

NATIONAL ACCOUNTS IN TRANSITION COUNTRIES: BALANCING THE BIASES?

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In the past several years, efforts have been made to introduce the *1993 System of National Accounts (1993) SNA* in most of the formerly centrally planned economies. In doing so, a number of problems have emerged, some of which are particular to the situation of these countries. Some of these problems will probably cause overestimates of national accounts variables, others will cause underestimates, and it would be purely coincidental if these effects cancel out. This paper discusses the most disconcerting issues in this situation, and possible solutions.

I. INTRODUCTION

The transition of centrally planned economies to market oriented economies has exposed the countries involved in this process (transition countries) to a great number of challenges. One of these is the adaptation of the statistical system to the requirements of participants in the economy, themselves in a process of transformation. This applies to the whole area of statistics, but in this paper we focus on the effects on the national accounts.

Over the past few years, in many countries in transition, great progress has been made with the introduction of the *1993 SNA*; in fact some of these countries may rightfully claim to be among the first in the world to have adopted the new system. Yet, in the period of transition a number of biases and distortions have emerged in the accounts that may take some time to remove. Some of these involve a misrepresentation of specific transactions or a spread of the elements of the transactions over time, while other distortions create an under- or over-estimation of levels of important macro-aggregates such as gross domestic product (GDP).

Since some biases result in an overestimate, and some in an underestimate of GDP, they cancel out to some extent. However, this should not give cause to complacency, because there is no reason to assume that the biases will balance. Although in view of the differences between the countries under consideration it is somewhat hazardous to venture an overall conclusion, it seems to the authors that at present the underestimates caused by the under-coverage of economic statistics outweigh the overestimates caused by the other biases. However, the magnitude of the biases may be expected to change over time. The effects of the

Note: This paper was first presented at the Twenty-Fourth General Conference of the International Association for Research on Income and Wealth in Lillehammer, Norway (August 18-24, 1996). Mr Bloem and Mr Cotterell are respectively Division Chief and Deputy Division Chief with the IMF; Mr Gigantes, who recently passed away, was an expert with the IMF. The views they express in this paper are their own, and may not necessarily coincide with the IMF's views. The authors are grateful to Mr Cornelis Gorter and Mr Nils Maehle for their comments. Any remaining mistakes are solely the authors' responsibility.

inclusion of allowances for anticipated delays in payments in the value of output will be mitigated in a situation of lower inflation rates, as will be the effects of holding gains. Also, it is our impression that statistical authorities are aware of the latter problem, and endeavor to exclude the holding gains from estimates. Clearly, authorities are also aware of the problem caused by under-coverage; however, this problem is much more difficult to tackle.

Without claiming to be comprehensive, we feel that the most important issues to be addressed in this respect include (1) the recording of transactions and stocks of government-owned enterprises, (2) valuation problems (i.e. the inclusion of allowances for anticipated delays in payments, and (3) the coverage of the emerging private sector. Problems concerning holding gains in the value of output, although very substantial, are well-known and will not be discussed here.¹

II. THE RECORDING OF GOVERNMENT-OWNED ENTERPRISES

In many transition countries, the relation between government and government-owned enterprise is not clearly defined; as a result, there are a number of problems with the recording of the payments between government and these enterprises. The typical organization of the production process in many transition countries is that ministries administratively encompass units producing goods and services which are sold on the market. These units are often very substantial, employ large numbers of staff, and produce huge outputs (in fact, they are often the main domestic producers). Most often, these units have an independent legal status and should be considered independent institutional units (enterprises) in the sense of the 1993 *SNA*. However, there may also be substantial production in units that do not have an independent legal status, and then it is not self-evident that they are institutional units in a national accounts sense; in fact, there may be cases in which the organization of the production process does not even warrant distinguishing a separate establishment.

The producing units, even if they are legally independent, are strongly intertwined with the respective ministries; the fixed capital used by the producing units is typically financed through the ministerial budgets; prices are often decided by the ministries, and the ministries usually also take care of the operating results by compensating losses or appropriating surpluses. Payments from the respective ministries (and other government agencies and funds) to these units and *vice versa* sometimes have an identified basis (e.g. payments relating to the size of the labor force or the wage bill) but often seem, on an as needed basis, resembling a “what the traffic can bear” approach.

In this situation it is difficult to achieve a meaningful description of the economic process, certainly if countries move beyond the description of the production process to a sectoral presentation of income distribution and capital-finance. A basic problem concerning the description of the production process is the calculation of value added of these units because there may be doubts as to whether they are market producers or non-market producers; as we will see, this

¹For a discussion of these problems and a possible solution, we refer to the IMF Working paper *National Accounts in Transition Countries: Distortions and Biases*.

has major implications for the valuation of output and value added. A basic problem concerning the description of income distribution and capital-finance is that the intra-government payments are usually not well-defined and are often not related to clearly identifiable economic actions. This may also influence GDP estimation.

In this context, the three main issues to be decided are (1) the status of the units, (2) the nature of the production and the producing units, and (3) the nature of the transactions and stocks; these will be discussed in the following subsections.

2.1. *The Status of the Units*

If units have an independent legal status, in general, they should be recognized as separate institutional units; this will be the case for the majority of units we discuss here.² However, for units that do not have an independent legal status, the question concerning their statistical status should be considered. If a government-owned unit engages in economic activities belonging to a non-government industry group; it could be considered to distinguish a separate statistical unit: an establishment within government or a separate institutional unit (i.e. a quasi-corporation). The *1993 SNA* recommends distinguishing an establishment if the activity of a local unit is different from the main activity, and if sufficient data are available to describe the production and income generation process (see paragraphs 5.21 through 5.27 for the general principles). However, for a unit to be considered a separate institutional unit, stronger criteria have to be met.

To be considered a separate institutional unit, the *1993 SNA* requires that a unit should be “capable, in its own right, of owning assets, incurring liabilities and engaging in economic activities and in transactions with other entities” (paragraph 4.2). Furthermore, it stipulates that there should be “Either a complete set of accounts, including a balance sheet of assets and liabilities, . . . or it would be possible and meaningful, both from an economic and legal viewpoint, to compile a complete set of accounts if they were to be required” (same paragraph).

Obviously, in a situation where units do not have a separate legal status, strictly speaking the autonomy implied by the first criterion does not exist. However, the *1993 SNA* also mentions the possibility of quasi-corporations (quasies) that do not have to meet such strict criteria, and specifically mentions “Unincorporated enterprises owned by government units which are engaged in market production and which are operated in a similar way to publicly owned corporations” (paragraph 4.50). Following this line of reasoning, many government-owned establishments producing for the market should be considered separate institutional units.

However, the *1993 SNA* is quite rigorous in these cases on the requirement to have a complete set of accounts: “Indeed, the existence of a complete set of accounts, including balance sheets, for the enterprise is a necessary condition for it to be treated as a quasi-corporation” (paragraph 4.51). In transition countries, applying this criterion may imply that producing units without an independent

²One of the authors has argued earlier that legal units that only serve administrative purposes without having a meaning for the description of the economy should not be considered separate institutional units (see Bloem, 1990).

legal status would not be discerned as separate institutional units and remain within the government sector, because they may not have a complete set of accounts, and in particular may lack balance sheets. In our view, the accounting requirement should be interpreted more liberally, as paragraph 4.2 of the 1993 *SNA* would allow. In our view, it is important to avoid inclusion in the government sector of units that do not belong in respect of their (market) orientation and production-oriented management. This would imply that a quasi-corporation is distinguished in all cases where there is enough basic information available to construct a complete set of accounts, even if such accounts are not established by the unit itself for its own purposes.

2.2. *The Nature of the Production and the Producing Units*

In many cases it is self-evident whether the production of government-owned units should be considered as market production or non-market production, but there are boundary cases, such as public transport and housing, for which criteria are needed. As Table 1 demonstrates, the market/non-market distinction is important because of its effect on the calculation of value added—i.e. from the output side or from the cost side—and as a consequence, on the measurement of GDP (we will return to this issue later). In view of the magnitude of these activities in transition countries the effects of decisions in this respect can be enormous.

An illustration of the magnitude of the problem is evident when comparing two recent statistical publications on transition countries, viz. the OECD/CIS publication *National Accounts for the Former Soviet Union* and the World Bank/State Statistics Committee of the Russian Federation publication *Russian Federation: Report on the National Accounts*; in the first publication all housing services are considered market services, while in the second publication 80 percent of total output of housing services is considered non-market (see Table 3.3 and Table B-1 in the respective publications). The same applies to public utilities that in the OECD/CIS publication are all market, while according to the World Bank/State Statistics Committee of the Russian Federation publication some 45 percent would be non-market; and output of services that were provided both as market and as non-market services amounted to 11 percent of total output.

The 1993 *SNA* makes a clear distinction between the nature of the producer and its production: non-market producers may engage in (some) market production besides their (main) non-market production; and vice versa. The distinction between market production and non-market production has to be made on the basis of prices: “Market output is output that is sold at prices that are economically significant or otherwise disposed of in the market . . .” (paragraph 6.45). The decision whether units are market producers or non-market producers depends on the extent to which a unit produces for the market: “A market producer is an establishment or enterprise all or most of whose output is marketed” (paragraph 6.52).

Eurostat’s revised *Economic System of Accounts (ESA)* combines these criteria to a single criterion, viz. that “more than 50 percent of the production costs are covered by sales” (*ESA*, paragraph 3.32). This may simplify making decisions in borderline cases, but the disadvantages of this criterion is that units that charge

prices that are economically significant (in the sense that they have a significant influence on the amounts that producers are willing to supply and purchasers willing to buy) for most of their production, but do not cover 50 percent of their costs would be classified as non-market producers. In particular, this may happen in a situation in which government decides on the prices to be charged by the producers it controls, which may result in a strongly reduced cost coverage. This could imply a shift over time from non-market to market production, as governments gradually release their hold on prices. As Harrison has convincingly argued, because of the difference in the valuation of output between market producers and non-market producers, this would lead to artificial and implausible growth rates (see Harrison, 1996).

A disadvantage of the 1993 SNA criteria that is sometimes mentioned in comparison with the ESA criterion, is that the 1993 SNA criteria are somewhat vague. However, the vagueness of these criteria was deliberate, because whether prices are economically significant very much depends on local situations. The authors consider that the 1993 SNA criteria provide sufficient grounds to make decisions on a case by case basis. For this reason, and certainly in the situation of transition countries, the 1993 SNA criteria are to be preferred.

The market/non-market distinction applies both to the level of establishments, and to the level of institutional units. On the level of establishments it should be noted that, although in principle each economic activity can be performed on a market or on a non-market basis, in practice the number of industries including both market and non-market establishments is usually limited (most frequently, to services such as education and health care). On the level of institutional units evidently most market production is concentrated in the institutional units of the private sector, but government institutional units and private non-profit institutions serving households may also include establishments that are market producers (see Schedule 1).

SCHEDULE 1
INSTITUTIONAL UNITS AND MARKET/NON-MARKET PRODUCERS

		Institutional units	
		Government Units and Private Non-Profit Institutions Serving Households	Financial and Non-Financial Corporations and Households
Establishments	Market producers	X	X
	Non-market producers	X	

2.3. *The Nature of the Transactions*

The next question to be answered is what this all means for the recording of the transactions. In our view, there are two sets of problems: the first set concerns the estimates of value added and GDP, the second concerns the identification of payments between government and the units it owns. The valuation of output and value added is largely determined by the classification of the production of

these units: market or non-market. The application of the criteria concerning market/non-market production in the way we interpret the *1993 SNA* would, in the vast majority of cases, result in labeling government-owned units that produce for the market as market producers, both as establishments and as institutional units. However, because even non-market units that remain within government are likely to generate some market production, two cases can be distinguished, viz. (1) market production by government establishments that are predominantly non-market producers, and (2) market production by government establishments that are market producers.

The classic example of market production by government units that are predominantly non-market producers is the ministry of forestry that produces and sells some timber. The calculation of production and value added of such government units would follow the general rules for government, viz. production and value added would be derived from the cost side. As a result, payments received from users (either within or outside government) for provision of goods and services do not add to total production. The fundamental difference between this valuation and the valuation of production and value added of government-owned units that are market producers, is that in the latter cases valuation has to be based on the market prices of the production. As a result, in principle it is possible that the market producing units (and in certain cases government itself) have an operating surplus.

As has been mentioned before, for national accounts purposes a problem concerning the recording of payments between government and the units it owns is that these flows do not always have an identifiable economic basis. This problem has two aspects, viz. (1) identifying specific flows, and (2) deciding on a proper way to record them in the national accounts. Concerning the identification of flows, a first distinction that has to be made is between current transactions, capital transactions, and financial transactions. The main difficulty in identifying capital transactions and financial transactions that are not clearly labeled as such refers to the provision of fixed capital assets to government-owned enterprises and quasies through the government budget, and related payments of the government-owned units to government. Since the outlays of government for the acquisition of fixed capital are usually identified, the main identification problem in this respect concerns the identification of the respective payments of the government-owned enterprises and quasies to government. A solution to this problem may be found in the practice of establishing output prices on the basis of production costs including a contribution to the maintenance of capital stock. The related payments can often be identified from the naming of the government funds to which these payments are made, often are dubbed Investment Funds.

Concerning the recording of these payments in the national accounts, four alternatives can be considered, viz. (1) to construct some kind of financial arrangement between government and government-owned enterprises and quasies, (2) to ignore the provision of fixed capital by government to producing units in the accounts, and record the outlays involved as government outlays on fixed capital, (3) to record the government capital outlays on behalf of enterprises and quasies as expansion of equity capital, or (4) to impute these outlays as capital transfers. Theoretically, it may be possible to construct some kind of financial arrangement

(such as loans) between government and government-owned enterprises and quasies to account for the provision of fixed capital by government to producing units, but if these arrangements are not actually made between partners this would involve a great number of imputations concerning loans, interest payments, and amortization. Clearly, this would result in an uncertain and opaque description of the financial process, and seems therefore not advisable. The second alternative, viz. to ignore the provision of fixed capital by government to producing units in the accounts, and record the outlays involved as government outlays on fixed capital, would entail that government balance sheets would include vast amounts of capital goods, that have nothing to do with government operations; while the balance sheets of the government-owned enterprises and quasies would not show the fixed capital assets in use. The third alternative, viz. to record the government capital outlays on behalf of enterprises and quasies as expansion of equity capital, would imply recording the payments received by government from its enterprises and quasies that relate to fixed capital as withdrawals from equity. This alternative seems relatively simple, as it would necessitate no imputed secondary flows or items on the balance sheets. However, this alternative cannot be applied in the situation of incorporated enterprises financed through share-capital. The fourth alternative, viz. to impute the government outlays as capital transfers, could be applied in all cases and would also be relatively simple; concerning the payments received by government from its enterprises and quasies this alternative would also imply recording as capital transfers.

All other unidentified payments between government and government-owned enterprises should be classified as current transactions. In this respect, distinctions have to be made between government purchases, taxes, and subsidies on products, other taxes and subsidies on production, social contributions, taxes on income and wealth, and property income.

As mentioned above, governments often decide on the prices that the producing units it controls may charge to its users. For policy reasons, these prices may be set below production costs, and if the unit is a separate institutional unit (i.e. a public corporation or quasi corporation) government has to compensate for the deficit in order to keep the unit in operation. These payments should be classified as subsidies (more precisely: as other subsidies on products). However, if the unit is an establishment within general government, there would not be any compensatory payment made to the establishment, and the treatment of its activities in the national accounts would depend upon whether it was classified as market or non-market producer. In the case of a market producer, the output would be valued at its selling price and the operating surplus (that can be negative or positive) would be absorbed by government in the income accounts of the system. On the other hand, if the unit was a non-market producer, the output would be valued as the sum of its costs, and the difference between that value and the value of output at its selling price would be absorbed by government and classified as government consumption expenditure.

Table 1 provides an example of the different estimates that would be made for the same activity depending upon the classification of the unit involved. The unit's cost (total cost=90) are partly offset by sales (35), and as this does not meet the ESA criteria for a market unit, it could be argued that this unit thus has

to be a government unit (column 1). However, if the prices of this market output are economically significant, following the 1993 SNA rules it can also be argued that this is a market producer; depending on the institutional arrangements as a separate institutional unit or as market establishment of government (columns II and III). If the unit is classified as a non-market producer, its total output will be estimated as the sum of its costs and the resulting value added (and contribution to GDP) would be 30. If the unit is classified as a market-producer, the output at producer prices would be 35, resulting in a negative operating surplus of -55. As a result, the unit's value added and its contribution to GDP would also be negative, viz., -25. If the government would compensate for the negative operating surplus (which is likely if it is a separate institutional unit), the unit's value added at basic prices would be 30, but its contribution to GDP would still be -25.

Concerning other current payments, our advice is to first classify payments that have some identifiable basis in the appropriate category (e.g. indications for payments to be identified as taxes can be found through reference to general tax-regimes that also apply to non-government enterprises, and to a relation to levels of income and wealth of the enterprises and quasies; and indications for payments to be identified as social contributions can be found in a relation with the size of the labor force or the wage bill), and to consider the remaining payments from public enterprises to government as property income (mainly withdrawals from income of quasi corporations), and the remaining payments from government to public enterprises as subsidies on production.

III. THE VALUATION OF OUTPUT

The price policy in the Soviet Union implied that an intricate system of implicit subsidies and taxes was maintained, favoring certain industries, products, or production factors to the detriment of others. The instruments that governments used for these purposes might be termed *list prices*. These prices, usually set by the ministry overseeing a specific industry, or by state purchasing agencies, included a mark-up over costs to allow for the replacement of fixed capital and for new capital formation. The list prices also served as an instrument to contain inflation, basically by not allowing price increases. Note that once set, the list prices of the Soviet Union were not changed—they were the prices at which all transactions took place, and in that respect, they were unlike list prices in market economies.

Enterprises had some possibilities for working around these arrangements when list prices did not cover costs of production sufficiently or if they felt they needed higher values for their products for other reasons. For instance, slight modifications to the specifications of a product would allow its introduction as a new product, to be valued on the basis of costs of production, regardless of what the list price had been previously.

In the liberalization process that has been in place for a number of years in most countries of the former Soviet Union (FSU), the grip of government on the production process has been relaxed over time. Nevertheless, vestiges of the former system still exist in many areas, not least in the practice regarding the valuation

TABLE 1
 COMPILATION OF VALUE ADDED AND GDP: EFFECT OF CLASSIFYING GOVERNMENT
 PRODUCING UNITS

	I Non-Market Establishment of Government	II Market Establishment of Government	III Separate Institutional Unit
(i) Market output at producer prices	35	35	35
(ii) Non-market output at producer prices	55 (=iii - i)	0	0
(iii) Total output at producer prices	90 (=viii + x)	35	35
(iv) Subsidies on products	0	0	0
(v) Market output at basic prices	35	35	35 (=i + iv)
(vi) Non-market output at basic prices	55 (=vii - i)	0	0
(vii) Total output at basic prices	90 (=viii + ix)	35 (=iii)	35 (=iii + iv)
(viii) Intermediate consumption at purchaser prices	60	60	60
(ix) Value added at basic prices (gross)	30 (=xi + xii)	-25 (=vii - viii)	-25 (=vii - viii)
(x) Value added at producer prices (gross)	30 (=xi + xii)	-25 (=xi - viii)	-25 (=vii - viii)
(xi) Wages and salaries	20	20	20
(xii) Consumption of fixed capital	10	10	10
(xiii) Operating surplus	—	-55	-55
(xiv) GDP: sum of value added at basic prices, plus taxes, minus subsidies	30 (=ix - iv)	-25 (=ix - iv)	-25 (=ix - iv)

of production. In the Russian Federation, the liberalization of prices at the beginning of 1992 was accompanied by price increases that in some months were of the order of 300 to 400 percent, and that were clearly at the discretion of enterprises. Markups were raised to an average of 70 percent over costs, compared to pre-transition levels in the range of 15–20 percent. Nonetheless, the pricing mechanism resembled the one that had prevailed before: enterprises set their own list prices, but once established, list prices once again became the basis for the valuation of all transactions, and were not adjusted subsequently to reflect market conditions.

In 1992 boosting markups to 70 percent appears to have been an overestimate of what the market would bear. At the outset, the incomes of wage earners and of pensioners did not increase as rapidly as the prices set by producers, and retailers facing a collapse of demand were not able to pass on the price increases to their customers (increases in retail prices appear to have had a three month lag by comparisons with increases in producer prices.)³ In a real free-market

³In the Russian Federation, producer price indices used to be Sauerbeck indices rather than Laspeyres indices. As described in an IMF working paper by Lequiller and Zieschang, under the kind of inflation experienced in the Russian Federation, Sauerbeck indices tend to overestimate price change (see Lequiller, 1994). Nevertheless, in 1992, the bias of the producer indices due to the index formula could only account for a fraction of the difference between the producer and CPIs.

setting, producers would have sought to adjust their prices, but the normal mechanisms for adjusting prices to clear markets were not in place—transactions continued to be recorded at the list prices. As a result, the revenues of retailers were not sufficient to cover the invoiced list prices of their suppliers, and retailers were forced to delay payment for their purchases, waiting to pay the agreed list prices for their purchases with the higher prices these would fetch on resale after some delay. In most FSU countries payments were made at the original list prices, without any compensation for the erosion in purchasing power involved in the inflation over the period of delay in payment.

Recognizing the problem of eroding purchasing power involved in delays in payment, producers soon began to include allowances for anticipated delays in payment in the sales prices. This entailed a practice of valuing output through list prices (as established at the moment of production), and incorporating in these list prices an allowance for anticipated delays in payment. The existence of this practice is indicated by considerable arrears in payments, with payment often at the original price despite the intervening erosion of purchasing power due to inflation, without an interest charge for the implicit short-term credit or a penalty for late payment.

The principal mechanism through which an allowance for the anticipated delay in payment is incorporated in the list price seems to be an extra mark-up over full costs. Indeed, because this mechanism is indirect, one could question whether this markup now truly includes an allowance for the anticipation of a delay in payment. However, the magnitude of the markups is strongly suggestive. For instance, in the Russian Federation and in Ukraine, before the transition markups over full costs were of the order of 20 percent. They were intended to secure the funds that were to be set aside for the internal financing of capital formation. Over the past several years, although they have fluctuated, markups over full costs appear to have been much higher than 20 percent. Some of this increase in markups probably reflects an allowance for the fact that inventories of materials are valued at historic cost and that, with inflation, markups need to be higher in order to compensate for the difference in material costs valued at historic versus current replacement prices; and some of the increase in markups may simply be gouging. However, it is difficult to see how a markup of 70 percent could be due to these factors alone. Some of the increased markup must be in the nature of insurance against late payment, in a period of rapid inflation.

According to the *1993 SNA*, allowances for anticipated late payment that are incorporated in the prices of goods or services should be viewed as interest paid on loans, the latter amounting to the value of the transaction excluding the allowance for late payment (see *1993 SNA*, paragraph 3.80). The rationale for this is that such allowances have no relation to the production process, and do not add to production of goods and services. Inclusion of such an interest component (on the implicit short-term loan) in the estimates of value of production would inflate the estimates of value added and GDP, of incomes and of expenditures.

However, in practice these aggregates need not be overestimated by the full extent of the allowances for anticipated delays in payment included in output prices (and values) because the purchase prices of goods and services in

intermediate consumption will contain the same allowances for anticipated delays in payment as the corresponding output prices, and these will be offsetting. Moreover, a system of inflated prices accommodated through delays in payment breaks down at the level of consumers. Consumers have only limited possibilities of delaying payment on their purchases, and hence will mainly purchase when prices are commensurate with their incomes. For instance, in Macedonia in 1992, this meant that retailers sold out of inventory at prices lower than the current replacement cost reflected in current list prices (but not necessarily lower than historic cost, in the case of goods that had remained in inventory for some time).

With accrual accounting, this would lead to losses (or rather, negative operating surpluses) in retail trade. Although value added in other sectors would be overstated, the value added in retail trade would show a compensating loss. For instance, the national accounts of Macedonia have shown a negative operating surplus for retail trade of up to 7 percent of value added for 1990 through 1992 (see the Statistical Office of Macedonia, 1995). However, negative operating surpluses for retail trade have not been found in the OECD/CIS publication *National Accounts for the Former Soviet Union* and the World Bank/State Statistics Committee of the Russian Federation publication *Russian Federation: Report on the National Accounts*. The reason is that in these countries retailers maintain accounts on a cash basis. Measured on a cash flow basis, purchases by retailers do not necessarily cancel the sales to retailers. There is virtually no distinction between the sales of retailers measured on an accruals basis and their sales measured on a cash-flow basis (because consumers are generally expected to pay at delivery). On the other hand, the value of the purchases of retailers on an accruals basis can be very different from the value of their purchases on a cash-flow basis, the difference governed by the duration of the delays in payments by retailers to their suppliers. This means that the value added of retailers will be overstated by the difference between the accruals and cash-flow measures of the purchases of such retailers.⁴

With accrual accounting throughout, although allowances for anticipated delays in payment will create an overstatement of GDP, the overstatement will affect estimates from production, from expenditures and from incomes equally.⁵ On the other hand, if some of the estimates are based on cash-flow accounts, discrepancies among estimates from production, from expenditures and from incomes will emerge. In particular, if retail trade maintains its accounts on a cash-flow basis, the estimate of GDP from production will exceed the estimate from expenditures by the aforementioned difference between the value of the purchases of retailers on an accrual basis versus the value of their purchases on a cash-flow basis. Moreover, cash-flow accounting is also prevalent in the financial accounts of enterprises in some FSU countries and is reflected in their financial surveys. Cash-flow accounting will introduce a further discrepancy between operating surplus measured directly from the cash-flow accounts of enterprises and operating surplus measured residually as the difference between value added and the components of the generation of income account other than operating surplus. Thus, in

⁴Annex 1 demonstrates by means of an example that retailers can have negative operating surpluses on an accrual basis, but positive cash-flows.

⁵It will also distort the calculation of value added across producing sectors.

these countries, direct estimates of incomes will differ from estimates of production and of expenditures.

With accrual accounting, the estimates of GDP from incomes, from expenditures, and from production will all be inflated to the same extent by allowances for anticipated delays in payment. The values of any transactions other than those concerning household consumption, i.e. direct sales by producers to government, sales to enterprises on capital account, exports, and finished goods routed to inventory, are likely to contain the allowances for anticipated delays in payment. Of course, it is possible that some products (particularly some capital goods and goods for export) will be produced with a specific customer in mind and on the understanding that payment will be immediate. In such cases, the list/sale price will not contain an allowance for anticipated delays in payment.

The prices of some imports may also include allowances for anticipated delays in payment, especially because intra-FSU trade has also been characterized by endemic arrears. These will have the opposite effect, diminishing rather than inflating the size of GDP.

The high proportion of capital expenditures to GDP suggests that capital expenditures are valued at prices that contain substantial allowances for anticipated delays in payment: in view of the decline in output of FSU countries, this proportion (currently running at between 20 and 40 percent of GDP) seems excessive, even allowing for the fact that the stock of capital is being replaced at a rapid rate and that the estimates on fixed capital formation may include some outlays on repairs.

In summary, in a number of FSU countries, the combination of prices that contain an allowance for anticipated delays in payment and the failure to use accrual accounting consistently combine to create not only inflated estimates of GDP but also discrepancies in estimates of GDP from incomes, expenditures, and production. In the case of income, the discrepancy can be disposed of by estimating operating surplus as a residual. This is done in the Russian Federation, for example. However, this does not solve the other problems.

In a sense, in some FSU countries the relevant market price is the list price adjusted for inflation over the period over which payment is delayed. However, it is by no means clear that this period is known in advance, or even discussed in advance between seller and purchaser. In that sense, it is not clear that there is agreement on price, whereas agreement on price is the foundation of all market behavior in market economies.

Stating the nature of the problem is one thing, doing something about it is another matter. All that can be done here is to outline a tentative approach. The main difficulty is that there are no data on the extent to which prices include allowances for anticipated delays in payment; as discussed below, there may be possibilities for adjusting the estimates to exclude allowances for anticipated delays in payment, but these will necessarily be crude.

In principle, estimates of aggregate expenditure are less inflated than estimates of production (by the extent of the difference between the accrual and cash-flow values of the goods purchased for resale by retailers). The introduction of accrual accounting in retail trade would eliminate the discrepancy. Alternatively, the difference between estimates of GDP from production and from expenditures

could be taken as a measure of the correction to value added in retail trade that should be introduced. The problem with this solution is that underestimates of household consumption on the expenditure side would then affect the estimation of value added in retail trade. In any case, on the production side, this would only improve the aggregate estimate of GDP, but not contribute to an adjustment of the distribution of value added by industry.

Concerning estimates of the magnitude of the allowances for delays in payment, there are two possibilities. If we can obtain estimates by industry of average delays in receipts and in payments, we may be able to develop procedures analogous to the ones involved in adjusting inventories for holding gains. Alternatively, it may be possible to infer the magnitude of the allowances for anticipated delays in payment from information about rates of markup over full costs of production, available by branch of activity. For instance, in the Ukraine and in the Russian Federation, these rates of markup have been as high as 70 percent, a number which exceeds international norms by a very wide margin. An estimate of the allowance for late payment could be derived by subtracting from the value of the markup of each branch of activity a more or less arbitrary estimate for a normal markup.

Since these estimated prices are not real transaction prices, adjusting the accounts would involve a modeling exercise within an input-output framework. This could provide important insights, but it should be noted that observed statistics and model estimates differ with respect to their reliability.

IV. THE UNDER-COVERAGE OF ECONOMIC STATISTICS

The statistics used to compile the national accounts must cover all economic activity, but complete coverage is bound to remain an ideal rather than a realization. There are several kinds of under-coverage of economic activity in statistical surveys and in the other sources used to compile the national accounts: (1) there is the “informal economy”—those small-scale, private activities, which present special difficulties for statistical coverage; (2) there is the formal unrecorded economy, i.e. businesses that belong to the formal economy for which statistical reports are not being received and whose activities are not being inferred; (3) there is the “hidden economy,” which may overlap with the informal and unrecorded economies, but which includes activities of formal enterprises that are hidden or misrepresented although the enterprises are covered in statistical surveys and other sources; and (4) there are illegal activities (such as drug production and trafficking) that are productive in an economic sense but difficult to capture in statistics. In the following paragraphs we will discuss each kind of under-coverage and its effects.

The Informal Economy

The informal economy comprises small-scale businesses that operate from private homes, in streets or markets, or without a fixed base, and activities that include small scale farming, small-scale transport, small-scale production, street selling, repairs, herding, and other small-scale trading. Probably, in most countries

there exists some informal economy; under certain circumstances the informal economy may increase rapidly and become a source of economic growth. This may well be the case in economies in transition; however, substantial evidence is scarce as statistics about the informal economy are evidently poor in terms of coverage and accuracy compared with those for the rest of the economy.

While probably not insignificant, it seems unlikely that the lack of information on informal activities would distort GDP estimates in transition countries to a sizeable extent. Informal activity is mostly retail trading activity, service activity, small-scale construction, small-scale trucking, and agricultural activity. In the case of trading, the value of output is a markup over the value of the goods that are being traded, less the costs involved in engaging in the informal trade. Usually, the contribution of retail trade to GDP is not large, and the contribution of informal trading activity is bound to be even less. The same is true of trucking, personal services, and repairs. Informal agriculture may well be more significant than trade or services, but estimates on this activity often include estimates of informal agriculture.

Similar observations can be made regarding the incomes from informal activity. Those available to engage in informal activity are some of the non-participants in the formal labor force (e.g. housewives, retired persons, handicapped, unemployed), and those with jobs who are motivated to supplement their income and who have the energy and the opportunity to do so (farmers being an example of people with both the opportunity and the motivation). Relative to the number of person-hours devoted to formal activity, any reasonable estimate of the number of person-hours likely to be devoted to informal activity is bound to be modest.

The Formal Unrecorded Economy

The formal unrecorded economy relates to inadequate coverage of the activities of private sector business firms that belong to the formal sector; this may occur for two reasons: (1) the absence of business registers or the under-representation of private sector firms in business registers; and (2) low rates of response on the part of such private sector firms as have been captured in the statistical net, without appropriate imputation for non-response. In economies in transition, rates of response may be low because of (1) a concern that responses to statistical surveys could find their way into the hands of taxation authorities or into those of organized crime; (2) an attitude that statistical surveys may be an instrument of recidivist control by the government; and (3) a perception that the government is powerless to enforce compliance, or that sanctions against non-compliance are not significant compared to the risks that might be involved in complying. In some countries, the under-coverage of activities in the formal sector may be a more important gap in the estimation of the national accounts than the informal economy.

The Hidden Economy

In economies in transition, enterprises of any size, including the largest, may contribute to the under-coverage of economic activity while they are included in statistics. The two main reasons for this are (1) that part of their activities may

concern outside-the-books transactions, and (2) under-reporting to avoid taxes. Examples of outside-the-book transactions that allegedly take place concern state enterprises that sell to private enterprises at low prices and receive kickbacks. Under-reporting to avoid taxes may be committed by firms that understate their revenues or their wages and salaries to taxation authorities; in order to avoid the possibility of inconsistencies coming to light they may decide to do likewise in statistical surveys. For instance, in a number of countries rates of taxation on payrolls are higher than rates of taxation on profits; firms are therefore motivated to understate rates of pay and to provide bonuses to employees taken from net revenue instead. This source of economic activity can also be important. Similarly, imports and exports may be understated to avoid taxes.

The three categories of economic activities causing under coverage mentioned thus far are mostly legal; although misrepresenting data to avoid taxes of course as such is not legal, the activity it concerns usually is not criminal. However, in most countries there are also criminal activities that have economic significance. Examples of these are the production of drugs, drug trafficking, prostitution, illegal copying of music and books, and abuse of brand names.

Statistical capture of these activities is evidently a difficult issue; direct observation is obviously often out of the question, and statisticians may be ill advised to try. Nevertheless, these activities can be of significant importance; not only for a reliable representation of the production process, but also because of the effects on income distribution, consumption, saving and finance. Therefore, if significant illegal production may be surmised in a country, efforts should be made to cover these statistically one way or the other.

Effects on Statistics

As was mentioned earlier, ideally statistics should cover the economic activities in a country comprehensively. This does not only apply to the statistics covering specific economic activities, but also the total economy as covered in the national accounts. Although the national accounts compilation offers some possibilities to enhance coverage where source statistics suffer from lacunas (we will come to that later on), these possibilities are limited and obtaining comprehensive source statistics is of major importance. Nevertheless, we have to recognize that this in practice is not likely to be achieved, given the limitations of staffing and equipment that statistical offices often face. Therefore, it is useful to develop a view as to where scarce resources could be best employed. For instance, with relatively small efforts it may be possible to enhance the coverage of government-owned enterprises and large enterprises; while it may take huge efforts to cover the illegal economy.

For countries in transition, the improvement of source data for the national accounts is likely to require three separate strategies. The first strategy will involve the improvement of standard survey processes, including of the registers of potential respondents to surveys, with a view to capturing a greater proportion of private sector and informal activity, through direct response and through imputation. For reasons that will become apparent, this is likely to be a long-term strategy. The second strategy, more medium-term in character, will seek to use household surveys as a means of capturing activity not now captured through business surveys,

as a means of correcting for bias in business surveys. The third strategy will involve the development of methods for estimating activities that are not likely to be measured directly or for which direct measurements are likely to contain large errors and omissions.

4.1. *The Improvement of Standard Survey Processes*

One of the fundamental requirements for surveys of business activity in a market economy is the statistical office's business register, i.e. a list of businesses, their addresses, component units, and other information such as industrial classification, size, or kind of ownership. The business register defines which businesses will be covered in each survey and, therefore, how comprehensive the resulting statistics will be. In a planned economy, identification of businesses is a relatively minor task, because there are a small number of large enterprises, and only a few enterprises cease operating or new enterprises are created. In a market or transition economy, the number of enterprises is very much larger, and there is a continuing process of births and deaths of enterprises. A considerable amount of statistical effort is required to keep the register current.

One of the advantages of a business register is that it can serve as a sampling framework. Sampling can also be used to reduce the collection and respondent burden (especially for smaller firms). With scientific selection, sampling errors will be relatively small and more attention can be devoted to non-sampling error (e.g. poorly completed forms). Where respondents have problems in completing forms, field interviews are likely to improve reporting. Field surveys may also serve to tackle problems of under reporting as discussed above.

The sources of information used to update the statistical office's business register depend on the legal and economic conditions of each country. Some of the sources will include business licenses, taxation registers, business bank accounts, and telephone line connections. In some countries, businesses are required to register with the statistical office. However, it should be recognized that despite the statistician's best efforts, many enterprises may still not be detected. Moreover, it will be difficult to identify businesses that have ceased operating and to maintain up-to-date addresses and codes on type of activity and size of business. Thus, the updating of registers requires not only adequate processes of registration, but also a continuous process for confirming the information in the register.

It must be recognized that the development and maintenance of business registers that are comprehensive and up-to-date is likely to be a long-term objective. For this reason, but also because of the very nature of the units involved, it is also useful to look at other means to provide a sampling framework. One possibility would be the application of a technique widely used in social statistics, but not so often applied in economic statistics, namely area sampling. For example, one can use the random walk method, according to which surveyors are given starting points that are randomly chosen on a map and instructions to go to the nearest building near these starting point and then every n -th building in that street.

To enhance response, a number of approaches can be followed, of which we would like to emphasize four. First, confidence should be built in the statistical

office as an independent agency safeguarding confidentiality. Second, a statistical law should be adopted requiring, among other things, that enterprises supply data; however, reliance on penalties to force compliance should be limited and statisticians should use cooperative techniques as much as possible. Third, the statistical office should build a reputation for being politically independent, and producing useful, publicly available data. Fourth, content and design of survey forms should be maximally user-friendly. After all efforts to achieve response are unsuccessful, there should be procedures to estimate data for non-respondents using the information received from similar enterprises.

4.2. The Potential Use of Household Surveys to Correct for Under-Coverage, for Non-Response and for Bias in Business Surveys

Many small businesses cannot be identified for inclusion in the business register. An alternative approach is to do a survey of households and ask them about their involvement in business activities. At their most simple form, such surveys would ask only about hours of work and kind of activity. These surveys could also capture the part-time involvement of housewives and other individuals in informal activities. (The results could be converted to money terms using an estimated average hourly rate of return from the formal sector.) Such surveys would probably be nested in more general surveys of the labor force.

Suitably designed, labor force surveys might be used as substitutes for business registers, in cases where the latter are not thought to be reliable or are in process of development. To be used for such purposes, labor force surveys would have to ask questions about kind of activity, hours worked and the size category of the employer(s) (in both primary and secondary jobs). If business surveys then also incorporate questions about the number of employees and the number of hours worked, the results from the labor force survey could be combined with the available business responses to impute, at one and the same time, for under-coverage in the business register and for non-response in business surveys.

It may be possible to identify respondents to surveys whose reported profitability lies significantly below the normal range for businesses of similar size that are engaged in the same kind of economic activity. On the assumption that such outlier behavior would be due to misreporting for covert reasons, it may be possible to use the average relationship within the normal range of businesses between hours worked and the various elements of revenue and cost to correct the responses of the outlier enterprises. It remains to be seen whether such a suggestion turns out to be practical.

In a number of countries, there are household income and expenditure surveys which collect data on household incomes and on household purchases of consumer goods and services. The estimates provided by these surveys could be compared with the estimates of sales reported by retailers. Provided that errors and omissions are negligible, the difference between the two could be taken to represent purchases by households from the informal sector. However, for economies in transition, errors and omissions are likely to be large both because of non-response in retail surveys of the formal sector, and because of bias in household income and expenditure surveys. The bias in such surveys tends to have two sources: (1) the sensitivity

of information about incomes, which determines that few of the well-to-do ever respond to such surveys; and (2) the onerous nature of the very detailed questions on household expenditures, questions included in order to provide information needed to estimate the weights for consumer price indices (CPIs). While it would be possible to design surveys supplementary to the ordinary household expenditure surveys, that collect a modest amount of aggregate information on incomes and expenditures, and thus reduce the bias due to the onerous nature of the ordinary surveys, the bias due to the sensitivity of information on income would remain. Thus, although they may be suitable for estimating weighting patterns for CPIs, data from household expenditure surveys are not likely to be the best source for estimates of aggregate household expenditures on consumer goods and services.

4.3. *National Accounts Adjustments*

Despite the best efforts of statisticians, direct collection of data pertaining to the informal, formal unrecorded, and hidden economies, or imputations based on data collected directly, may still be incomplete. Statisticians, especially national accountants, can use other methods to check the coverage of the estimates and, if necessary, make adjustments.

One method of checking data is to analyze the results for consistency with expected physical relationships. For example, agricultural output data from surveys can be compared with other information about areas and average yields. Another example is comparing data on food supply with knowledge about per capita dietary patterns. These methods are not precise, but can be used as a check on other data, and are sometimes used when no other information is available.

However, care must be exercised in formulating assumptions about the correspondence between physical relationships and the national accounts, basically because no strong evidence is available to support a specific choice of relationship. For example, it will be misleading to use changes in electric power consumption as a proxy for changes in the GDP of countries in transition for at least two reasons; first because there are components of the use of electricity which are not affected significantly by changes in output of producers, including the use of electricity for lighting and heating by households, enterprises and other institutions (schools, hospitals, public buildings), and second because the price of electricity, although it has increased faster than the prices of most other goods and services, has increased very much more slowly than the price of petroleum; there have been observable substitutions of electricity generated by hydroelectric or thermonuclear facilities for electricity generated by fossil fuel plants.^{6,7}

Data from the suppliers to the informal sector can sometimes be used to estimate the extent of the informal activity. For example, the building industry may include many small enterprises. It is usually possible to obtain reliable data about the production of building materials such as bricks, cement and pipes. From

⁶See Dobozi, I. and G. Pohl: "Real Output Decline in Transition Economies—Forget GDP, Try Power Consumption Data," *Transition Newsletter*, the World Bank, Volume 6, January–February 1995.

⁷In the case of heating, there may be substitution in the medium-term between electricity and other sources of energy, the direction and magnitude of which will depend on changes in relative prices.

a sample of builders, a relationship could be developed between the value of building materials used and the total value of work done. This would then be applied to estimates of the total value of building materials to obtain estimates of the total value of work done.

The most systematic and comprehensive national accounts adjustments are made in the process of compiling input-output tables. This involves commodity flow studies, whereby the domestic and imported supply of particular commodities (goods and services) is compared with available information on their disposition, including, in the case of consumer goods and services, intermediate consumption, the change in inventories, and exports and consumption by households. Discrepancies between estimates of supply and estimates of disposition then lead to imputations of the difference to the items whose estimation is least firmly based. These adjustments (to estimates based on data collected through surveys and other sources) can also be applied to estimates of the national accounts over the interval following the compilation of the most recent input-output table. Of course, the effectiveness of such methods of estimation depends on the extent to which corrections have been made to the source data for non-response and bias. Moreover, commodity flow studies will not capture aspects of economic activity which fail to be captured in measurements both of supply and of disposition.

If both supply and demand equally escape statistical coverage, input-output compilation and commodity flow methods will not help. However, other aspects of national accounting may provide further insights into the adequacy of estimates. In the framework of the accounts not only supply and use of goods and services have to be balanced, but also incomes, use of incomes, saving, investment and finance. Although all these variables may have intrinsic weaknesses, bringing them together in a consistent framework will further help to uncover data deficiencies.

In statistical publications, it may be desirable to show data for public, large-scale private, and small-scale private enterprises separately. It could also be useful to show the official sector separately from the adjustments for the informal sector. This will assist users in assessing the coverage of the data and in analyzing the sources of growth by sector.

ANNEX 1: VALUATION OF OUTPUT: NUMERICAL EXAMPLE

This example demonstrates the effect on the measurement of GDP of producers including an interest component in the price of their output to cover late payment during periods of rapid inflation. It demonstrates, also, the effect of recording transactions using a mixture of accrual and cash based transactions. The example uses a simple economy with only two enterprises (a producer and a retailer); the intermediate consumption of the producer is all imported, while the retailer has no intermediate consumption; and there are no inventories. The scenario underlying the example is that the producer sells all its output each period to the retailer for distribution to households for consumption. In period 1, the retailer charges a price sufficiently above its purchase price to enable it to pay on time. In period 2, however, the producer doubles its price and the retailer delays payment for some purchases, and starts to build up arrears. The producer had included an element of interest in its price in anticipation of late payment by the

retailer. In period 3, the producer again doubles its price (including a greater element of interest), the retailer repays the arrears accrued in the previous period but delays payment for most of the goods purchased in the current period. The arrears build up at a greater rate. In period 4, the situation is similar to period 3, except that the retailer is able to increase its price more than the producer and slow down the rate of increase in arrears. The example is presented in four tables.

Table 2 presents the basic data underlying the example. It shows for the producer the quantity produced and sold, the invoiced price and the price adjusted for interest, the resulting values of sales, the materials used in production (all imported), and the wages paid. Similarly, for the retailer it shows the quantity sold and its price, the cash payment made to the producer for the goods sold, and the wages paid. This table shows, also, the cash flow for each enterprise. It should be noted that the retailer is not able to increase prices sufficiently to cover the cost of the goods sold and, therefore, delays payment to the producer. As a result, arrears build up between the retailer and the producer as shown, and both enterprises have a positive cash flow.

Table 3 converts the basic data into enterprise profit and loss statements, presented on an accrual basis. Two statements are presented for each enterprise reflecting the different valuation that could be given to sales by the producer to the retailer. In the "invoiced prices" statement, sales by the producer (purchases

TABLE 2
BASIC DATA

	Period 1	Period 2	Period 3	Period 4
<i>I. Transactions data</i>				
a. Producer				
Production (quantity)	1,000	800	600	500
Sales (quantity)	1,000	800	600	500
Price (invoiced)	1.00	2.00	4.00	5.00
Price (adjusted for interest)	1.00	1.80	3.00	4.50
Sales value (invoiced)	1,000	1,600	2,400	2,500
Sales value (adjusted)	1,000	1,440	1,800	2,250
Imported material	700	600	450	350
Wages	200	200	200	200
b. Retailer				
Sales (quantity)	1,000	800	600	500
Price	1.50	1.70	2.80	5.50
Payment to producer (cash)	1,000	1,000	1,200	2,000
Wages	300	300	300	300
<i>II. Cash flow</i>				
a. Producer				
Sales and interest	1,000	1,000	1,200	2,000
Purchases	700	600	450	350
Wages	200	200	200	200
Net cash flow	100	200	550	1,450
b. Retailer				
Sales	1,500	1,360	1,680	2,750
Payment to producer	1,000	1,000	1,200	2,000
Wages	300	300	300	300
Net cash flow	200	60	180	450
<i>III. Arrears (change)</i>				
	0	600	1,200	500

TABLE 3
ENTERPRISE BOOKKEEPING: (ACCRUAL BASIS)

	Period 1	Period 2	Period 3	Period 4
<i>I. Profit and Loss (invoiced prices)</i>				
a. Producer				
Sales	1,000	1,600	2,400	2,500
plus inventories	0	0	0	0
OUTPUT	1,000	1,600	2,400	2,500
Cost of sales	700	600	450	350
Purchases	700	600	450	350
less inventories	0	0	0	0
Wages	200	200	200	200
Operating surplus	100	800	1,750	1,950
Interest income	0	0	0	0
Profit	100	800	1,750	1,950
b. Retailer				
Sales	1,500	1,360	1,680	2,750
Cost of sales	1,000	1,600	2,400	2,500
Purchases	1,000	1,600	2,400	2,500
less inventories	0	0	0	0
Wages	300	300	300	300
Operating surplus	200	-540	-1,020	-50
Interest expense	0	0	0	0
Profit	200	-540	-1,020	-50
<i>II. Profit and Loss (adjusted prices)</i>				
a. Producer				
Sales	1,000	1,440	1,800	2,250
plus inventories	0	0	0	0
OUTPUT	1,000	1,440	1,800	2,250
Cost of sales	700	600	450	350
Purchases	700	600	450	350
less inventories	0	0	0	0
Wages	200	200	200	200
Operating surplus	100	640	1,150	1,700
Interest income	0	160	600	250
Profit	100	800	1,750	1,950
b. Retailer				
Sales	1,500	1,360	1,680	2,750
Cost of sales	1,000	1,440	1,800	2,250
Purchases	1,000	1,440	1,800	2,250
less inventories	0	0	0	0
Wages	300	300	300	300
Operating surplus	200	-380	-420	200
Interest expense	0	160	600	250
Profit	200	-540	-1,020	-50

by the retailer) are valued at the invoiced price. In the “adjusted prices” statement they are valued at the price excluding interest. As a result, the latter statement for each enterprise records the interest component separately and differentiates operating surplus from overall profit.

Table 4 presents the national accounts that would be compiled if the invoiced prices were used to value the sales from the producer to the retailer. In the accrual accounting section the data are recorded on an accrual basis, and provide a common estimate for GDP by each of the three standard approaches. This is because the overstatement in the value of the producer’s value added that results

TABLE 4
NATIONAL ACCOUNTS: (USING INVOICED PRICES)

	Period	Period 2	Period 3	Period 4
<i>I. Accrual accounting</i>				
a. Production approach (value added)				
Producer	300	1,000	1,950	2,150
Retailer	500	-240	-720	250
Total GDP	800	760	1,230	2,400
b. Income approach				
Wages	500	500	500	500
Operating surplus—producer	100	800	1,750	1,950
Operating surplus—retail	200	-540	-1,020	-50
Total GDP	800	760	1,230	2,400
c. Expenditure approach				
Consumption	1,500	1,360	1,680	2,750
Inventories	0	0	0	0
less Imports	700	600	450	350
Total GDP	800	760	1,230	2,400
<i>II. Mixed accounting</i>				
a. Production approach (value added)				
Producer (accrual)	300	1,000	1,950	2,150
Retailer (cash)	500	360	480	750
Total GDP	800	1,360	2,430	2,900
b. Income approach				
Wages	500	500	500	500
Operating surplus—producer	100	800	1,750	1,950
Operating surplus—retail	200	60	180	450
Total GDP	800	1,360	2,430	2,900
c. Expenditure approach				
Consumption	1,500	1,360	1,680	2,750
Inventories	0	0	0	0
less Imports	700	600	450	350
Total GDP	800	760	1,230	2,400

from the use of inflated prices is offset exactly by an understatement in the retailer's output and value added, resulting from overstating the value of purchases. For example, in period 2, the value added of the producer equals 1,000 and is derived from Table 3 as output at overstated invoiced prices (1,600) minus cost of sales (600), while value added for the retailer equals -240, derived as sales (1,360) minus cost of sales at overstated invoiced prices (1,600). The mixed accounting section shows the effect of recording the producers transactions on an accrual basis while recording those of the retailer on a cash basis. As the latter overstate the value added and operating surplus of the retailer, the estimates of GDP from the production and income accounts overstate the true level of GDP by the value of arrears. For example, in period 2, the operating surplus of the retailer on an accrual basis is -540 (Table 3, invoiced prices) while the surplus on cash basis is 60 (Table 2, cash flow). The difference of 600 between these estimates is the change in arrears in period 2 (Table 2).

Table 5 presents the national accounts that would be compiled using the adjusted prices; i.e. accounts that remove the interest component from the value added of the producer and from the purchases of the retailer. For example, in period 2, the value added of the producer is 840, derived as output at adjusted

TABLE 5
NATIONAL ACCOUNTS: (USING ADJUSTED PRICES)

	Period 1	Period 2	Period 3	Period 4
<i>I. Accrual accounting</i>				
a. Production approach (value added)				
Producer	300	840	1,350	1,900
Retailer	500	-80	-120	500
Total GDP	800	760	1,230	2,400
b. Income approach				
Wages	500	500	500	500
Operating surplus—producer	100	640	1,150	1,700
Operating surplus—retail	200	-380	-420	200
Total GDP	800	760	1,230	2,400
c. Expenditure approach				
Consumption	1,500	1,360	1,680	2,750
Inventories	0	0	0	0
less Imports	700	600	450	350
Total GDP	800	760	1,230	2,400
<i>II. Mixed accounting</i>				
a. Production approach (value added)				
Producer (accrual)	300	840	1,350	1,900
Retailer (cash)	500	360	480	750
Total GDP	800	1,200	1,830	2,650
b. Income approach				
Wages	500	500	500	500
Operating surplus—producer	100	640	1,150	1,700
Operating surplus—retail	200	60	180	450
Total GDP	800	1,200	1,830	2,650
c. Expenditure approach				
Consumption	1,500	1,360	1,680	2,750
Inventories	0	0	0	0
less Imports	700	600	450	350
Total GDP	8090	760	1,230	2,400

prices (1,440) minus cost of sales (600), while for the retailer the value added is -80 and is derived as sales (1,360) minus cost of sales (1,440). The difference between the value added on an accrual basis in Tables 4 and 5 for each enterprise is the interest component of 160 (Table 3, adjusted prices). Similarly, the operating surplus of each enterprise on an accrual basis differs between Tables 4 and 5 by the interest component of 160.

In this example, the overall GDP in Table 5 is identical with that of Table 4, suggesting that the inclusion of an interest component in the producer's price only leads to a distortion in the measure of value added by activity. This result occurs because of the simplified nature of the example where all the output of the producer goes to final consumption via the retailer. If some of the output was sold directly to final use by the producer at prices that included an interest component then the adjusted value of GDP would be lower than the invoiced price value to the extent of that interest. The simplified nature of the example also results in the expenditure approach producing the correct estimate of GDP in both Table 4 and Table 5.

Again, a mixed accounting presentation is provided which shows that GDP would be overstated by using cash-based accounting records, but that the overstatement would be less than is shown in Table 4 because the accrual based figures

for the producer exclude the interest component. The cash based figures for the retailer in Table 5 are identical with those of Table 4 because they record the payments by the retailer and cover indistinguishably the purchase price and the interest component.

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