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**Gaddy and Ickes Model of Russian Barter Economy:
Some Criticisms and Considerations**

by

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INTRODUCTION

A peculiar feature of the transformation process of the Russian economy is the growing importance of barter exchanges, reminiscent of soviet era. According to transition theoreticians this phenomenon should have disappeared thanks to the market reforms performed by the Russian government, but things went the other way round. Barter is now much more important in the Russian economy than in the soviet period.

Recently some articles appeared on this growing phenomenon and other non-cash mode of payment, which give rise to wage, tax and inter-enterprises arrears. This creates an economy with distorted real and financial flows. In the literature there are three explanations of the growing importance of barter in the Russian economy: (1) tax incentives, (2) liquidity squeeze and (3) an environment characterized by disorganisation and network effects, in which Russian firms try to survive.

Aukutisonek (1998) and Poser (1998) describe the importance of barter in the Russian economic system, its extension, its rate of growth and which are the sectors mainly affected by the phenomenon. What is missing in these articles is an analytical framework that relates all the macroeconomic sectors of the Russian economy.

Gaddy and Ickes (1998a), (1998b) try to fill this gap with a four sectors accounting macro-model. They try to explain the macro-consequences of the existence of barter for the working of the Russian economy, and give some economic policy advices in order to eliminate the barter from the system in order to achieve economic efficiency¹. In their article they explain the existence of barter with economic and social characteristics inherited by the former system, i.e. the possibility of using relational capital that allows enterprises to survive without restructuring².

Gaddy and Ickes (GI) model shares with the physiocratic economic theory the basic idea of the co-existence of a productive and an unproductive sector ("Gazprom" and manufacturers) in the economy. The former has the function of producing a surplus to be distributed in the economic system. Thanks to this similarity, it is convenient to translate Gaddy and Ickes model in the notation proposed by Pasinetti (1989) to describe the macro relationships of the physiocratic system. In our opinion, this makes the working of GI's model, which is somewhat difficult to read because of its accounting notation, clearer.

Within Pasinetti's framework we are able to show that, contrary to what GI claim, model's viability does not need any outside buyer providing cash. Cash can be consistently introduced by assuming that manufacturers are initially endowed with some amount of money that they use to pay wages.

Furthermore, we propose a new version of the model, which we believe better accounts for two key-features of the Russian economy that are overlooked by GI: namely, the role of power relationships and the distribution of income. These, in turn, are shown to be closely related to the arrears problem, which GI explain only by the low productivity of the manufacturing sector. On the contrary, we suggest that the monopsonic power of Russia's oligarchy may be one of the determinants of the barter phenomenon, of distributional inequality and of low economic growth.

¹ For a criticism of Gaddy and Ickes model see Menshikov, 1999 and Woodruff, 1999.

² The more general phenomenon of *blat* is discussed in Ledeneva, 1998.

1. REVIEW OF GADDY AND ICKES MODEL

1.1 Assumptions

The main assumptions of the model are the following³:

- The economy is made up by four sectors:

H Households;

G value-adding industrial sector (Gazprom);

M value-subtracting industrial sector (Manufacturers);

B government sector (Budget).

- Production:

G and H each produce 100 Roubles of output (gas and labour) at no cost

G and H supply the gas and labour to M, which uses them to make a product that has a market value of 100.

- Payments:

M contracts to pay G and H the market value of the inputs (gas and labour), which they supply.

All accounting (between enterprises and for tax purposes) is on the accrual basis, i.e. income and expense items are recognised as incurred regardless of when they are actually paid.

Everyone tries to meet all obligations. No one conceals income.

- Fiscal considerations:

On the revenues side, B consists of all taxes collected from the enterprise sector (G and M); on the expenditure side, it consists of transfers to H (e.g. pensions, subsidies, etc.).

The only tax in the economy is a value added tax levied at a rate of 100%. Specifically, there is no personal income tax on households' income.

B is obligated to transfer all taxes collected to H but cannot borrow. (Unmet budget expenditure obligations will be considered budget arrears to H.)

- Households requirements:

H need a minimum of 100 in cash to survive. This is the only cash requirement in the system.

- Cash:

The output of M can be sold for cash at any time, at its market value.

1.2 The virtual economy

GI use two different models: a virtual and a real one. The virtual economic model is based on fictitious values higher than the market's, which every agent of the economy accepts as real. No agent is deceived, everyone knows the deception and participates to it, allowing its reproduction. The real economic model describes the true relationships among economic agents when the fictitious veil is taken away.

The virtual economy works as follows.

- M prices its output at 300, i.e. it pretends that the value of the output, which in market terms is only 100, is 300. G and B accept this valuation.
- Inputs (gas and labour) are supplied to M and production occurs before any financial settlements are made.
- As the output (cash value of 100; priced at 300) sits at M, waiting to be shipped out, the following claims prevail among the sectors:

Gazprom:

³ See Gaddy and Ickes, 1998a: pp. 4 – 5.

Has a claim of 100 on M (for gas).

Owes 100 to B for taxes.

Manufacturing:

Owes 100 to H (for wages).

Owes 100 to G (for gas).

Owes 100 to B (because the pricing of M's output at 300 made it appear that it added value of 100).

Budget:

Has a claim of 100 in taxes from G.

Has a claim of 100 in taxes from M.

Owes 200 to H (all budgeted revenues are due to H as transfers).

Household sector:

Has a claim of 100 on M (for wages).

Owes nothing to B (no personal income tax) or to G.

Has a claim of 200 on B.

- Financial settlements:

M's settlements:

M delivers one-third of its output to G in kind (nominal value: 100) as full payment for gas.

M delivers one-third of its output to B in kind (nominal value: 100) as full payment for its taxes.

M owes 100 in wages to H. But H cannot accept non-cash payments for wages. M therefore sells the output for cash at the market value of 33, which it pays to H.

Result: M's accounts with G and B are balanced. M ends up with wage arrears to H of 67.

G's settlements:

G takes the 100 (nominal) it received from M and remits it to B as its tax payment in full.

Result: Since G has no direct dealings with H, G's accounts are balanced.

B's settlements:

B has now received 100 (nominal) in goods from M and 100 (nominal) in goods from G. Together, these have a cash value of 67, which B realises and transfers to H.

Result: B's accounts with M and G are balanced. But B owes H 133.

H's settlements:

H has received 100 in all (33 from M, 67 from B).

Result: H is still owed 67 by M and 133 by B in budget transfers.

- **Result:** H has received a total of 100, which was assumed to be its minimal survival requirement. The system can thus start again for another round.

1.3 The (underlying) real economy

In the real economy, no one (including M) would pretend that M's output is worth anything else than the 100 it actually is worth.

- M would report a loss of 100 instead of a profit of 100. It therefore would have no tax obligation.
- With sales revenue of only 100, M could not pay both G (to whom it owes 100 for gas) and H (to whom it owes 100 for wages). It would have to apportion the 100 it does have between them. Assume it pays equal shares to each, that is, 50 to H and 50 to G. M thus has wage arrears of 50 to H and inter-enterprise arrears of 50 to G.
- G remits to B the 50 it receives from M. Since, on accrual basis, G owes B a total of 100 for taxes, this leaves G with tax arrears of 50.
- B's only revenues are what it receives from G, since M has no value added. B transfers 50 it received from G to H.

B still has budget arrears of 50.

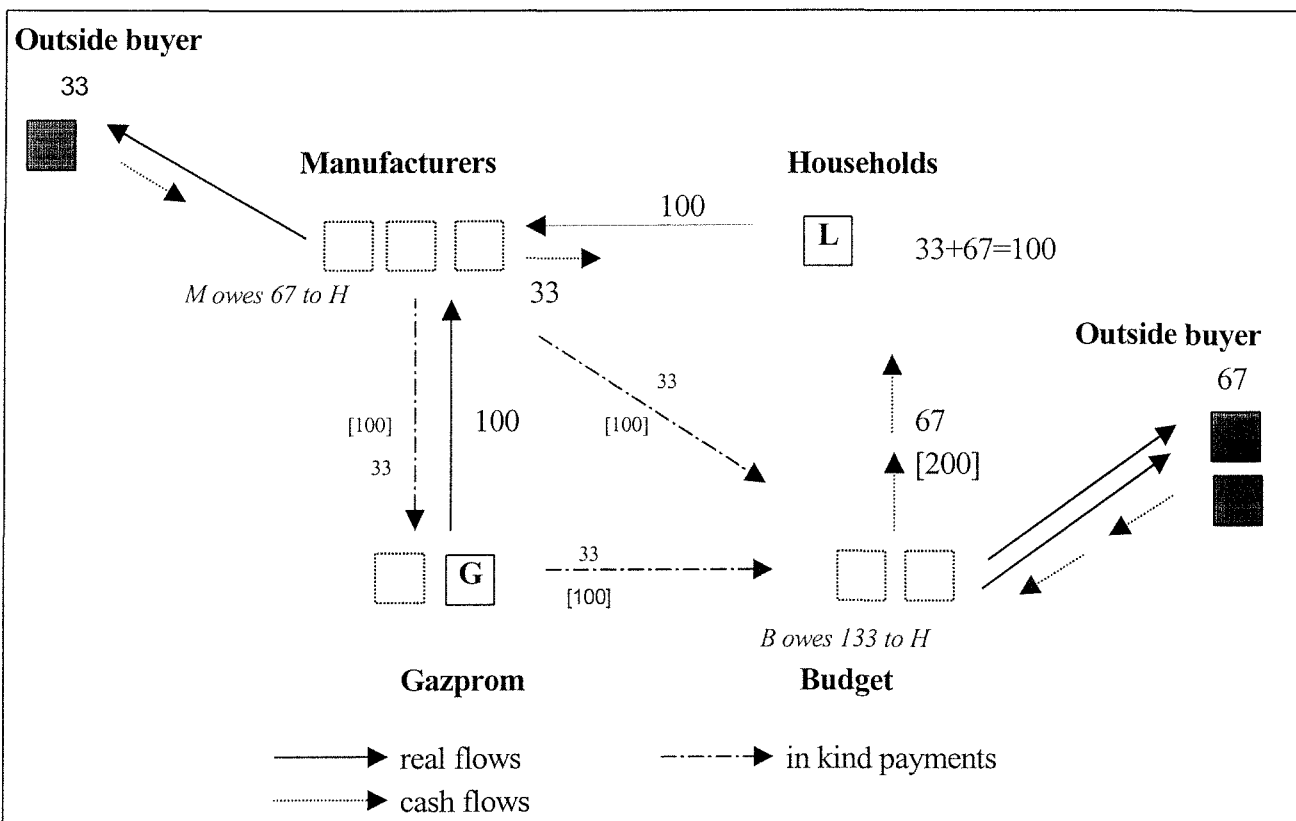
- **Result:** H survives because it receives 100 (50 from M and 50 from B).

2. GADDY AND ICKES MODEL IN PASINETTI NOTATION

2.1 The virtual economy

Figure 1 represents the working of the virtual economy of GI's model using Pasinetti's (1989) notation. Each box represents good or services whose agreed upon price (be it real or virtual) is 100. The label "L" refers to labour services, and "G" refers to gas. Boxes without labels represent manufactured goods. Figure 1 - The virtual economy of GI model in Pasinetti's notation.

Figure 1 - The virtual economy of GI model in Pasinetti's notation.



Solid arrows show flows of goods and services priced at their real (i.e. market) value, while dash-and-dot arrows show virtually priced in kind flows. Dotted arrows refer to monetary flows. The numbers in square brackets are virtual values, and the rest are market values.

Households and Gazprom provide manufacturers inputs, gas and labour, whose total real value is 200. Manufacturers produce goods, whose real value is 100 (M is a value-subtractor), but price them 300.

M delivers one-third of its output to G in kind (nominal value 100) as full payment for gas.

M has to pay wages, but it cannot pay them in kind. Therefore, it must sell the output for cash at the market value of 33. M pays only 33 to households, instead of 100. This generates wage arrears for 67.

Gazprom pays taxes in kind using the goods it has received from manufacturers. Manufacturers also pay taxes in kind, by transferring one third of the output to the government.

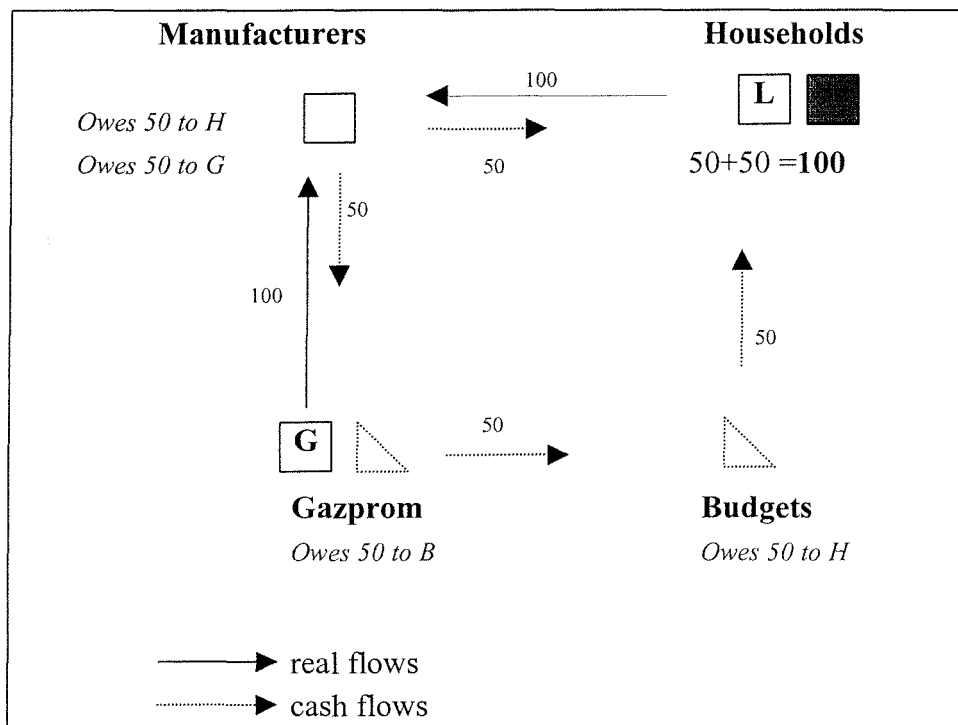
The goods B has received from G and M have a nominal value of 200 (B's accounts with M and G are balanced), but a cash value of 67. B sells them on the market and transfers 67 to H. B still owes 133 to H. Anyway, H's total revenues amount to 100, that is the minimal amount of cash required for survival.

As GI observe, this system works thanks to three conditions:

- 1) G pumps value added into the system;
- 2) both G and B accept M's pretence that its output is worth 300 rather than 100;
- 3) there has to be a buyer outside the system who supplies cash by buying M's output at the market price.

GI realise that this condition makes the system not self-contained and comment that, although this is a non-market environment, it requires the existence of a market with which it can interact in order to survive. This is quite a nonsensical proposition.

Figure 2 - The real economy of GI's model.



2.2 The real economy

Figure 2 describes what happens to this system if nobody pretends that the output of M has a value greater than 100. The main consequences are: lower nominal output (100 instead of 300), and a different distribution of arrears. Graphic conventions are as before. The outside buyer was not drawn for the sake of simplicity, but it is implied that goods must still be sold on the market for cash.

M is revealed to be a value subtractor (it receives inputs for 200, but produces only 100), and cannot fulfil its obligations to H and G. We assume it pays 50 to H and 50 to G. Thus, M has wage arrears of 50 to H and inter-enterprise arrears of 50 to G.

B transfers 50 it receives from G to H. B still owes H 50. H receives 100 (50 from H and 50 from M), and can survive.

3. THE MODIFIED GADDY AND ICKES VIRTUAL MODEL

Gaddy and Ickes maintain that their four sector model is not self-contained, because it needs the existence of a market with which it can interact in order to survive. Therefore, they suggest completing the system by assuming the presence of an "outside buyer" who supplies cash in return for the manufacturers' production. This actually amounts to introducing a fifth sector in the model, whose only function is to transform the manufactured good into cash. This activity is not profitable for the outside buyer, nor it requires any further input to be performed, but is essential for the system to be viable because it is assumed that the household sector needs cash to survive.

GI do not introduce a fifth sector explicitly. They just postulate that the manufactured good can be sold outside the system. Indeed, from an accounting standpoint, this does not make any difference. A fifth sector whose only role was simply to turn goods into cash would not generate any value added or arrears, nor pay wages and taxes⁴.

We think that this framework is nonsensical. There is actually no need to introduce a shadow fifth sector to make the system viable, provided that one modifies GI's assumptions as follows:

1. Households need 100 units of manufactured goods to survive;
2. The only way households can obtain these goods is to buy them on the market for cash;
3. There are 100 Roubles in the system, which are paid as wages to the household sector by manufacturers, and then used by the former to buy goods on the market.

Amending the model in this way, one obtains a better representation of the Russian economy, which is characterised by a mix of market and non-market trading, without having to summon the market as an external entity.

Figure 3 - Case 1: Trades and transfers.

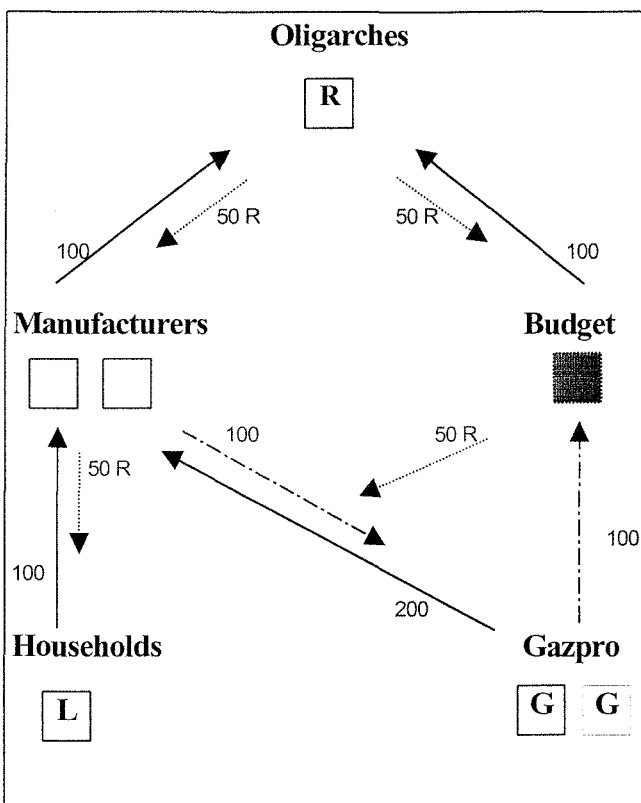
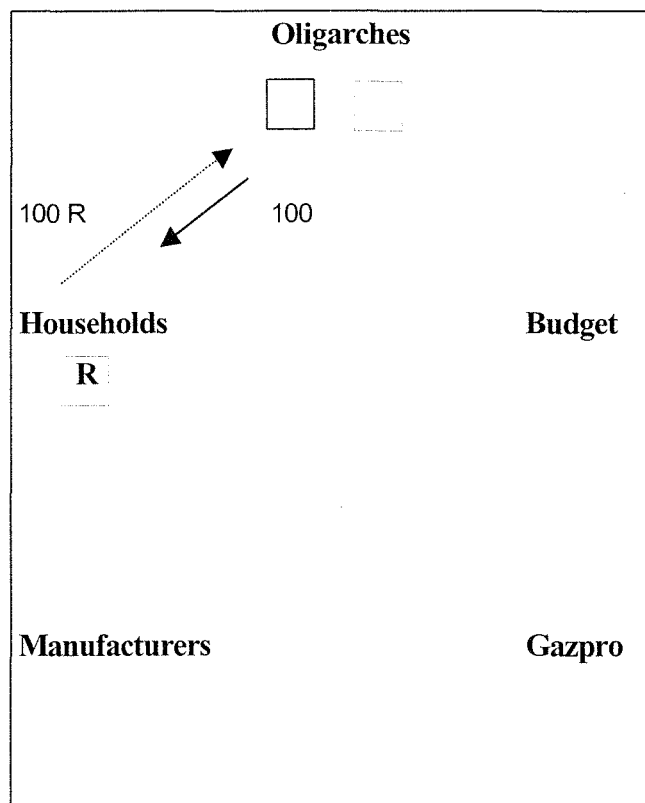


Figure 4 - Case 1: Consumption.



⁴ Actually, one could think of it as a service sector - absent in GI's model. If this were the case, a "Service Output" item would appear among macro indicators.

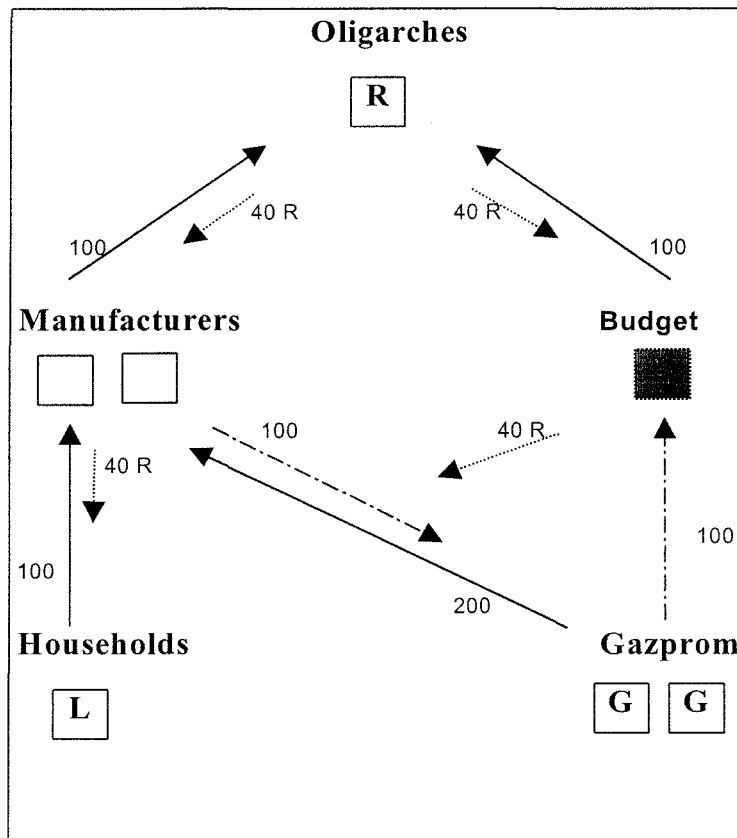
Now we expand on GI's model by introducing explicitly a fifth (rent) sector. This allows us to stress our point about the working of the Russian economy: the income distribution problem and the arrears problem stem not only from the low productivity of the manufacturing sector but also from the monopsonic power of the oligarch sector. In order to do this, there is no actual need to pursue the duality of the model any further. Therefore, in the following we only deal with the real side of the system. The new model has the following features:

1. a fifth sector ("the oligarchs") which has all the money of the system at the beginning of the transaction process and has a rent extracting power which enables them to change the distribution of income;
2. the manufacturing sector produces 200 worth of goods;
3. Gazprom produces 200 worth of gas.

In this model the introduction of the oligarch sector does not change the basics of the system, in so far as the household survival requirement is satisfied as in GI real model. Notice that the manufacturing sector is still value subtracting, since it produces 200 Roubles worth of goods with 300 Roubles worth of inputs⁵. Figures 3 and 4 represent this case.

The oligarchs buy 200 worth of goods for 100 Roubles only, thanks to their monopsonic power. This comes from the fact that they are the only ones endowed with cash at the beginning of the transaction process.

Figure 5 – Case 2.



Once trades and transfers are over, the oligarchs own 200 worth of goods and the households sector has 100 Roubles. The latter buys from the former 100 worth of goods for

⁵ To keep figures simple and round, we altered the values from the original GI's example. Of course, this has no bearing on the underlying concepts in itself.

consumption, as in Figure 4. Thus, oligarchs end up with a rent of 100 worth of goods and with 100 Roubles.

Case 1 shows how the rent extracting power of the oligarch sector (a well known stylised fact of the Russian economy), represented here by their monopsonic power, accounts for it appropriating a 50% share of the national product. By assuming it being stronger, e.g. the oligarchs paying 80 Roubles for 200 worth of goods, we may depict a scenario where: the household minimum monetary requirement is not satisfied, the distribution of income is worsened in favour of the oligarch sector, and the total amount of arrears increases. This situation, labelled as Case 2, is represented in Figure 5.

The oligarchs exercise their increased monopsonic power by paying the manufacturing sector and the budget only 40 Roubles instead of 50. Therefore, the final accounts are the following:

1. the households sector receives only 80 Roubles instead of 100 Roubles,
2. the oligarch sector has a rent of 120 Roubles,
3. and the total arrears increase of 20 Roubles.

These results nicely correspond to some well-known Russian economic facts:

- a. The continuous worsening of the distribution of income, as shown by the continuous increase of the Gini coefficient for the Russian economy. The Gini coefficient for wages was 28 in 89 and 60 in 96 (Milanovic, 1999).
- b. The increasing amount of arrears (Illarionov, 1999; Harvard Newsletter, 1999), as reported in Table I.

Table I – Arrears in the modified GI model.

	<i>Case 1</i>	<i>Case 2</i>
<i>Wages arrears</i>	50	60
<i>Budget arrears</i>	150	160
<i>Tax arrears</i>	100	100
<i>Inter-enterprises arrears</i>	100	100
<i>Total</i>	400	420

In their article on Foreign affairs GI suggest that the only viable policy option in order to stop the inefficient working of the Russian economy is to stop IMF financing. Let's assume that IMF injects 20 Roubles in the system by granting a loan to the state budget. It is easy to check that the budget arrears diminish by 20 and tha the household monetary requirement is met. This IMF loan does not eliminate the economic mechanisms that create and perpetuate the arrears phenomenon, i.e. the low productivity of the manufacturing sector *and* the rent extraction power of the oligarch sector. The IMF loan only allows the economic system to satisfy the household monetary requirement. Our simple idea is that if the surplus appropriated by the oligarchs were invested in the real sector instead of being squandered in importing luxury goods or invested abroad, the productivity of the Russian manufacturing sector could be increased. This means that the ultimate responsible of the low performance of the system lies in the power of the oligarchs, who have no incentive to change the existing situation.

4. FINAL REMARKS

The use of Pasinetti notation enabled us to make clearer the macroeconomic relationships of GI model, emphasising at the same time its physiocratic features. By modifying Gaddy and Ickes model we introduce two important features of the present Russian economy: the power relationships, represented in the model by the monopsonic power of the oligarch sector, and the distribution of income.

Our main conclusion is that the arrears problem in Russia's barter economy may be solved only by a long process of reform. This should be focused on the the banking sector in order to make it an effective actor in financing industrial investments, while aiming also at breaking up the financial-industrial groups. This would wipe out the oligarchs' power. In this new context, a less restrictive monetary policy would probably turn out to be effective in rising the rate of productive investments. As far as the IMF loans are concerned, our conclusion is that IMF interventions are only a permissive although important factor in keeping the distribution of income unchanged, and in permitting a stable social equilibrium in the Russian economy. Stopping the IMF loans would drastically change the distribution of income against wage earners, and break the social deal on which the inefficient working of the Russian economy rests. By itself, this would not necessarily start the much needed changes in Russia's economic system; on the contrary, the likely outcome of stopping IMF loans would be a period of social and political unrest, that would hinder the restructuring of the Russian economy.

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