introduced, it is not universally used right away. There is a lag that depends on whether the government can credibly commit to limiting the size of the money supply so that inflation is less than the rate at which saved goods depreciate, that is, $\pi_t < \bar{\pi}(\delta) = \delta / (1 - \delta)$ where π_t and $\bar{\pi}(\delta)$ are the inflation rate in

⁷ The World Bank states that “when [firm-level productivity differences due to history; whether a firm is old, restructured or *de novo*] is lost in a country, transition can be taken to be over” (World Bank, 2002b: xix).

⁸ This says that if one unit of good y is saved in period zero, there will be $(1 - \delta)$ left in period one.

time t and the rate at which saved goods depreciate, respectively. If the strict inequality holds, then money will be used in all transactions. If $\bar{\pi}_t = \bar{\pi}(\bar{\pi})$, it is ambiguous whether the economy will monetise; people will be indifferent between using the durable good y and using money.

Next, Dutta extends the analysis beyond the two-period horizon; if future inflation above $\bar{\pi}(\bar{\pi})$ is predicted, the use of money falls to zero because durable goods are a better store of value, inflation is higher than the depreciation of durables. That is, the opportunity cost of holding money is higher than the opportunity cost of holding durables, so durables will be used as a store of value. In the transition from barter to monetary transactions, there are some winners and some losers because

$$V_{YB} > V_{YM}(\bar{\pi}(\bar{\pi})) = V_{XM}(\bar{\pi}(\bar{\pi})) > V_{XB} \quad (2)$$

where V_{YB} and V_{XB} are the utilities of producers of y and x , respectively with barter and $V_{YM}(\bar{\pi}(\bar{\pi})) = V_{XM}(\bar{\pi}(\bar{\pi}))$ is the common utility of producers of y and x after the introduction of money. The producers of y lose because in the barter economy, the value of y depended on more than its value for consumption; its value increased because it can be used as an intertemporal store of value. Using these properties, Dutta concludes that if a shock occurs (such as a fall in real income or life expectancy), which decrease the propensity to save, then inflation will rise, even if the growth rate of money remains constant. If the propensity to save falls far enough (so that $\bar{\pi}_t > \bar{\pi}(\bar{\pi})$), then people will switch back to using barter as a medium of exchange because y becomes a better store of value than money.

B. The ‘Virtual Economy’

Gaddy and Ickes (2000) state that the “essence of the virtual economy is the transfer of value from value producing sectors—primarily, but not exclusively, energy and raw materials—to value destroying sectors” (Gaddy and Ickes, 2000: 5). However, the ‘virtual economy’ hypothesis⁹ encompasses many different explanations for the rise in the frequency of inter-firm NMTs. As Guriev and Ickes noted, “[there is an effective discount for barter because] cash receipts are more

⁹ This hypothesis was primarily conceived by C. Gaddy and B. Ickes. Gaddy and Ickes state that “[an] enterprise destroys value when the value of inputs purchased from other enterprises exceeds the value of the output that is produced” (Gaddy and Ickes, 1999a: 3). Thus, a value destroying enterprise is in worse financial straits than a loss-making one. The former’s output is worth less than the inputs *before* labour and capital costs are added in while the latter’s revenues are less than its costs (including labour and capital costs).

heavily taxed” (Guriev and Ickes, 1999: 5). Thus, firms that use the ‘virtual economy’, both the value added and value destroying, will gain by splitting the surplus from the untaxed NMTs. This is not to say that firms in the ‘virtual economy’ only use NMTs. In the vast majority of cases, firms will use *both* NMTs and roubles in the ‘virtual economy’. The driving force behind the ‘virtual economy’ is the inability or unwillingness of old firms (those that existed before transition) to restructure and the willingness of value added firms to support them. These value subtracting firms, due to lack of efficient bankruptcy procedures, have not been forced out of the economy. The government pressures value added firms to support these unviable firms to avoid the political backlash that would result from the mass unemployment caused if many firms close within a short period. However, some firms enter the ‘virtual economy’ as a way of evading taxes, both direct taxes as well as the inflation tax caused by the government’s use of seignorage to make up for its inability to collect tax payments in cash. NMTs allow value added firms to avoid taxes because they accept non-cash payments from value subtracting firms. The price of the goods they receive is vastly overstated, increasing their costs and reducing their value added (and tax obligation). Although the value subtracting firms receive more for their output than it is worth, they do not gain more tax obligation as long as their gains from the ‘virtual economy’ are outweighed by their value destruction. Optimally, they would balance the amount of value subtracted in production with gain they receive for overvaluing their goods. They would then, not only pay no VAT (value added would be zero), but would also appear to be viable. NMTs also avoid the inflation tax because it is not necessary for exchanges to be conducted with any exchange of roubles.

Gaddy and Ickes (1999a) provide a simple but elegant four-sector accounting model of the ‘virtual economy’. The ‘virtual economy’ is a relic of the Soviet practice of overvaluing the output (or undervaluing the costs) of high priority firms (e.g. firms producing for the military) so they appear more profitable than low priority firms (e.g. firms producing consumer goods). This was accomplished using arbitrary pricing, similar to the practices used in inter-firm NMTs. Once prices were liberalised and firms had to compete domestically and against imports, firms that had appeared value adding in the Soviet era became value destroying. Gaddy and Ickes note that this does not explain why value destroying firms are still around many years after the end of the Soviet Union. This is the main task of their model. They show that all parties, households, value

subtracting firms, value added firms and the government all allow the ‘virtual economy’ because it is in their interest to. It is obvious that it is in the interest of the value subtracting firms to participate in the ‘virtual economy’ because otherwise they would be forced to close. The value added firm acts as a pump; it supplies value destroying firms with an input to production. It accepts payment in kind, at a ‘virtual’ value higher than the market value because it can then give this to the government as a tax payment. The value subtracting firm appears to be value added and pays the VAT in kind to the government and sells the remaining output to pay wages. However, it does not have enough to pay all wages, so there is a build up of wage arrears. The government is assumed to pay all the tax revenue in a lump-sum payment to the households. It cannot pay its full obligation, but as long as the sum of the wage payments and the government transfers satisfies the household’s minimum need, they are indifferent between the ‘virtual economy’ and the real economy. The government accepts the in kind payments because it knows that if it does not accept the overvalued payment in kind, it will not receive anything at all. Thus, all parties are at least indifferent to the ‘virtual economy’ and some prefer it, therefore, although it is not the optimal outcome, it persists^{10, 11}

Boyarchenko and Levendorski (2000) present a search-theoretical approach to model Russia’s ‘virtual economy’. They assume that there are two sectors: one inefficient sector which can collude and produce universally valid promissory notes (*veksels*), inside money, and one efficient sector, which cannot produce notes. They also assume the possibility of outside money; government issued roubles, for example. They find that there are two possible equilibria: the two sectors do not trade and the inefficient sector relies on *veksels* while the efficient sector uses money, or the two sectors trade using both cash and *veksels*. They show that if trading friction (the inefficiency loss from barter) is small, then the inefficient sector will not trade using money unless forced to by an exogenous factor. However, if trading friction is not too small, the inefficient firms will use both money and *veksels*. In terms of a policymaker’s alternative, the

¹⁰ See Gaddy and Ickes (1999a) for the full description of the losses incurred if the government does not accept payments in kind.

¹¹ Gaddy and Ickes (1998a) provide another analytical model that focuses more on firms’ choice of whether to restructure or produce for the informal economy. Gaddy and Ickes (1998b) assert that the debt relief from the West reduces the Russian government’s incentive to curb the ‘virtual economy’. Gaddy and Ickes (1999b) describe an evolutionary analysis comparing the development of the ‘virtual economy’ to the evolution of Multi-Drug Resistant (MDR) Tuberculosis (TB). Neither are found in the wild, they are both the result of incomplete reforms/drug therapy.

only way to totally monetise the economy is to increase the money supply *and* effectively ban the use of *veksels*.

C. Liquidity, Cash and Credit Constraints

Ellingsen (1998) provides a model on why firms might use barter where credit markets are poorly supported and where firms are cash and liquidity constrained. However, he proves that lack of access to credit alone will not give rise to barter; the seller needs to have market power (in order for price discrimination to be an issue) and incomplete information about the buyer's financial position (i.e. an informational asymmetry). The lack of cash may be due to the buyer's lack of enough collateral to receive a loan or the lack of trade credit as in Poser (1998), which is described below. Ellingsen begins with the assumption that the amount of a purchasing firm's available cash is a firm's private information. Furthermore, because of poor legal contract enforcement, most of the assets of the buying firm cannot be pledged as collateral. Looking at the survey data on reasons for barter, Ellingsen concludes that tax evasion and contract enforcement are not primary reasons for barter. But, as Kim *et. al.* (2001) note, this could be because managers are hesitant to reveal tax evasion as a reason for barter to avoid attracting unwanted attention regardless of promises of confidentiality. The selling firm announces a take-it-or-leave-it cash offer and whether or not a firm accepts the offer is a signal of the buyer's financial situation; all firms with enough cash to pay the price will to avoid the inefficiency losses of barter^{12,13}. Those firms without the cash available to purchase are able to promise the delivery of goods in the future in exchange for the goods it desires. Thus, even though there is an efficiency loss from the barter transaction, it is outweighed by the benefit to both firms of completing the transaction. If the transaction was only completed if the payment was in cash, the buyer would not receive the good, losing the value of the good (minus the price) and the seller would lose the price (minus the cost). Ellingsen shows that no transaction will be accepted that decreases net welfare, so any

¹² Commander *et. al.* (2000) state that barter prices are 20-50 percent higher than cash prices, which Kim *et. al.* (2001) attribute to implicit interest on barter transactions. As noted above, Yakovlev (2000) believes that the barter price could be between 2 and 2.5 times higher before August 1998 and 1.5 times higher after. The figure presented by Commander *et. al.* might be an average of the difference between cash prices and that of all NMTs.

¹³ This assumption is at odds with Guriev and Ickes (1999), "While employing barter involves the usually noted transaction costs, it also affords the buyer the opportunity to pay an effectively lower price" (Guriev and Ickes, 1999: 2). If barter is cheaper and firm's financial situation is private information, firms will have an incentive to understate their financial situation. Ellingsen avoids this problem by implicitly assuming that the transaction cost of barter is greater than the price cut from barter.

barter transactions must result in a welfare gain. This result is intuitively satisfying because the firms, as always, are assumed to be profit maximising, so neither would accept a deal that reduced their welfare. In this framework it is not essential that there be a ‘double coincidence of wants’ because the seller could either sell or trade with the goods it received. There is evidence that firms re-barter goods they receive in barter transactions. In Russia, 40 percent of goods received in barter are not desired by the receiver and 25 percent are resold or rebartered (Aukutsionek, 1998). The theory that credit constraints leads to increased barter supports the observation that barter is nearly always associated with recessions, which are often associated with credit and liquidity constraints.

Poser (1998) posits that the increase in barter is the result of lack of money demand and liquidity constraints, in more general terms, monetary disruption. He incorporates the conclusion reached by Prendergast and Stole (1996) that barter trades are used because they give firms more power in levelling trade sanctions, which might be needed in the transition countries where property rights and contracts are harder to enforce due to the ineffectiveness of the justice system. Poser also attributes the increase in barter to avoiding taxes, either direct taxes or seignorage. However, he believes that the use of barter to avoid taxes has decreased in importance as the level of inflation has fallen because it has not been accompanied by a significant fall in the effectiveness of collection of direct taxes. His final conclusion is that barter is not a problem in itself, it is more of a symptom of the deep institutional problems that have not been resolved during the transition and may have been worsened by bad policy decisions by the government.

D. Market Power and Barter

Guriev and Kvasov (2001) believe that in addition to the ‘virtual economy’ hypothesis and the liquidity constraint hypothesis, market power is an important factor in the share of NMTs used by a firm. They note that “anecdotal evidence suggests that these are the natural monopolies that are most engaged in barter” (Guriev and Kvasov, 2001: 3). Their model is constructed so that increased market power has a positive effect on the share of NMTs because it is used as price discrimination and as a screening device when a firm’s output quality is unobservable; firms with high-quality output prefer to pay in cash while those with poor-quality output prefer to barter.

If the oligopolist seller increases the amount of sales in cash, the cash price will fall relative to the barter price. Thus firms producing higher-quality goods will buy with cash. Thus the other oligopolist firms will also have an incentive to sell more for cash because the firms willing to barter have a lower average quality than before the fall in relative cash prices. Extending Ellingsen (1998), who used market power as a way to introduce price discrimination into his model, Guriev and Kvassov assert that “barter can indeed emerge in equilibrium as a means of price discrimination even if there are no liquidity constraints” (Guriev and Kvassov, 2001: 4). Their model allows three equilibria, no barter, rationed barter, and barter. The share of barter is determined by the concentration of firms. For sufficiently low concentrations $1/N < 1/N^b$, where N is the number of firms (approaching a perfectly competitive market as $(1/N) \rightarrow 0$), there is no barter. For concentrations above a certain level, $1/N > 1/N^b$, barter becomes more common. In between, there is a range of values of N , $N^{nb} \leq N \leq N^b$ where all three equilibria (barter, rationed barter, and no barter) are all possible. Guriev and Kvassov (2001) and Guriev and Ickes (1999) empirically test the implications of this model, that increased market power increases the share of barter. The results are described in section III.

E. Consequences of Barter

Aukutsionek (1998) focuses primarily on the effect barter has on the government’s ability to stimulate demand by increasing its spending. He lays out a very simple theoretical model where A is autonomous (aggregate-income-increasing government) expenditure, C is consumer expenditure, B is barter expenditure and Y is aggregate income. Consumer expenditure and barter expenditure are related to income by:

$$\begin{aligned} C &= cY \\ B &= bY \end{aligned} \tag{3}$$

so that in equilibrium income is

$$Y = A + cY + bY \tag{4}$$

and therefore

$$Y = A / (1 - c - b). \tag{5}$$

If the government decides to spend 100 million roubles to stimulate demand in an economy with no barter, assuming that c , the marginal propensity to consume, is roughly 0.6, aggregate income

will increase 2.5 times the amount of the increased autonomous expenditure. However, when there is barter, this increase will be less, and for high enough levels, the government's ability to increase income by significantly more than the increase in autonomous expenditure will be insignificant. Thus, the high level of barter in the economy may cause further economic stagnation by eliminating the response to an increase in autonomous spending, an important tool of fiscal policy. In Russia, where barter may constitute up to 40 percent of all transactions, this simple model may provide some explanation as to the failure of the Russian government to stimulate the economy. When $b = 0.4$, an increase of A by 100 million roubles increases aggregate income only 125 million roubles, half as much as when b is close to zero. Using an alternate estimate that barter constitutes 55% of all transactions in Russia, $b = 0.55$, the increase in aggregate income falls to only 105 million roubles.

III. Inter-Firm Barter in Russia: Empirical Evidence

It is common knowledge that inter-firm NMTs occur very frequently in Russia¹⁴. The report on Russia by the OECD (2000) notes a “rise in [the] prominence of various forms of money surrogates, including barter, debt offsets, and various bills of exchange (*veksels*)...[and has] mushroomed [by 1998] to the point of accounting for a majority of industrial transactions and subnational budgetary operations (taxes and expenditures)” (OECD, 2000: 19).

Guriev and Ickes (1999) test the effects of restructuring, financial constraints and market power on the incidence of barter in the Russian economy in 1996 and 1997. They suggest that, while initially financial (i.e. liquidity and cash) constraints may have influenced a firm's use of NMTs, that by the period they study, there is little evidence to support the hypothesis that financial constraints are a determining factor in the use of NMTs. Initially, they explain, financial constraints may have been important in determining how many NMTs a firm uses, but by 1996-1997, there were enough firms using NMTs that, because barter transactions were less costly than those paid in cash, non-financially constrained firms had an incentive to pretend they were in dire financial straits in order to join a barter ‘community’. Guriev and Ickes find more support for the link between market power (as measured by the concentration ratio of the industry) and NMTs.

¹⁴ Selected data on NMTs in Russia are presented in Appendix A.

In support of the ‘virtual economy’ hypothesis, they find that restructuring is negatively affected by the share of NMTs of a firm¹⁵.

Guriev and Kvassov (2001) specifically test the relationship between a firm’s market power (as measured by the share of the four largest firms in total sales of an industry) and the share of NMTs it uses, controlling for firm size (by the log of a firm’s sales) because it is positively correlated with market concentration and also large firms are less affected by the problem of ‘double coincidence of wants’. They also control for a firm’s export share (negatively correlated with barter) and the distance of a firm to a consumer market, because firms selling to retail stores or directly to consumers will receive cash from both more often because the transaction costs of barter are prohibitively high for consumers and most retail firms, which tend to be small. They find that the import adjusted concentration ratio has a positive and significant coefficient with all combinations of distance to consumer market and using two-digit industries (as an alternate measure of distance to consumers). Guriev and Kvassov find that this result is robust when taking into account the multiple equilibria levels of concentration predicted in their model.

Brana and Maurel (1999) use quarterly survey data from 200 Russian firms collected from 1995 to 1996 to test hypotheses on the reasons for using barter¹⁶. First, they test the effects of monetary tightness during stabilisation on the share of barter by regressing firms’ financial situation and interest rates on the share of barter. They conclude that “that monetary policy tightness at the macro-economic level only partially explains the increasing use of barter” (Brana and Maurel, 1999: 14). They believe that the true explanation lies in a microeconomic analysis of firm’s liquidity situations. So they divide the sample into two groups; those firms with access to credit and those that are indebted (and do not have access to credit)¹⁷. They find that indebted firms use barter to unload excess inventory and continue production of ‘soft goods’, those goods

¹⁵ Ivanenkov (2001) tests the ‘virtual economy’ hypothesis by adjusting Russian prices to their ‘market’ values using U.S. prices. He states that “Regarding the hypothesis of virtual economy, the evidence is either ambiguous or unfavorable to it” (Ivanenko, 2001: 16). In its current form, the ‘virtual economy’ hypothesis is difficult to test because it has not been analytically fleshed out enough to suggest a clear empirical test. Once the hypothesis has been analysed analytically, empirical testing is likely to be more conclusive.

¹⁶ Marin *et al.* (1998) look for empirical support for different reasons for bartering using a survey of 165 barter deals in Ukraine in 1997. Carlin *et al.* (2000) extends the analysis of Marin *et al.* to other transition countries. Both studies find that liquidity constraints are the primary factors in determining the level of barter. Their findings are corroborated by Commander *et al.* (2000) and Linz and Krueger (1998).

¹⁷ Guriev *et al.* (2000) confirm these findings with a slightly different theoretical model. They find that the more indebted a firm is, the more it will use barter to hide cash from creditors.

for which there is no demand. They posit that barter is a symptom of partial or unsuccessful restructuring. For the firms with credit, barter is not used as often as by indebted firms and is a short-term solution to avoid input and financial shortages. Their analysis supports the U-shaped curve hypothesis of Marin and Schnitzer (1999) that barter is positively correlated with growth when used infrequently but negatively correlated with growth when used extensively. Brana and Maurel suggest that introducing efficient bankruptcy procedures would allow firms that cannot restructure to exit the market; the lack of such bankruptcy procedures causes firms to struggle to stay afloat using barter, hurting more competitive firms. The restructuring and market exits that more efficient bankruptcy procedures would facilitate would allow effective monetary and fiscal policy and a remonetisation of the economy, which would speed up growth.

Kim *et. al.* (2001) believe that Brana and Maurel (1999) do not take into account the microeconomic theories of barter in their macroeconomic analysis. Kim *et. al.* expand on the macroeconomic analysis of Brana and Maurel, empirically testing the hypotheses that the demand for money, demand for barter, and inflation are interconnected in Russia from the end of Communist rule in 1991 to 2000. They observe that hyperinflation is not likely to be the cause of the rise of barter exchange; inflation fell from 840 percent per annum in 1993 to only 11 percent in 1997. Over the same period the share of barter transactions in all inter-firm transactions rose from 9 percent to 42 percent. They also test the role of the availability of credit and the incidence of bank failures play in the increase of barter transactions. They slightly modify an IS-LM model of a small, open economy by expanding the conventional theory to include barter, which results in the following three-equation system:

$$\begin{aligned}
 m_t \square p_t &= \square + \square(y_t \square p_t) + \square(b_t \square p_t) + \square r_t + \square e_t \\
 b_t \square p_t &= \square + \square(y_t \square p_t) + \square r_t + \square(m_t \square p_t) \\
 p_t &= \square + \square e_t + \square p_t^\square + \square(b_t \square p_t)
 \end{aligned} \tag{6}$$

where p_t is the price level, m_t is the nominal money demand, e is the exchange rate, the ratio of the rouble to the US dollar, p_t^\square is the foreign price index, y_t is output, r_t is the nominal interest rate and b_t is the nominal value of barter¹⁸. Kim *et. al.* find that, after testing for statistical

¹⁸ All variables are in logs.

problems in the data, that using three cointegrating vectors is appropriate¹⁹. Their most significant result is that both barter and output have a significant effect on money demand, the former negatively and the latter positively. Also, money has a negative impact on barter, about half the size of the negative effect of output on barter. Furthermore, they find that depreciation lowers the demand for money and increases the price level. Then, they test the short run impact of bank failures and low availability of credit on barter and find that in the short run, money and barter are complements, but in the long run they are substitutes. One explanation predicted by the theory for inflation falling and barter rising simultaneously that they do not explore is that the primary inflation related cause of barter is not just its level, but the credibility of the government to sustain low inflation. It has been documented that throughout the transition period the Russian government has promised not to devalue the rouble, but once the creditors knock on the door, abruptly break its promise. Credibility is not built by the words of the government politicians, but by backing their words with actions for a sustained period. After the Asian financial crisis, despite statements to the contrary, the government devalued the rouble. This action does not convince the masses of the government's commitment to sustaining low inflation. It is still unclear how long it will be before the word of the government is taken without a grain of salt and until this time is reached, it is overly optimistic to believe that the level of non-monetary transactions will decrease.

IV. Concluding Remarks

In this paper, I have attempted to provide a representative survey of the literature on the causes and consequences of barter in Russia during transition and the policies that the evidence suggests for curbing its prevalence. Because most of the literature on Russia is from the past ten years, no firm conclusions have been reached; some evidence supports one theory while different evidence contradicts that theory. Furthermore, it is a possibility that all the theories in this paper are determining factors in the rise of inter-firm NMTs. Because of this possibility, the 'virtual economy' hypothesis holds the most promise because it takes a broader view of the Russian economy; value added sectors pump value into value subtracting sectors using barter.

¹⁹ Kim *et. al.* find that their data are unproblematic; for a more detailed description of the diagnostic tests used, see pp. 14-20 and page 22 as well as the sources cited therein.

The theory and evidence suggests a few policy measures for decreasing the occurrence of barter in the transition countries²⁰ :

Implement effective bankruptcy procedures: This will allow (force) firms that cannot restructure and cannot compete in the market economy to leave exit.

Increase availability of affordable credit: This complements and reinforces the previous reform if affordable credit is offered to firms with transparent balance sheets and denied to non-transparent firms.

Tax payments in cash: If the transition countries' governments insist that all taxes are paid in tax, they will have more money to spend on social programs, especially unemployment insurance, which will soften the blow that the first two measures will cause in terms of rising unemployment. However, the welfare effect of this policy are highly ambiguous and further research is needed.

These policy recommendations, similar to the general 'encourage and discipline' policy recommendations of the World Bank (2002b), will not be easily or costlessly implemented, but when they are implemented, will lead to the creation of a virtuous circle. Inefficient firms will either be forced to restructure or exit the market. Those that restructure and already existing efficient firms will be helped by not having to maintain the most inefficient, which will have been forced out. If this occurs, then the government will have less problem collecting taxes in cash, which can be used to support those who lose from the closure of inefficient firms while the efficient firms expand and increase employment. In a way, these reforms are just an extension of the initial reforms that were not successfully implemented at the beginning of transition, particularly in many former Soviet republics. As the experience of some of the advanced reformers in CEE demonstrates, this reform process is quite long and arduous, but over time, the costs become outweighed by the benefits.

Since the completion of the studies in this paper, the world has changed, as it does over time.

The latest statistics show that the share of non-monetary transactions in Russia has fallen from

²⁰ These policy suggestions, while specific to reducing NMTs, are very similar to the general policy objectives given in more detail by the World Bank (2002b) and the OECD (2000). For a summary of the economic performance of Russia in 2001, see the World Banks (2002a) and for all transition countries, see EBRD (2000).

31 percent in 2000 to below 25 percent in every month of 2001²¹ with a low in April 2001 of 21.7 percent (World Bank, 2002a). The share of firms making negative profit declined from an average of 41.6 percent in 2000 to a low of 37.2 percent in the third quarter of 2001. In addition, the European Bank for Reconstruction and Development (EBRD) noted in its annual report for 2000 that in Russia, “there has been some improvement in the areas of governance and enterprise restructuring, as shown by a sharp decline in barter and the resolution of a few high-profile corporate governance abuses” (EBRD, 2000: 2). It appears as if the situation is clearing up in Russia. One possibility, as Gaddy and Ickes (1999b) noted, is that “[c]apital replacement in loss-making sectors [who are the primary beneficiaries of barter] is nearly nonexistent. This suggests, perhaps, that over time the size of this sector will shrink relative to the rest of the economy” (Gaddy and Ickes, 1999b: 17). However, as Gaddy and Ickes (2000) demonstrate, these figures may reflect only the effect of the devaluation of the rouble; firm behaviour need not have changed, in which case, the devil truly would be in the details. Nonetheless, it is still necessary to determine the causes of the huge increase in the share of barter from 1992 to 1998 and the consequences it has had on Russia’s future economic growth and development.

²¹ The data are only available for January to September 2001.

Appendix A: Data on NMTs in Russia

Table A1: Barter Share in Sales for Selected Industries

Industry	Barter Share in Sales
Construction Materials	59
Ferrous and nonferrous Metallurgy	56
Chemical and Petrochemical	52
Electricity	46
Wood and Paper	46
Textile, Apparel and Footwear	42
Machine Building and Metal Processing	41
Fuel, Mining, Extraction and Processing	33
Agriculture	31
Food Processing	25

Source: Aukutsionek (1998).

Table A2: Motives for Barter

Motive For Barter	Share in 1997
No Cash	87.5
Faster Payment than Cash	72.1
Goods in Stock Accepted	56.1
No Bank Loan	29.1
Better Deal than Cash	20.8
To Maintain Production	12.5

Source: Kaufmann and Marin (1998), Table 4.

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