

**HOW MUCH DID THE SOVIETS  
REALLY SPEND ON DEFENCE?  
NEW EVIDENCE  
FROM THE CLOSE OF THE BREZHNEV ERA**

Mark Harrison

**No 662**

**WARWICK ECONOMIC RESEARCH PAPERS**

**DEPARTMENT OF ECONOMICS**

THE UNIVERSITY OF  
**WARWICK**

# How Much Did the Soviets Really Spend on Defence? New Evidence From the Close of the Brezhnev Era

Mark Harrison\*

Department of Economics  
University of Warwick

and

Centre for Russian & East European Studies  
University of Birmingham

## Abstract

The paper considers the influence of the budget for military spending in the Soviet command economy. A specific problem is that the Soviet strategy of concealment left us without good measures of the military burden on Soviet resources. The paper surveys previous western attempts to fill this gap alongside post-Brezhnev revelations. A new documentary source from 1982 that appears authoritative suggests much higher figures than anything proposed or revealed so far, and supports these higher figures in detail. However, the figures contain many puzzles and the authenticity of the document itself cannot be fully assured.

---

## Acknowledgements

This paper is based on a presentation to the Soviet Industrialisation Project seminar at the University of Birmingham Centre for Russian and East European Studies on 27 November 2002; I thank the participants for comments, and especially the discussant Julian Cooper for excellent advice and also for permission to quote from personal correspondence. I also thank Michael Ellman, Paul R. Gregory, Byung–Yeon Kim, Vladimir Kontorovich, and R.W. Davies for advice and comments on various issues. My greatest debt, one that cannot be repaid, is to the late Peter Wiles. I am solely responsible for remaining errors of fact and interpretation.

\* Address for correspondence: Department of Economics, University of Warwick, Coventry CV4 7AL, UK. Email [Mark.Harrison@warwick.ac.uk](mailto:Mark.Harrison@warwick.ac.uk).

# How Much Did the Soviets Really Spend on Defence? New Evidence From the Close of the Brezhnev Era

## Introduction

The breadth and depth of disagreements aroused in the last quarter of the twentieth century when independent scholars and western government agencies attempted to measure the size of the Soviet economy was remarkable. Similar disagreements beset the attempts of the time to grasp the scale of the Soviet military burden.

In this paper I present and consider the evidence of a new source relating to the level and composition of Soviet military outlays in rubles under the tenth five-year plan of 1976 to 1980. The evidence is apparently authoritative, and the figures are much larger than any that have been independently estimated or officially revealed.

To set the context I proceed as follows. Part 1 discusses the role of budget outlays including defence appropriations in the Soviet planned economy and how military spending may have affected economic performance and stability. Part 2 outlines the range of existing estimates of Soviet defence outlays and explains briefly the basis for divergent estimates. Part 3 summarises the documentary character of the new source and evaluates its possible authenticity. Part 4 seeks to interpret its internal puzzles. Part 5 considers its use for measuring the Soviet military burden. Part 6 concludes.

## 1. The Role of the Military Budget

### 1.1. The Overall Allocation of Resources

The Soviet military budget was of significance in two aspects. First, it provided for the maintenance of the USSR's armed forces and the accumulation of its military stocks. From this point of view the importance of the military budget was that it provided the inputs that helped to promote the place of the Soviet Union in the international military balance. Second, the military budget served to extract the necessary resources for this from the Soviet economy and consequently had a major influence on the allocation of Soviet resources; because there was a trade-off between military and civilian uses of resources the military budget represented a burden that adversely affected civilian outcomes including living standards and economic growth. The character of the information provided in this paper is such that it provides no further insight into the former aspect of the international military balance and throws light exclusively on the latter aspect, the issue of the military burden on the Soviet economy.

The Soviet Union is often said to have had a planned economy and that detailed supply plans denominated in physical units fixed the allocation of real resources to final uses from above. It is not necessarily obvious what role budgetary assignments in rubles could have played in such a system.<sup>1</sup> In fact, the financial resources assigned through the state budget were very important in allocating real resources to final uses, and the more we find out about the inner working of the Soviet regime the more important these appear to have been. For example, it seems that Stalin and his immediate associates gave much more time and energy to determining the appropriate magnitudes of the annual budgets for civilian construction and military procurements than to cursory approval of the "control figures" for material supply plans.<sup>2</sup>

---

<sup>1</sup> For classic studies of the working of the Soviet budgetary and financial system see Davies (1958) and Garvy (1977).

<sup>2</sup> Davies (2001); Gregory (2001); Davies, Ilić, and Khlevniuk (2002); Gregory (2002).

The importance of budget allocations appears to have been a direct result of the inability of centralised supply planning to determine final uses. This was for two reasons, first, because some products did not have a determinate intermediate or final use, and second, because centralised plans were insufficiently detailed to link products to intermediate or final users.

As far as the first point is concerned, consider the civilian economy as comprising three sectors of origin. These produced (1) *specialised consumables*: goods and services that could not be used except for consumption, for example food, clothing, and entertainment (2) *general-purpose* goods and services that could be used equally in production and consumption: industrial and building materials, fuel and power supplies, transport services, information and communications equipment, light automobiles and parts, electrical components and fittings, furniture, office supplies, and stationery, and (3) *specialised machinery*: industrial and military equipment, often produced in the same industrial facilities, that could only be used in production or the defence sector. From this it is apparent that supply planning was only the beginning of the allocation of resources. Once plans had fixed shares in output by sector of origin, a competitive struggle ensued in which households and the armed forces fought over the distribution of consumables; in the distribution of general-purpose goods and services the contestants were households, firms, and the armed forces; and firms and the armed forces contested the distribution of machinery. In brief the competing users of each class of product were as shown below:

	By households: for final consumption and household inventories	By firms: for intermediate consumption, inventories, and fixed investment	By the Armed Forces: for consumption and military inventories
Class of Product:			
Specialised Consumables	×		×
General-Purpose Products	×	×	×
Specialised Machinery		×	×

Thus supply plans for output, although more detailed than suggested by this simple example, were not sufficient to allocate resources among final uses. Budget allocations to investment and military purchases closed the system, fixing civilian consumption as a residual as follows. Households were able to consume the output of consumables not claimed for military services, plus the output of general purpose goods not claimed for production by producers of consumables and machinery or for investment or for military services. Therefore, holding the military and investment budgets equal, civilian consumption rose with the supply of each sector, including even specialised machinery; controlling for supply, however, civilian consumption fell as the military and investment budgets rose. (For formal treatment see Appendix 1, proposition 1.) In turn the military and investment budgets could be traded off against each other ruble for ruble.

A corollary governs the allocation of resources to the pay of conscripts. The pay of workers was determined differently in different activities. Given the relative freedom of the postwar Soviet labour market firms had to retain civilian workers by paying them their reservation wage. The armed forces, in contrast, relied on conscripts who were retained by fear of the penalties for desertion; consequently, the pay of conscripts was much lower. However, soldiers' wages were not determined completely arbitrarily. In fact, the condition of an equilibrium in the general market

for consumer goods, or less stringently the requirement to control the extent of disequilibrium, imposed a limit on what the authorities could pay. The maximum conscript wage was positively associated with supply plans of the three civilian sectors but negatively associated with budgetary demands, with the civilian reservation wage, and with the labour intensity of military services output. At first sight it might appear that a more generous budgetary allocation to defence would allow conscripts to be paid more, not less; controlling for other factors, however, the result would be a lower *equilibrium* wage since higher military spending would reduce, not increase the resources available for consumption generally; higher conscript wages would result only in soldiers receiving more tickets of lower expected value in the lottery of the retail market (see Appendix 1, proposition 2).

This story may overstate the importance of budget appropriations in determining real resource allocation. The reason is that some sectors of the Soviet economy displayed considerable price flexibility; as a result, an increased budget for capital construction or defence might result in faster inflation rather than greater real investment activity.<sup>3</sup> In the case of defence enlarged budgets were not always spent, perhaps for this reason.<sup>4</sup>

## 1.2. Long–Run Performance

In considering the rise and fall of great powers Paul Kennedy concluded that excessive military spending typically leads to economic decline.<sup>5</sup> In the case of the Soviet Union it is often suggested that military–economic competition with the United States helped to destabilise the economy at the end of the 1980s.

In contrast to historical writing, economic investigations of the possible long–run consequences of peacetime military spending have often tended to remain unimpressed, at least as far as market economies as concerned. Various studies have identified a growth–defence relationship across countries that is weakly positive, weakly negative, or with a sign dependent on income level, or not significant at all.<sup>6</sup>

Two reasons for the lack of strong results suggest themselves, even within a highly simplified framework. First, the share of defence spending may be increased at the expense of household consumption, not investment, so that the long–run growth of the economy is unaffected and, after the adjustment, living standards also rise at the same rate as before but at a level that is permanently lower by the amount of the initial sacrifice. This case is illustrated in figure 1. Second, to the extent that defence spending takes resources away from investment the country’s economic growth will decelerate but the deceleration should be temporary; once the capital stock has adjusted to a smaller size its increased marginal productivity should mean that it will resume growth at the same rate as before. Figure 2 illustrates this case on the basis of standard assumptions about diminishing returns and technical progress. In short, an increase in the share of defence may permanently affect the levels of consumption and perhaps also total output but, once stabilised, the level of defence spending should have no persistent effect on their growth.

---

<sup>3</sup> For examples see Davies (2001), and for microfoundations Harrison and Kim (2001).

<sup>4</sup> Gregory (2002).

<sup>5</sup> Kennedy (1988).

<sup>6</sup> Evidence from the postwar period is summarised by Landau (1993) and Anderton (1993), 96–98. Easterly and Fischer (1995), 347–8, confirm Landau’s result of an inverse U–shaped relationship: for low levels of defence expenditure, growth rises as defence expenditure rises, but then falls back at higher levels. On the interwar period see Eloranta (2002).

Figure 1. *Effects of Raising the Military Burden at the Expense of Consumption*

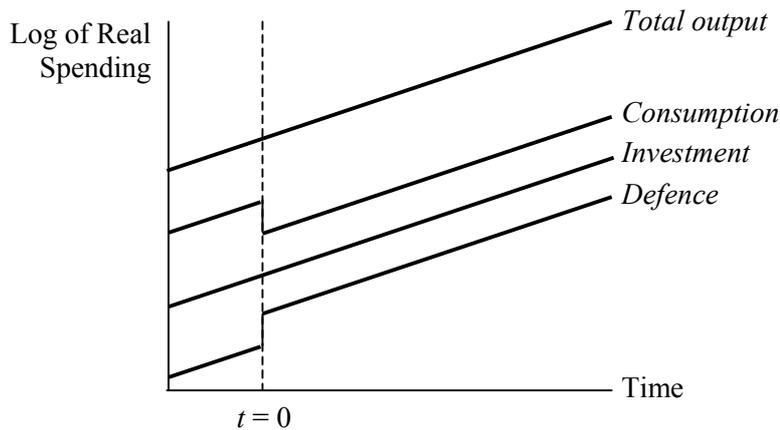
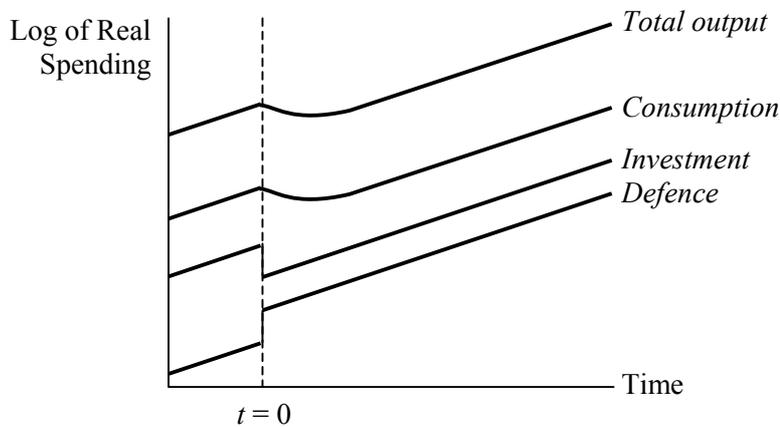


Figure 2. *Effects of Raising the Military Burden at the Expense of Investment*



Such a simplified approach may be criticised in various ways. For one thing the Soviet economy was not a market economy; its peculiar institutions may have constrained its choices more rigidly than the above would imply. Specifically, if the Soviet economy found it harder to substitute capital for labour than a market economy, then growth might only be maintained by continuous increases in the investment share and a given defence share might impose a constraint on growth that binds more and more tightly through time.<sup>7</sup>

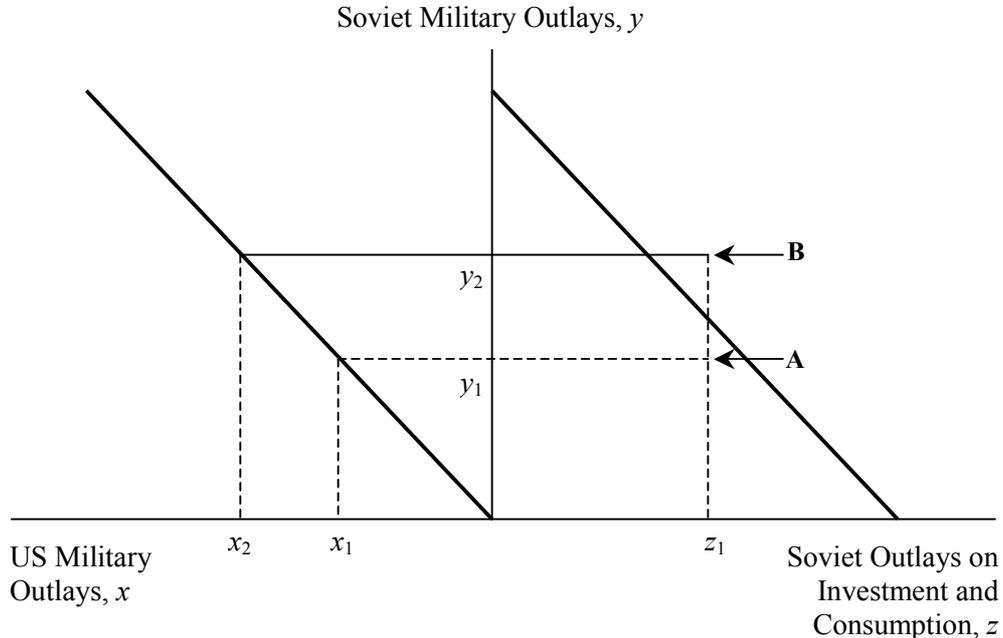
More interesting insights into the implications of military spending may arise from an arms race model of the type proposed by Murray Wolfson.<sup>8</sup> The spirit of this approach is illustrated in figure 3. The right hand side of the figure shows Soviet production possibilities: total output could be allocated to military uses on the vertical axis, or to investment and consumption on the right-hand horizontal axis so the downward sloping 45° line represents an aggregate supply constraint. On the demand side suppose that the Soviet economy faced a minimum investment requirement to replace the capital stock, a minimum consumption level to maintain loyalty and effort on the part of the population, and a minimum level of military force required to deter attack. In figure 3 the combined sum of minimum requirements for investment and consumption is represented on the right-hand horizontal axis by a vertical line at  $z_1$ .

<sup>7</sup> On Soviet capital labour substitution see Kontorovich (1988) and on the significance of Soviet defence outlays in an econometric framework Easterly and Fischer (1995).

<sup>8</sup> Wolfson (1985).

Think of each requirement dynamically. Soviet economic growth meant the capital stock was growing and with it the minimum investment requirement for replacement. Continually increasing skills and human capital were also pushing upward the population's reservation wage. Through time, therefore,  $z_1$  moved rightwards at a rate similar to that of the production frontier.

Figure 3. *Effects of the Arms Race on Soviet Economic Stability*



The demand for military spending is represented on the left hand side of figure 3: United States military spending fixed the Soviet requirement for minimum deterrence. If US military spending was  $x_1$  the matching requirement for Soviet military outlays was  $y_1$ . When  $y_1$  is combined with  $z_1$ , the total of minimum requirements is within Soviet production possibilities at A with something left in reserve. But US economic growth meant that US military spending was rising. Thus,  $x_1$  was moving to the right, driving  $y_1$  upwards.

Suppose the Soviet steady-state growth rate of total output fell below that of the US economy. Then the military outlays required for minimum deterrence would rise faster than the production frontier could expand, implying a steadily rising military burden on Soviet GDP. Suppose US military spending rose to  $x_2$ ; so that the matching requirement for Soviet military outlays rose to  $y_2$ . When  $y_2$  is combined with  $z_1$ , the total of minimum requirements falls outside Soviet production possibilities at B: demand exceeds supply. One of the constraints must give. To breach the investment constraint would trigger declining capacity and a vicious circle of collapsing output; to violate the fair wage constraint would lead to defection of the population; or the Soviet military would no longer deploy sufficient resources to deter attack.

In hindsight this class of model seems to support a plausible interpretation of the Soviet economic collapse that highlights the role of the military burden. On closer inspection it becomes less attractive. For one thing in other historical cases the constraints on which it relies have rarely been found to be either sharply defined or absolutely binding. Rather, there are usually very broad zones of gradually increasing violation.<sup>9</sup> For another thing Gorbachev, keenly aware of the military burden, scaled

<sup>9</sup> Germany in World War II illustrates the point. Between 1941 and 1944 despite intense aerial bombardment and civilian belt-tightening the German economy not only tripled its war production but also carried out new industrial investment on a

down the Soviet concept of minimum deterrence in the late 1980s in the name of “new thinking” so as to leave more room for investment and consumption. Rather than violate the investment and consumption constraints, he permitted the military constraint to give way. Despite this the Soviet economy began to collapse in 1990. So the timing of the historical events does not seem to fit the theoretical model.

In summary there are various reasons to suppose that the Soviet military burden was associated with slow growth, or with declining growth, or even with ultimate Soviet collapse: so far so good. But the reasoning is often speculative; it does not find very detailed or firm support in the evidence. There are more good reasons to discount the influence of the military factor on growth, slowdown, or collapse, than is often supposed. We suppose it must have mattered but we are still not sure how.

## 2. The Range of Estimates

### 1.1. Official Figures

In the 1970s and early 1980s the State Budget adopted each year by the USSR Supreme Soviet assigned to defence a sum of never less than 17 or more than 18 billion rubles annually. Since the nominal value of the USSR’s net material product in those years was measured in hundreds of billions, the military burden implied by the official budget measure was trivial. In 1980, for example, it was no more than 3.8 per cent of the net material product, or 2.8 per cent when the Soviet national income was recalculated on a western goods-and-services or GNP basis. Since the nominal value of the USSR’s net material product was rising while the official budgetary allocation to defence stood still, the officially admitted military burden was not only trivial but also falling. On both counts it was a transparent lie.

This had not always been the case. In the 1920s and 1930s Soviet figures for defence spending were mostly truthful. The archives have revealed one exception: published military budgets were directly falsified and understated in the period from 1931 to 1933 in order to influence the Geneva disarmament negotiations; the deceit was carried on in 1934 and 1935 so as to smooth the transition back to relatively truthful accounts in 1936.<sup>10</sup> Thus for several years there were two sets of defense accounts, one for consumption by both the public and the broad mass of less privileged officials, and another for the Politburo alone which showed the true state of affairs. Defence budgets were concealed during World War II but were revealed soon after with relative truthfulness, although minimally so with regard to the support of military spending by Lend–Lease.<sup>11</sup> The published Soviet budget continued to tell the truth after the war and into the 1950s. But by the 1960s official releases and the truth had parted company again and this was no mere trial separation but a lasting divorce. There was no attempt at reconciliation until a whole generation had passed and *glasnost* (“transparency”) intervened, first in 1987 and again in 1989; even then, it has been suggested, the truth was incompletely revealed.<sup>12</sup>

---

scale that exceeded the destruction of manufacturing facilities from the air (Abelshauser, 1998). That civilian loyalties and the civilian infrastructure remained intact is testimony partly to the power of German nationalism and hatred or fear of the enemy, partly to the power of substitution processes to enable people to get by in wartime without that which was formerly defined as “essential”. The German economy collapsed in early 1945 only after years of military attrition; economic warfare contributed but was not the primary factor. See further Overy (1994).

<sup>10</sup> Davies (1997); Davies and Harrison (1997).

<sup>11</sup> Plotnikov (1945); Voznesenskii (1947); Bergson (1948); on Lend–Lease see Harrison (1996).

<sup>12</sup> Cooper (1998) surveys trends since 1987.

The motive of postwar deception was apparently the same as in 1931, that is, to influence the climate of arms control and armament negotiations. The explanation offered recently by Iurii Masliukov and Evgenii Glubokov confirms this:

In 1963 the USSR unilaterally cut [its] allocations to the armed forces to show good will and the USA also made some cuts, but the West did not support the 1964 proposal to cut military budgets by 10 to 15 per cent. The USSR made proposals to cut military allocations successively in 1973, 1976, 1978, 1980, 1982, 1983, 1984, and 1987. At the same time the necessity of providing for strategic parity in the arms race that was imposed on us, and of improvement of the technical level of armament and military equipment, demanded further development of the defence complex and growth of the volume of finance. Therefore defence spending in real terms rose and peaked in 1988–89. In 1989 it amounted to 77 294.2 million rubles (16.1 per cent of the overall budget of the country).<sup>13</sup>

This statement implies directly that the falsification of the official budget series for defence began after or in 1963. However, the new figure for defence spending in 1960 that Masliukov and Glubokov then revealed, 15.3 billion rubles, is more than 50 per cent larger than the official budget figure for that year, 9.3 billions. Since a gap of this magnitude cannot have been created quickly, it follows that the deception actually began some years before 1960.

Masliukov and Glubokov also indicate the accounting methodology of deception: outlays on the procurement of weapons and military equipment, and also allocations to military R&D, were transferred to budget spending for finance and development of the national economy (i.e. to current subsidies plus capital investments). Implicitly, then, official budget spending on defence comprised mainly outlays on current operations and maintenance of the armed forces. The method of accounting for military construction is not indicated. Finally, Masliukov and Glubokov list a number of items of potential or actual military application that would be excluded from the defence accounts of most countries such as administrative costs of the defence complex, the maintenance of a number of research institutes and colleges, fixed investments in the defence industry, and investments in industrial mobilisation inventories, together making up to 15 billion rubles in 1989.<sup>14</sup>

Even on a narrow definition of military spending, however, speculation that the new figures of 1989 were not fully inclusive began already not long after their first release.<sup>15</sup> Such speculation was encouraged by the fact that much higher figures for overall “narrow” defence spending and with quasi-official authority had long been in circulation in the West, some provided by defectors and others obtained by intelligence means. Called the “benchmark data” by William T. Lee, a former

---

<sup>13</sup> Masliukov and Glubokov (1999), 105. Glubokov is a former member and Masliukov a former chief of the VPK of the USSR Council of Ministers; Masliukov also formerly headed USSR Gosplan.

<sup>14</sup> Masliukov and Glubokov (1999), 106. The authors state that the extra items left out of the defence budget on a 1989 basis would have raised military spending in that year to 10 per cent of GNP. They give the defence budget in that year as 8.6 per cent of GNP and GNP as 924.1 billion rubles, from which  $924.1 \times (10\% - 8.6\%) = 14.8$  billions approximately.

<sup>15</sup> For a survey that includes the role played by western experts in auditing and validating the new figures see Masliukov and Glubokov (1999), 109–14.

employee, then critic of the United States Central Intelligence Agency (CIA), these figures are as follows:<sup>16</sup>

1970	50 billion rubles
1972	approximately 58 billion rubles
1980	approximately 100 billion rubles
1982	more than 150 billion rubles.

To these may be added a figure for 1990 supplied by Soviet economic journalists of “more than 200 billion rubles”.<sup>17</sup>

However, when the late Dmitri Steinberg consulted with Goskomstat officials and former defence industry managers in Moscow 1990/91 on the subject of “hidden” defence industry costs, including both budgetary items not counted under the Ministry of Defence allocation and other resources costs imposed on the civilian economy by military activities and defence procurement, he was unable to raise the upper limit of defence costs in 1989 above 133 billion rubles.<sup>18</sup>

## 1.2. The CIA Figures and Their Critics

In the 1970s and 1980s western government agencies and independent scholars attempted to overcome the Soviet policy of misinformation in different ways. The CIA discarded official Soviet figures altogether and developed a direct costing or “building block” methodology. This began with intelligence-based estimates of quantities of defence resources consumed or stockpiled in each year and prices of each resource in dollar equivalents of some base year, for example 1970 or 1982; for each block of a given resource the quantity multiplied by the base-year price gave its dollar value; the sum of values of the blocks gave the CIA its figure for overall Soviet defence outlays in constant dollars.<sup>19</sup> The constant ruble value of Soviet defence activity was estimated either by applying ruble prices of a base year where known directly to the same blocks of quantities, or by applying estimated dollar-ruble convertors to the dollar values already computed. Finally, the current ruble value of Soviet defence activity could be derived by applying estimates of price change in the current year relative to the base year.

Admitting that the results were of uneven reliability, the CIA insisted that they were corroborated by other sources and also accepted by other intelligence services.<sup>20</sup> But this assessment was challenged, most notably by Lee and Steven Rosefielde. They charged that the CIA’s direct costing procedures were incomplete, understated the growing quality and cost of Soviet weapons, were insufficiently transparent, and proved insufficiently robust when new information appeared.<sup>21</sup>

---

<sup>16</sup> Lee (1995), 145.

<sup>17</sup> Gams and Makarenko (1990).

<sup>18</sup> Steinberg (1992), 257.

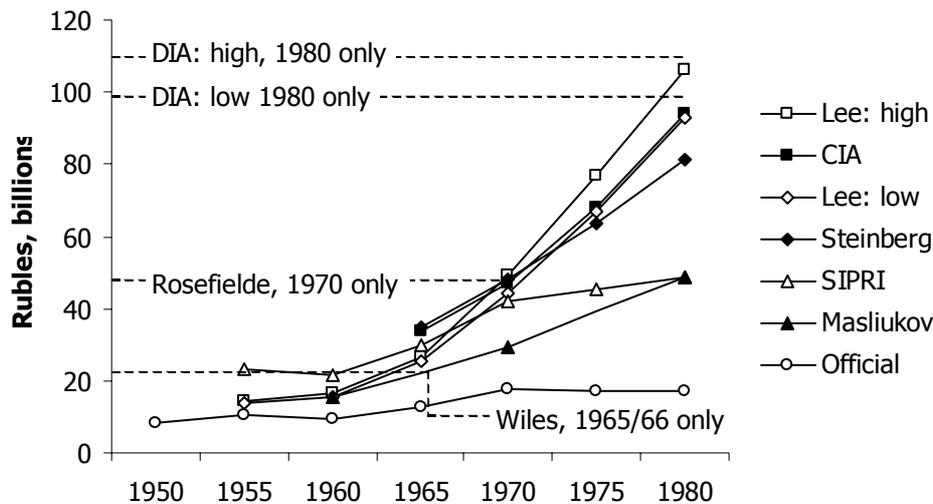
<sup>19</sup> Specific controversies surround the dollar estimates that I do not consider here. A persistent critic was Holzman who, in a series of articles beginning with Holzman (1980), stressed the role of substitution or index number biases in the CIA figures.

<sup>20</sup> Swain (1990), 109.

<sup>21</sup> CIA (1976); Lee (1977); Rosefielde (1982). It was suggested that the building-block methodology could only give a lower bound on Soviet spending because its coverage of the building blocks was inevitably incomplete. For the categories of equipment that were covered the CIA was alleged to understate the rates of growth of true quantities and costs. That is, it attributed too much of observed price changes to hidden inflation and so failed to capture the full improvement in the quality of Soviet

In the CIA's exchanges with Lee and Rosefielde there was bad feeling on each side and the implication of bad faith on the other. Lee and Rosefielde separately suggested that the CIA had colluded in a Soviet strategy of disinformation, resulting in understatement of the Soviet military-economic effort. The conclusions that they drew diverged, however. According to Rosefielde, the result was insufficient United States preparedness for war.<sup>22</sup> According to Lee, the result was excessive United States engagement in arms control; since the Soviet economy was already at the limits of its military-industrial potential, restraining the arms race would one-sidedly advantage the Soviet Union since only the United States was capable of further mobilisation.<sup>23</sup>

Figure 4. Soviet Military Spending in Rubles and Current Prices, 1950 to 1980: Alternative Estimates



Source: Figures are from Noren (1995), 269, except Masliukov (from Masliukov and Glubokov, 1999, 105), Rosefielde (from Rosefielde, 1987, 186), and Wiles (from Rosefielde, 1990, 70).

When we see the estimates of Lee and Rosefielde alongside those of the CIA in figure 3 there is irony in the relative closeness of the resulting figures. They differed

---

weapons through time; this led to an understatement of Soviet military stocks relative to the United States. At the same time it failed to observe the full extent of price inflation, and this led to understatement of the cost of Soviet defence activity to the economy supplying it. Lee and Steven Rosefielde argued that the CIA methodology lacked transparency in withholding the evidence base of prices and quantities from which the building blocks were valued, and the procedure for consistent revision of serial data when new information was factored in. Finally, they diagnosed lack of robustness from the character of CIA responses to new information. In the most celebrated case, when the “benchmark” figure of 50 billion rubles in 1970 transpired it was more than twice the existing CIA estimate. The latter was then revised upwards, but the CIA claimed that this revision would have happened anyway in the course of repricing and was independent of the “new information”. Burton (1983) replied on behalf of the CIA, but neither Rosefielde (1987) nor Lee (1995) was reconciled. Although the CIA's direct costing exercise was wound up after the fall of communism, those formerly engaged in it continued to defend their position (Noren, 1995; Firth and Noren, 1998).

<sup>22</sup> Rosefielde (1987).

<sup>23</sup> Lee (1995).

far less among themselves than with others. But we find this in other fields of inquiry as well.<sup>24</sup> Those who differ most bitterly are often drawn together by the gravitation of intense debate, and small differences may sustain ill feeling as easily as large ones, especially when each side claims moral victory over the other.

### **1.3. Alternative Methodologies**

Many took a different view on Soviet defence spending from the CIA, but what they all had in common, lacking the CIA's advantage of access to intelligence-based data, was some greater reliance on the use of Soviet published information. This was true of all of them, even those who criticised the CIA most severely for following a Soviet-inspired line. Therefore their advantage, if they had one, could lie only in greater scholarship.

Of all of them Rosefielde worked nearest to the lines of the CIA's direct costing methodology. Rosefielde started from the same quantity building blocks as the CIA supplemented or corrected by those of the United States Defense Intelligence Agency (DIA) and base-year prices or costs of 1960 that the CIA at first advocated, then later abandoned. In addition, Rosefielde claimed a superior methodology of price adjustment for quality change in later years. The result was a measure of defence spending in rubles that approximately matched that of the CIA but Rosefielde claimed the match was no accident: the CIA estimates were being forced to adapt to realities, but the adjustment was being done dishonestly under a pretence of scholarship. Moreover the implications of the CIA's and Rosefielde's estimates for military stockbuilding in real terms were quite different: in Rosefielde's view the Soviet Union had substantially overtaken the United States in its military capabilities by the 1980s.

The rest, including Lee, worked directly with Soviet data and did not attempt to build from blocks in physical units; if they estimated defence activity in real terms, it was usually at the final stage of deflating nominal values. Lee for example began from the residual of the nominal gross output of the machine building industry in each year after subtracting reported or estimated net intermediate and final deliveries to other sectors and inventories; this, which he attributed to military procurement, became the foundation stone of a calculation of the wider military budget. As figure 3 indicates Lee produced figures in a range that approximately straddled those published by the CIA. To Lee, as to Rosefielde, this was no accident but the mark of his own moral victory.

Rosefielde also worked with the machine building residual and approved of this method. Against it may be made a general point: working with small residuals left after subtracting one large number from another is always hazardous because small errors in the larger numbers lead to large errors in the smaller ones. But there is also an important point for it, and perhaps one that could not have been made before: a document in the Soviet archives for 1937 shows that officials understood exactly the danger of publishing information that might permit computation of a heavy industry residual: it could reveal the volume of military procurement.<sup>25</sup>

Beyond Lee and Rosefielde a number of others also attempted to estimate Soviet defence spending by decoding Soviet official data. Among these were both academic scholars and staff researchers at the US Defence Intelligence Agency. Starting from the official military budget which they generally treated as representing outlays on the pay and subsistence of troops, they added varying shares of other items in the budget, or of the accumulation fund or additions to state reserves, to cover the other costs of maintenance, operations, construction, and R&D. DIA estimates turned out

---

<sup>24</sup> The same is found when we look at competing estimates of Soviet real GDP growth; see Harrison (2002).

<sup>25</sup> Barber, Harrison, Simonov, and Starkov (2000), 21.

larger than those of the CIA, but those of other scholars were often smaller, sometimes much smaller.<sup>26</sup>

Some estimates of this type were very elaborate. Most complex was the apparatus developed by Steinberg, who began from the hunch that most Soviet defence production and activity was excluded from the official national accounts; he created a methodology that accounted for hidden real and financial flows and distributed them among producers and users in such a way as to consistently reveal the true scale of Soviet defence.<sup>27</sup> But the hunch itself remained untested and has not been confirmed since. Unlike those of others in this group, as figure 3 shows, Steinberg's estimates were relatively large and close to those of the CIA.

Cleverest was the method of Peter Wiles, who argued that the Soviet statisticians had hidden military procurement by accounting for it only in net terms, after subtracting depreciation which he called the "weapons write-off".<sup>28</sup> Wiles too was playing a hunch that has not been substantiated since. There was a promise in these methods that Rosefielde for one recognised at the time.<sup>29</sup> But in retrospect it is fair to say that the promise has not been fulfilled; neither Steinberg nor Wiles is here today to make it good, and no one else has followed in their steps.

Finally I arrange the estimates mentioned so far in a table that considers 1980 alone, and compare them with various measures of overall economic activity in that year: total government purchases, the net material product, and GNP. The estimates in table 1 fall clearly into three groups. At between 13 and 17 per cent of Soviet GNP are those of Michaud, Lee, Steinberg, Rosefielde (not shown but listed in a note to the table), and the CIA. At about 8 per cent of GNP the figures estimated by SIPRI coincide almost exactly with those revealed since the fall of communism. In a class of its own remains the 3 per cent admitted and advertised under Brezhnev.

---

<sup>26</sup> Higher DIA figures are presented in Michaud (1990), but the methodology also represented by Duchêne (1987), Duchêne and Steinberg (1987), and Mochizuki (1987) has roots that go back to Becker (1964) and these tended to come up with lower figures. A methodology of the same general class underlay the SIPRI figures shown in figure 3 and table 1.

<sup>27</sup> Steinberg (1987, 1990a, 1990b).

<sup>28</sup> Wiles and Efrat (1985); Wiles (1987).

<sup>29</sup> Rosefielde (1990).

*Table 1. Soviet Military Spending in Rubles and Current Prices, 1980: Alternative Estimates*

	Billion Rubles	Per Cent of		
		Total Budget Outlays	NMP	GNP
1. US Defense Intelligence Agency (high)	107	36.3	23.6	17.3
2. William T. Lee (high)	106	36.0	23.3	17.1
3. US Defense Intelligence Agency (low)	96	32.6	21.1	15.5
4. US Central Intelligence Agency	94	31.9	20.7	15.2
5. William T. Lee (low)	93	31.6	20.5	15.0
6. Dmitri Steinberg	81.2	27.6	17.9	13.1
7. USSR State Budget, 1989 basis	48.9	16.6	10.8	7.9
8. Stockholm International Peace Research Institute	48.7	16.5	10.7	7.9
9. USSR State Budget, contemporary basis	17.1	5.8	3.8	2.8

Source: figures in rubles, except rows 1 and 7, are from Noren (1995), 269. For row 1 see Michaud (1990), 120. For row 7 (USSR State Budget, 1989 basis), 48.9 billion rubles based on the defence share of the state budget or 49 billion rubles based on the same share of net material product utilised. 48.9 billion rubles is confirmed by Masliukov and Glubokov (1999), 105. A figure for the share of defence in Soviet GNP that is approximately equivalent to others in the table but for 1977, not 1980, is estimated by Rosefielde (1987), 204, at 16.5 per cent.

Shares of total budget government outlays, net material product (NMP) and gross national product (GNP) are computed on the basis of 294.6, 454.1 and 619 billion rubles from Goskomstat (1987), 629, and Goskomstat (1990), 6 and 15 respectively. For 1980 Masliukov and Glubokov (1999), 105, give the defence share in GNP as 7.4 per cent based on a GNP figure of 661.9 billion rubles; no explanation is given for the 43 billion ruble excess over the official Goskomstat figure of 619 billions. For 1985 to 1987 and 1999 their GNP series follows that of Goskomstat, but there is another unexplained gap in 1988. Since Masliukov and Glubokov give GNP figures to one more decimal place than those released by Goskomstat, and also give GNP figures for 1960 and 1970 that have not been released by Goskomstat at all, it would appear that their information was based on privileged access to Goskomstat data; such figures cannot therefore be easily dismissed. At the same time it is hard to resist the logic of the fact that 661.9 is only a misplaced decimal point and a keystroke away from 619 and that 619 was the intended figure. This suspicion is strengthened by the superior internal consistency of the Goskomstat series: for example, taking the Goskomstat figure for 1980 as a base nominal GNP grew by 25.5 per cent up to 1985, which approximately matches the 25.2 per cent growth in the Goskomstat series for NMP produced over the same period and falls slightly below the 28.3 per cent growth reported for the gross social product; Goskomstat's GNP growth rate also approximately matches the growth over the same period in the alternative series estimated by Steinberg (1990), 168–9 and 228, 26.7 per cent for GNP on an official basis (pp. 168–9) and 24.6 per cent for true GNP (p. 228). In contrast, taking the 661.9 billion figure of Masliukov and Glubokov as a base GNP increased by only 17.4 per cent up to 1985, and this is clearly out of line with all the other estimates available. I thank Byung–Yeon Kim for advice on this matter.

### 3. The Konoplev Report

A new documentary source from the close of the Brezhnev era allows us the chance to put this uncertainty to an end. Unfortunately it is only a chance, because there is a gap in the provenance of the document concerned.<sup>30</sup> As a result we cannot be completely assured that it is genuine. At the same time it is not obvious how anyone might have gained from fabricating it with the aim of engaging in a game of disinformation. Moreover its uniqueness suggests that it did not form part of any campaign or trade in deception.

The document is entitled “Report of the Military–Industrial Commission of the USSR S[upreme Soviet] [and] C[entral] C[ommittee] of the CPSU on the Utilisation of Allocations to Defence for the Quinquennium (1976–1981)”. It is signed by commission chairman B.V. Konoplev; I will refer to it below as “the Konoplev report”.<sup>31</sup> Dated 7 January 1981, the document states that it is presented “with the aim of preparation of the working and reference materials for the report of the C[entral] C[ommittee] to the Congress”, that is, the report that general secretary L.I. Brezhnev would deliver the following month to the twenty sixth party congress. Consistently with this the document is marked as an appendix to some other more substantial document: “*Prilozhenie k No. 2/437–710/VS/TsK*”.

The form of the document is a photocopy of thirteen typewritten pages; evidently the original was archived in a larger file, so each page is numbered twice, once in its internal sequence from 1 to 13, and again in the archivist’s hand from 46 to 58. The document is stamped “*Seriia ‘K’* [Series K]” and “*Sov. sekretno* [entirely secret]”. In keeping with its security classification the document is marked “*Ekz[empliar]* No. 2 [copy no. 2]”.

The report details “expenditures on defence for the quinquennium (1976–1981) by type of the Armed Forces and arms of service, and also data concerning other expenditures associated with provision of the defensive capability of the country, its

---

<sup>30</sup> The provenance of this document, listed under the References as Konoplev (1981), is as follows: Peter Wiles, internationally known for his interest in the measurement of Soviet military spending, received a photocopy of it unsolicited in 1991 or 1992. He shared it privately with a few colleagues including myself and he and I discussed it in considerable detail. Although ignorant of its origin, and despite differences in our interpretation of it, Wiles and I concluded at the time that it was probably genuine. Taking into account the residual uncertainties Wiles resolved not to share the information in the document more widely until either some external confirmation could be found or ten years had passed. Sadly he died in 1997 without the first condition being met, but his ten–year limit has now also expired. Therefore I take the opportunity to release this information into academic circulation so that others may scrutinise and judge it. A scanned image of the copy in my possession is available at

URL <http://www.warwick.ac.uk/fac/soc/economics/staff/faculty/harrison/papers/konoplev.pdf>.

<sup>31</sup> The title in Russian is *Otchet VoЕННО-promyshlennoi komissii VS SSSR TsK KPSS ob ispol’zovanii assignovanii na oborony za piatiletku (1976–1981 gg.)*. In principle other constructions of “*VS SSSR TsK KPSS*” are possible. Thus *VS SSSR* is the abbreviation not only for the USSR Supreme Soviet (*Verkhovnyi sovet*) but also for the USSR Armed Forces (*Vooruzhennye sily*), so the commission might strictly be of the Armed Forces, not of the Supreme Soviet. I read it as the Supreme Soviet on the basis of Konoplev’s known affiliations with the latter. “*TsK KPSS*” could be translated as “to” the Central Committee since the case of *TsK* is indeterminate. Since the Central Committee was an unlikely recipient I read it as “[and of]” the Central Committee, in other words as the report of a temporary joint commission. Thanks to Julian Cooper and R.W. Davies for this suggestion.

strategic interests, and the interests of our allies”. Apart from a few statements of an ideological character (“Thanks to the care of the party and the efforts of the whole Soviet people”, etc.) the document is exclusively descriptive and quantitative and this is where its interest lies. It is organised in eight sections and two appendices that may be listed as follows:

- I. Maintenance of the Armed Forces
- II. Procurement of Weapons, Military Equipment, and Stores
- III. Procurement of Scientific and Technical Products
- IV. Capital Construction and Capital Repair, and Special–Purpose and Residential Construction
- V. Provision of Pensions for Servicemen and Their Family Members
- VI. Maintenance of Armed Forces Within the Provisions of the Organisation of the Warsaw Treaty and Treaties for Mutual Defence
- VII. Maintenance of Soviet Personnel and Establishment of Military Advisers in Foreign States Within the Provisions of Treaties for Friendship and Mutual Aid and Special–Purpose Agreements
- VIII. Partial Repayment of Rent for Utilisation of Air Force Bases and Foreign Ports

Appendix I. [Maintenance of Special Forces ...]

Appendix II. [Expenditures on Payment for Production of Nuclear Weapons ...]

For the most part what is covered under each item is rendered self–explanatory by the more detailed figures that are supplied. In some cases further definition is added elsewhere in the text. We are told in various places that item II, “Weapons, Military Equipment, and Stores”, includes “means for the purchase of atomic munitions” of all kinds with their means of delivery. Item III, “Scientific and Technical Products”, comprises “payment for scientific and technical products produced on the orders of the Ministry of Defence in scientific research institutes and design bureaux of the Ministry of the Aircraft Industry, the Ministry of Medium Engineering, the Ministry of Heavy Engineering, the Ministry of the Radio Industry, and the Chief Administration for Space”. Item VI covers the maintenance of Soviet forces “structurally incorporated in the Organisation of the Warsaw Treaty” and stationed in the northern, central, and southern groups of forces “as well as in particular countries”.

Some further clarification is necessary. The Military–Industrial Commission (*Voенно-промышленная комиссия*) of the USSR Supreme Soviet and CPSU Central Committee is hitherto unknown; it was perhaps a temporary body set up specifically to prepare for the February 1981 party congress. Its title seems almost deliberately confusing since *Voенно-промышленная комиссия* or VPK for short was also the unofficial title of the well known and very important Commission for Military–Industrial Questions of the Presidium of the USSR Council of Ministers, upgraded in 1987 to a State Commission of the USSR Council of Ministers. The latter VPK, the one that really mattered, was the consolidated successor organisation to the Special Committees that created the Soviet nuclear, missile, and radiolocation industries after World War II. The heads of the VPK were D.F. Ustinov followed by L.V. Smirnov (1962 to 1985), Iu.D. Masliukov (1985 to 1987 and 1991), and I.S. Belousov (1987 to 1991).<sup>32</sup> Thus the chief of the VPK in January 1981 was Smirnov, which confirms that the body of which Konoplev was chairman at that time could not have been the VPK about which we already knew.

Konoplev himself was a party official and USSR Supreme Soviet member of long standing. He was first secretary of the regional party committee for the Perm’ oblast’

---

<sup>32</sup> Minaev (1999), 21.

and head of the region's local government. In the Supreme Soviet Konoplev chaired a committee on housing, which seems a long way from defence affairs. On the other hand Perm', formerly Molotov, is a major centre of the defence industry and Konoplev himself was on friendly terms of long standing with defence minister Ustinov and other Politburo members.<sup>33</sup> These circumstances make Konoplev a reasonable choice to take a leading role in scrutiny of the Soviet defence complex.

Some unsolved problems arise from the nature of the scrutiny involved. It is not clear why Konoplev was asked to carry it out or who was meant to read the results. In his memoirs Gorbachev has written that in the period before his leadership "All statistics concerning the military-industrial complex were top secret, inaccessible even to members of the Politburo"; "only two or three people had access to data on the military-industrial complex."<sup>34</sup> According to a military source the true scale of military funding was known to "only four men [...] the General Secretary, the Council of Ministers Chairman, the Minister of Defence, and its Chief of the General Staff".<sup>35</sup> Iurii Masliukov, a leader of the Council of Ministers VPK under Gorbachev, has confirmed that:

Until 1988 summary figures concerning the defence of the country were considered to be a secret of exceptional state importance; a limited circle of people (the leadership of USSR Gosplan and not even all Politburo members) were familiar with them. It was forbidden to reproduce such figures in typing pools, and in documents they were circulated by authorised individuals from hand to hand.<sup>36</sup>

Was the report read beyond this "limited circle"? The version of the document that is available is marked "copy no. 2", so more than one copy was made for official use, but perhaps not many more, and few enough that each was marked by hand.

If the information in the Konoplev report was so sensitive, it is not clear why a joint commission of the parliament and ruling party was appointed to compile it. If the leadership required it, one would have expected the Ministry of Defence to supply it directly. Gorbachev recalls that Ustinov "essentially had monopoly control" over defence information; it was a serious breach of protocol for outsiders, even other Politburo members, to question him.<sup>37</sup> Steinberg, visiting Moscow in 1990/91, confirmed that "the Defence Ministry continues to exercise a complete monopoly on the flow of information in the area of defence finances".<sup>38</sup> Perhaps Konoplev was not an outsider to the defence complex. But his involvement still seems unnecessary.

Finally, it is not clear why the leadership required such sensitive information in order to prepare for a highly public and largely stage-managed occasion such as a party congress.

It follows that we do not fully understand the role of the Konoplev report in the Soviet system of power and information. Consequently, doubts may be raised about its authenticity that are hard to answer.

---

<sup>33</sup> Boris Vsevolodovich Konoplev was alive and well and residing in Perm' as recently as March 2002 when he gave a press interview that provides the information in this paragraph (Konoplev, 2002). I thank Julian Cooper for this reference.

<sup>34</sup> Gorbachev (1996), 136, 215.

<sup>35</sup> Generals V.G. Kulikov and M.A. Gareev writing in *Vooruzheniia, politika, konversiia*, 1993, no. 2, cited by Firth and Noren (1998), 260n.

<sup>36</sup> Masliukov and Glubokov (1999), 105.

<sup>37</sup> Gorbachev (1995), 121, 136, 204.

<sup>38</sup> Steinberg (1992), 244.

Good practice in the authentication and interpretation of historical documents is a principal theme of Richard J. Evans's recent account of his expert testimony to the David Irving trial in the spring of 2000.<sup>39</sup> Reading Evans suggests to me that in the case of the Konoplev report we need explicit criteria of authenticity. This is because we lack the knowledge of provenance, that is, continuous information concerning where a document has been held and who has handled it since the moment it was created, that would normally be decisive. Four tests seem potentially useful:

- a) Originality. Is the document original or a copy? If a copy, is it a mechanical or electronic facsimile or has it been transcribed or retyped? If a copy, is it uniquely identified by a serial number or signature?
- b) Contextual integrity. Is the document complete in itself or are there elements missing? Does the document provide its own context or does the context require to be established by presumption or hypothesis?
- c) Formal comparability. Does the document conform to other documents of the same type in style and presentation?
- d) Corroboration. Does the substantial information in the document find support elsewhere?

In the course of my own research I have handled many hundreds of official documents in former Soviet archives and it must be said that even if I knew nothing of their provenance most if not all that I have seen would get fairly full marks under all four headings. The Konoplev report does not conform to this pattern.

Consider each test. Under *originality* the document we have is not an original but a photocopy of what appears to be a typed or duplicated original. Its security stamp, file reference, copy number, and personal signature are somewhat reassuring: say 7 out of 10. Under *contextual integrity* we have a document that purports to be complete and self-explanatory. However, we do not have the more substantial document to which it was appended and we cannot easily guess what that contained, especially if it was for public consumption or even for limited circulation. Worse, we do not have access to the workings or methodology that produced the figures in it and reconstructing this will require considerable speculation below. Here therefore we do less well, say 6 out of 10. Under *formal comparability* we have an immediate problem: there is nothing very close with which the Konoplev report may be compared. At the same time it has the language and presentation of an official report and again the apparatus of security classification, file number, reference number, signature, and archival repagination are helpful as well as potentially verifiable. It *looks* like an official document that was later officially archived: say 8 out of 10.

Under *corroboration* there is almost nothing. The figures in the Konoplev report are quite different from and much larger than those supplied or estimated by other authorities, and there is no Konoplev-shaped hole left by other data into which the report may easily be fitted. In this sense the Konoplev report is somewhat sensational and this immediately raises a question mark for the simple reason that sensations are very rare in economics. The rarity of sensational discoveries in economics reflects partly the nature of the discipline: in economics everything must fit together, so the first suspect when an outlying figure is found is the reliability of the figure itself. Under corroboration, then, *nul points*.

Total score:  $7 + 6 + 8 + 0 = 21$  out of a possible 40, about what one would get by tossing a coin.

---

<sup>39</sup> Evans (2002).

#### 4. Plan or Outcome?

The Konoplev report provides ruble figures for defence outlays of two kinds. First is the figures shown in table 2. They break the cumulative total for the period of the tenth five-year plan, 1976 to 1980, down into annual figures, one for each year of the *piatiletka* plus one that is presumably the planned figure for 1981; a result of this is that the report's title oddly covers not five but six years. The reader should note right away that the annual figures in table 2 are very large; that for 1980 is larger than anything in table 1 by a factor of more than 50 per cent. Second, the report provides more detailed figures under the eight items and two appendices that are listed above, except for pensions, but these are five-year totals without an annual breakdown. They are shown in Appendix 2.

Within all these figures there are puzzles. Some are of the adding-up and rounding kind; they lead to minor internal inconsistencies or are purely trivial. They are disconcerting all the same. We think of good bureaucrats as taking pride in detail. Dictators in particular have reason to be intolerant of sloppiness since their main problem is often to have accurate knowledge what their subordinates are really doing when they look as if they are loyally carrying out orders. Under Stalin a casual attitude to the facts might easily have fatal consequences.<sup>40</sup>

Other puzzles are more significant because no internal inconsistency arises as a result, but the figures given are clearly too proportional or too smooth. Table 2 gives the annual figures into which the quinquennial total of defence spending is broken down. In 1977, 1978, and 1979 each annual figure increases over the year before by exactly 6.36 billion rubles. In 1980 it increases by 12.77 billion rubles which is almost exactly twice the increment in the preceding years; the sudden acceleration is plausible given that the Soviet Union invaded Afghanistan in December 1979.

*Table 2. Soviet Budget Allocations to Defence, 1976 to 1981 (billion rubles)*

	Total	Change Over Previous Year
1976	133.71	..
1977	140.07	6.36
1978	146.43	6.36
1979	152.79	6.36
1980	165.56	12.77
Total	738.56	..
1981	176.11	10.55

Source: Konoplev (1981), 3.

Then, consider the breakdown of the 738.56 billion quinquennial total “by type of the Armed Forces and arms of service” shown in table 3. The most important percentages are strangely round. For example 295.424 billion rubles in row I, “Maintenance of the Armed Forces”, is *exactly* 40 percent of the total. And the same is true down to item IV, by which time we have accounted for *exactly* 85 per cent of total outlays on defence.

<sup>40</sup> See for example documents relating to the fate of Gosplan chief N.A. Vozensenskii, alleged to have engaged in covering up a plan failure in 1949, provided by Khlevniuk et al. (2002), 274–85.

If we look more closely at the various subdivisions we find the same thing repeated. Table 4 shows how maintenance is broken down among the various arms of service and categories of troops. Again we find, for example, that the ground forces' maintenance accounted for *exactly* 25 per cent of total maintenance, and that the air defence forces' maintenance accounted for *exactly* 15 per cent of that of the ground forces. And so on.

A few figures do not fit this template. In table 4, for example, below item IV figures for pensions, the costs of Warsaw Treaty forces' maintenance, and the rent of foreign bases are rounded in rubles but not per cent; the costs of foreign advisers' maintenance are unrounded in both columns.

In short, what are we looking at? Certainly, we are *not* looking at an accurate account of *ex post* expenditures, because no such complex budget in the history of the world has ever been fulfilled in such exact proportions. Instead, it seems likely that these figures were compiled on some other basis.

*Table 3. Soviet Budget Allocations to Defence, 1976 to 1980, by Category of Expenditure (billion rubles)*

	Billion Rubles	Per Cent of Column Total
I. Maintenance of Armed Forces	295.424	40
II. Procurement of Weapons, etc.	184.840	25
III. Procurement of Scientific and Technical Products	73.855	10
IV. Capital Construction	73.855	10
V. Pensions	4.000	0.54
VI. Maintenance of Armed Forces under the Warsaw Treaty	55.000	7.44
VII. Maintenance of Foreign Advisors, etc.	7.286	0.86 <sup>a</sup>
VIII. Rent of Foreign Facilities	44.500	6.25 <sup>b</sup>
Total	738.560 <sup>c</sup>	100 <sup>c</sup>

<sup>a</sup> 7.286 billion rubles is 0.99 per cent of the total given.

<sup>b</sup> 44.5 billion rubles is 6.03 per cent of the total given.

<sup>c</sup> The row totals should be 738.76 billion rubles and 100.09%, not the 738.56 billion and 100% totals given.

Source: Konoplev (1981), 3. For further explanation of row titles see the text.

One possibility is that the Konoplev report reveals the implementation of a planning algorithm for which Wiles invented the name of “top-down disaggregation”. Was this how it worked? Suppose the Politburo first set the overall budget allocation to defence in rubles. Then, perhaps, the defence ministry distributed the overall sum across the major and minor headings using conventional rules of thumb: thus it allocated 40 per cent to “maintenance of the armed forces”, of which 35 per cent was disbursed to the strategic missiles troops, and so on. In this way one might imagine a cascade of percentages spreading the flow of cash out into a widening stream as it descended each level of the administrative hierarchy. Such an allocative mechanism could cope with distributing resources to the main demands on the ministry. However, some items were driven by exogenous demands that are awkward because they do not fit: pension entitlements, for example, reflected the

demographic profile of past cohorts of military personnel and so had to be fixed as a round ruble figure, not a round percentage. Finally the internal algorithm, combined with the exogenous drivers, left residual funding for residual items. This hypothesis sufficiently explains the oddities that we see.<sup>41</sup>

*Table 4. Soviet Budgetary Allocations to Defence, 1976 to 1980: Maintenance of the Armed Forces, by Arms of Service (billion rubles and per cent)*

Branch [Sub-Branch]	Billion Rubles	Per Cent of Column Total [of Branch Subtotal]	
Strategic Missile Forces	103.398	35	
Ground Forces	73.856	25	[100]
[Missile Forces]	[11.816]	..	[16]
[Air Defence Forces]	[11.078]	..	[15]
[Motorised Rifle Forces]	[14.771]	..	[20]
[Armoured Forces]	[17.725]	..	[24]
[Engineering Forces]	[5.169]	..	[7]
[Artillery Forces]	[5.908]	..	[8]
[Communications Forces]	[4.431]	..	[6]
[Special Forces]	[1.477] <sup>a</sup>	..	[4]
Air Force	64.993 <sup>b</sup>	22	[100]
[Long-Range Aviation]	[19.479]	..	[30]
[Frontal Aviation]	[31.167]	..	[48]
[Military Transport Aviation]	[14.285]	..	[22]
Navy	53.176	18	[100]
[Surface Fleet]	[21.270]	..	[40]
[Submarine Fleet]	[23.929]	..	[45]
[Naval Aviation]	[7.976]	..	[15]
Total	295.424	100	

<sup>a</sup> The figure of 1.477 billion rubles is exactly half that required to balance the total of 73.856 billion rubles shown for ground forces' maintenance, and to yield a share of 4 per cent in the latter. For an alternative figure see table 2.8.

<sup>b</sup> The figures shown for the composition of the air forces' maintenance sum to 64.931 billion rubles, not the 64.993 billion given by the source, and their given percentages match the corrected total, not that shown.

Source: Konoplev (1981), 4.

An alternative explanation is that the compilers of the Konoplev report were not at all close to the allocation process, as the first possibility might suggest, but on the contrary had been kept away at a respectful distance. Perhaps Konoplev's researchers had limited leverage with which to command information; if so, they might have

<sup>41</sup> In particular, it implies that the  $\alpha_{ij}$ s in table A-1, column (4) could be interpreted as planning ratios fixed by the Ministry of Defence.

extracted ruble magnitudes for overall defence spending from the Ministry of Finance but got a cool reception at the General Staff. Perhaps the Ministry of Defence chose to withhold exact information about ruble values of many items, and instead provided only rough percentages from which Konoplev's team then had to work backwards to yield ruble sums.

Of these two possibilities my money is on the second. It corresponds more closely with the institutional realities. A precedent exists in a monograph on military budgeting for World War II published by the USSR Ministry of Defence in 1967 in a limited-circulation edition.<sup>42</sup> The latter shows us the cautious style in which the Ministry of Defence engaged in partial revelation even within the restricted boundaries of circulation to a privileged group of officials. In it we find a skeleton of ruble aggregates, percentage shares, and index numbers somewhat similar to that of the Konoplev report, one from which the attentive reader might construct an approximation, but no more, to the statistical truth.<sup>43</sup>

## 5. What the Figures Mean

### 5.1. The Konoplev Gap

Let us turn from the internal logic of the Konoplev figures to their consistency with what is more widely thought to have been the case. As soon as we do this we come up against their sheer size. Does anything in the report permit them to be easily reconciled with the lower figures of Masliukov and Glubokov, the western intelligence agencies, and the scholarly estimates that are in circulation?

Think of the "Konoplev gap" as the difference between the figures for 1976–80 in the Konoplev report and those suggested by the Soviet defence budget in 1989 revealed by Masliukov and Glubokov. Table 5 shows that on an annual average basis the Konoplev gap was somewhat more than 70 billion rubles. This is a purely nominal gap which allows for neither inflation nor real changes between the two periods. Considered by category of expenditure, 21 billion rubles of the gap are accounted for by items VI to VIII which were clearly omitted from the 1989 figures and possibly no longer very significant in that year. Another 10 billion rubles are accounted for by a lower level of capital construction in 1989 which is not implausible in so far as construction tends to be volatile in all economies and systems. The mystery component and largest single source of the Konoplev gap is apparently nearly 40 billions of extra outlays on the maintenance of the armed forces.

Further light is thrown on the sources of the gap by the distribution of outlays across arms of service. Table 5 shows that, while the gap is distributed across all branches, more than half is accounted for by a single branch: "other forces", that is, the strategic missile forces.

Any attempt to explain the larger differences between the figures in the Konoplev report and the official figures more recently circulated should begin with the Konoplev figure for maintenance of the strategic missile forces which, at 103 billion rubles over five years, is one of the largest subtotals under any heading in the entire document.

---

<sup>42</sup> Terpilovskii (1967). This volume is marked "*dlia sluzhebnogo pol'zovaniia* [for official use]".

<sup>43</sup> Doe (1982) and Harrison (1990).

Table 5. *The Konoplev Gap (billion rubles)*

	Konoplev, 1976–80 Annual Average	Masliukov & Glubokov, 1989	Konoplev Gap
	(1)	(2)	(3)
<i>By Category of Expenditure</i>			
I. Maintenance of Armed Forces	59.1	21.0	38.1
II. Procurement of Weapons, etc.	37.0	35.2	1.7
III. Procurement of Scientific and Technical Products	14.8	14.3	0.5
IV. Capital Construction	14.8	4.0	10.8
V. Pensions	0.8	2.6	-1.8
VI. Maintenance of Armed Forces under the Warsaw Treaty	11.0	..	..
VII. Maintenance of Foreign Advisors, etc.	1.5	..	..
VIII. Rent of Foreign Facilities	8.9	..	..
<i>By Arm of Service</i>			
Ground Forces	31.2	21.0	10.2
Navy	21.1	12.1	9.1
Air Force	24.8	12.3	12.5
Other Forces	47.6	16.8	30.9
General Provision	22.9	14.1	8.8
Residual	..	1.1	..
Total	147.7	77.3	70.4

Source: By category of expenditure, column 1 figures computed from table 3 adjusted to annual average; column 2 computed from the total given by Masliukov and Glubokov (1999), 105, and shares in the total on page 114. By arms of service, column 1 figures for items I to IV by arm of service computed from tables 2.1 to 2.4 and adjusted to annual average; column 2 computed from from the total given by Masliukov and Glubokov (1999), 105, and shares in the total on page 116, but note that these shares sum to less than 100 per cent. All rows, column 3 is column 1 less column 2.

It is surprising that maintenance should turn out to be the main source of the Konoplev gap. This is because it is widely thought that the greatest understatement of Soviet defence costs arose from the issuing of subsidies to defence industry and defence industry suppliers, which hid the true cost of weapons and equipment in civilian budgets. Thus Christopher Davis notes that the Soviet Ministry of Defence “was able to purchase substantial quantities of goods and services with modest official budget allocations as a result of its ‘heavy ruble’ [...] a defence ruble could

buy three to four times as much more machinery and equipment than a civilian ruble".<sup>44</sup>

How heavy was the defence ruble? On the 1989 budget basis Soviet weapon procurement in 1988 was 34.2 billion "heavy" rubles. The largest single item of "hidden" defence costs that Steinberg identified in Soviet budgetary outlays of 1988 was direct subsidies to the defence industry worth 20.4 billion rubles. To these may be added 3.8 billion rubles of cross-subsidies from civilian to defence activity within the defence industry, and also 20.5 billion rubles of subsidies from the defence industry's suppliers, making 78.9 billion "light" rubles as the true resource cost of weapons and military equipment procured in that year.<sup>45</sup>

Comparing these figures suggests that 1 heavy ruble was worth 2.3 light, that is unsubsidised rubles. But this is not nearly enough to explain the difference between the Masliukov–Glubokov figure for 1980 of 48.9 billion rubles and Konoplev's 165 billion rubles. Nor does it help at all to explain the composition of the Konoplev gap. For there is no gap between Konoplev for 1976 to 1980 and the Masliukov–Glubokov figures for 1989 in weapons and equipment. The gap is all in maintenance and construction.

This has led Julian Cooper to ask whether the spending figures in the Konoplev report are in fact based "not on actual prices but on some form of *smetnyi* [estimate] prices [...] It is almost as if the *smetnyi* prices used by K[onoplev] were based on relative prices in dollars, not rubles".<sup>46</sup> On this line of thinking we should treat the Masliukov–Glubokov figures as truthful in their own terms, and explain the discrepancies thrown up by the Konoplev figures as the result of a repricing exercise using dollar weights. Machinery was expensive in the Soviet economy but cheap in the United States, and Soviet conscripts were cheap relative to expensive American volunteers. The Soviet armed forces used relatively more of the cheap factor, labour, and less of machinery which was the costly factor. Any revaluation of Soviet military spending in dollars would thus be vulnerable to an upward substitution bias that would inflate both total Soviet military spending relative to US military spending and also the expenditure share of soldiers' pay and maintenance.

I agree that this hypothesis could be set out in such a way as to sufficiently explain the size and distribution of the Konoplev gap. I see two obstacles, however. First, it has no foundation in the document itself, which does not mention prices, and specifies only that figures are measured in either "billions of rubles" or percentages of the military budget. Second, to the extent that they increased the size of the figures involved such calculations ought to have been kept even more secret than the true military budget at established prices; they would surely have been circulated only within a closed circle of experts and kept well away from a pre-congress report. Thus, on present information it is impossible to confirm this interpretation.

## 5.2. The "True" Military Burden?

Taken at face value, can the figures in the Konoplev report be used to estimate the Soviet military burden? The military burden is best measured as the proportion of national income that is allocated to military uses. To be meaningful it must satisfy tests of both internal and external consistency. Internal consistency requires that military spending is measured in the same prices that are used to compute the national income. External consistency requires that its coverage conforms to internationally accepted standards of defence accounting.

---

<sup>44</sup> Davis (2002); see also Firth and Noren (1998), 190.

<sup>45</sup> Steinberg (1992), 240, 246, 256 ("cost padding") and 258 ("price discrimination").

<sup>46</sup> Personal communication, 11 September 2002.

A first pass at the problem is shown in table 6, the first row of which compares defence outlays from the Konoplev report with official figures for Soviet government outlays and the Soviet net material product utilised, all at established prices. The share of defence in government spending is shown to have fallen at first, then to have stabilised at around 60 percent. The share of national income is shown at more than one third and rising; it gained more than two per cent of national income within five years.

*Table 6. Soviet Budget Allocations to Defence, 1976 to 1981, Unadjusted (billion rubles and per cent)*

	Billion Rubles	Per Cent of	
		Total Government Outlays	NMP utilised
1976	133.71	59.0	34.9
1977	140.07	57.7	35.1
1978	146.43	56.3	34.8
1979	152.79	55.3	35.3
1980	165.56	56.2	36.5
1981	176.11	56.8	37.2

Source: Budget allocations in rubles are from Konoplev (1981), 3. Figures for total government outlays and NMP in 1976 to 1979 are from TsSU (1981), 522 and 380 respectively, and in 1980 and 1981 from TsSU (1982), 562 and 418.

However, these ratios do not satisfy either internal or external consistency tests. The net material product was computed using established prices which mixed “light” and “heavy” rubles.<sup>47</sup> The Konoplev figures may have used both light and heavy rubles, but in a different mixture to the economy as a whole, or they may have used light rubles only, or they may have used some other kind of estimate rubles, perhaps dollar-related. None of these provides internal consistency; in the case of light or estimate rubles the percentages in the table are all inflated.

If the Konoplev figures turned out to be measured in light rubles or unsubsidised prices then it would make sense to go a step further. In principle the unsubsidised prices of defence goods and services may be close to their “basic” prices or factor costs. In this case the Konoplev figures would be directly comparable with GNP at factor cost. Table 7 shows the comparison.

In this table GNP is larger than NMP because GNP counts all final goods and services whereas NMP counts only intermediate services that are purchased by sectors making final goods. However, GNP at factor cost is less than at established prices because net indirect taxes must be removed to find value added.

For external consistency defence also needs to be redefined. Not everything in the Konoplev report qualifies for defence spending under the GNP system of accounts. Table 7 shows the adjustment. We leave in items I to III which cover the maintenance and equipment of the Soviet armed forces and military R&D respectively, and also item VI and VII which cover the maintenance of Soviet forces assigned to the Warsaw Treaty Organisation and of foreign advisors. Other items go. Military capital

<sup>47</sup> The Ministry of Defence monopoly of disaggregated defence information also prevented the statistical administration from accounting consistently for defence flows (Steinberg, 1992: 244).

construction (item IV) is omitted because, unlike weapons that can only be used in military operations and then for destruction, not production,

the airfields, docks or other facilities used as bases [for such weapons] can be used with little or no modification for quite different purposes of a non-military nature. Very often such facilities are shared between military and civilian use. Moreover, the manner in which the facilities are utilised is essentially the same whether they are used by military personnel or others.<sup>48</sup>

Military pensions (item V) go because they represent a welfare obligation incurred as a result of past spending, not a current allocation to defence. And the rent of foreign facilities (item VIII) must go by analogy with item IV. When these corrections are made the defence allocation for 1980 on an SNA basis emerges at 138 billion rubles rather than the 166 billion rubles given by Konoplev.

*Table 7. Soviet Budget Allocations to Defence in 1980: Adjustment to SNA Basis (billion rubles and per cent)*

Defence Allocation	165.6
<i>less</i> Adjustment to SNA Basis	
IV. Capital construction	-16.6
V. Pensions	-0.9
VIII. Rent of Foreign Facilities	-10.0
Adjustment, Total	-27.4
Defence Allocation, SNA Basis	138.1
Per cent of	
NMP at Established Prices	30.4
GNP at Established Prices	22.3
GNP at Factor Cost	24.6

Source: The budget allocation to defence in rubles is from Konoplev (1981), 3. For adjustment of Soviet defence outlays to SNA (System of National Accounts) basis see the text; annual subtotals for items IV, V, VII, and VIII in 1980 are the quinquennial subtotals multiplied by the ratio of overall defence outlays in 1980 to the quinquennial total, i.e. by  $165.56 \div 738.56$ . NMP and GNP at established prices in 1980 are 454.1 billion rubles from table 6 and 619 billion rubles from Goskomstat (1990), 6. GNP at factor cost is 560.8 billion rubles being 619 billion rubles at established prices multiplied by 0.906; the latter is the ratio of GNP at factor cost to the same at established prices estimated by the CIA (1990), 114–15, for 1982..

This “narrow” classification of defence takes us in exactly the opposite direction from those who advocate broadening the definition of Soviet defence-related activity, sometimes to the point where most of the Soviet economy is seen as geared to military needs.<sup>49</sup> But, as the compilers of the SNA make clear, grey areas involving defence are not a uniquely Soviet problem. Every economy has systems and activities that serve more than one purpose; while they add to the economy’s military potential

<sup>48</sup> CEC et al. (1993), 146. More detail on the content of defence under the Classification of Functions of Government is contained in UN (2000), 43–44.

<sup>49</sup> For example Epstein (1990).

they add to its productive potential as well, and therefore should not be classified as consumed by defence.

If the prices in the Konoplev report have any meaning in this context, table 7 puts the Soviet military burden in 1980 at one fifth to one quarter of national income on a GNP basis. This figure is not wholly without support from other sources, but the support is very weak. Gorbachev recalls that on coming to power in 1985 he found military spending to be “not 6 per cent but 20 per cent of the gross national product”, but this figure has no foundation in the revelations of the *glasnost*’ era and its basis has never been made clear.<sup>50</sup> Steinberg’s final estimate of the Soviet military burden was 20 to 21 per cent of GNP in 1987 and 1988, but this figure included the full range of “hidden” defence costs some of which would have no place in a narrow definition of defence, for example the costs of mobilisation preparations and foreign aid.<sup>51</sup>

A military burden of even one fifth of national income measured on a narrow basis is very large by peacetime standards. To find equivalent figures for other major economies we have to go back to the early years of World War II. For example, in 1939 Germany’s military burden stood at 23 per cent of national income at market prices and Japan’s at 22 per cent; both figures doubled and tripled in the course of the war. Italy’s had reached 23 per cent by 1941, but this proved to be a wartime peak. Between 1939 and 1940 the military burden on the UK economy measured on a comparable basis jumped from a lower figure, 15 per cent, to a higher one, 44 per cent, while the Soviet military burden, 17 per cent in 1940, rose to 28 per cent in 1941 when both defence outlays and GNP were measured at prewar factor costs. The US military burden rose from 11 to 31 per cent at market prices between 1941 and 1942.<sup>52</sup> In short, the level of outlays suggested by the Konoplev report appears to be without precedent for a major power without immediate plans for waging aggressive warfare or defending itself against immediate attack.

## 6. Conclusions

Our understanding of the role of the military budget in the allocation of Soviet resources has been considerably expanded by recent historical studies based in the archives. But our understanding of the influence of the military burden on Soviet economic performance, including its record of growth, slowdown, and collapse, remains fuzzy to say the least. To make matters worse, we do not have good measures of the size and trend of the burden itself. We know it was large but we do not know how large. We know it mattered but we do not know exactly why.

The new evidence provided by the Konoplev report indicates that the military burden was much larger than was previously supposed, even on the basis of the most hawkish of western estimates. Taking interpretation to the limit of what is possible, the report indicates a military burden on Soviet resources in 1980 of more than a fifth of GNP. This is a very high figure, perhaps unprecedented by historical peacetime standards. However, it is too soon to be confident of the authenticity and reliability of the report itself. Until its authenticity is confirmed and its purposes are clarified our judgement should remain in suspense.

---

<sup>50</sup> Gorbachev (1995), 215. It would be surprising if Gorbachev had been given any figures computed on a GNP basis as early as 1985.

<sup>51</sup> Steinberg (1992), 239.

<sup>52</sup> Figures from Harrison (1998), 21.

## Appendix 1

The simplified input–output table presented below allows us to define how budget allocations co–determined the overall allocation of resources. First, think of the economy as comprised of four sectors producing (1) specialised consumables: goods and services that could not be used except for consumption, for example food, clothing, and entertainment, (2) general–purpose products: goods and services that could be used equally in production and consumption such as industrial and building materials, fuel and power supplies, transport services, information and communications equipment, light automobiles and parts, electrical components and fittings, furniture, office supplies, and stationery, (3) specialised machinery: goods such as industrial and military equipment, often produced in the same industrial facilities, that could only be used in production or the defence sector, and (4) military services, the specialised task of the armed forces.

The northeastern square of the table is the inter–industry matrix; for simplicity intra–industry transactions are netted out. Column (5) then shows the total intermediate demands for each category of product just as row (5) shows total intermediate consumption by each sector.

Second, final uses are set out to the right of the inter–industry matrix in columns (6) civilian consumption, (7) civilian investment, and (8) military spending. Civilian consumption depended on the wage incomes of households, and investment and military spending were the most important aggregates fixed by the state budget. The subtotal of these three makes column (8) total final demand or GDP.

Third, when we add together columns (5) total intermediate demands and (8) total final demands we finally reach the level at which the economy was planned, that is column (9) the gross output of each sector.

**Proposition 1.** *Budgetary allocations to defence and investment closed the allocation of resources and determined household consumption as a residual.*

This framework defines the role of the state budget as follows. The vector of supply

plans for gross output  $\begin{bmatrix} X_1 \\ X_2 \\ X_3 \end{bmatrix}$  of the material production sphere was not sufficient to

allocate resources among final uses. This is because it left two things undetermined: the allocation of general–purpose products among intermediate and final uses, and the allocation of all products to final military use. Budget allocations to final demand  $[I \ M]$  closed the system, fixing civilian consumption as a residual. Specifically,

$$C = (1 - \alpha_{21}) \cdot X_1 + X_2 + (1 - \alpha_{23}) \cdot X_3 - I - (\alpha_{14} + \alpha_{24} + \alpha_{34}) \cdot M$$

i.e. civilian consumption rose with  $\begin{bmatrix} X_1 \\ X_2 \\ X_3 \end{bmatrix}$  and fell as  $[I \ M]$  rose. In words,

households were able to consume the output of consumables not claimed for military services, plus the output of general purpose goods not claimed for production by the producers of consumables and machinery or for investment or for military services.

**Proposition 2.** *The conscript wage consistent with an overall macroeconomic equilibrium was associated positively with supply plans for civilian output, negatively with budgetary allocations to defence and investment, negatively with the civilian reservation wage, and negatively with the labour intensity of military services output.*

The totals of intermediate inputs shown in row (5) and columns (1) to (4) of table 2 may be transposed to column (11) and rows (1) to (4) and subtracted from column (10) gross output to yield column (12) value added in each sector or its contribution to GDP. But value added is divided between wages and profits; this is shown in rows (6) and (7). Think of labour inputs multiplied by wage rates to fix the wage bill of each sector, leaving profits as a residual. These profits were taxed away to create the revenues matching the state budget outlays. The sum of rows (5) to (7) is once again row (8) the gross outputs of the economy.

Suppose that workers in civilian sectors were retained by receipt of a reservation wage  $w_R$ . Military services, on the other hand, were supplied by conscripts who were retained by fear of punishment if they left; they were paid a lower conscript wage  $w_C$ . The condition of an equilibrium in the market for consumer goods imposed limits on what the authorities could pay their conscripts; on the simplifying assumption that households spent all their income the equilibrium conscript wage  $\hat{w}_C$  could be defined as follows:

$$\hat{w}_C = \frac{(1 - \alpha_{21} - w_R \lambda_1) X_1 + (1 - w_R \lambda_2) X_2 + (1 - \alpha_{23} - w_R \lambda_3) X_3 - I}{\lambda_4 M} - \frac{\alpha_{14} + \alpha_{24} + \alpha_{34}}{\lambda_4}$$

That is the equilibrium conscript wage was positively associated with supply plans of the three civilian sectors but negatively associated with budgetary demands, with the civilian reservation wage, and with the labour intensity of military services output.

Table 1.1. Soviet Supply Plans and Budget Allocations in an Input–Output Framework

	To:	(1) Specialised Consum- ables	(2) General Purpose Goods	(3) Specialised Machinery	(4) Military Services	(5) Total Inter- mediate Demand	(6) Civilian Con- sumption	(7) Civilian Invest- ment	(8) Military Outlays	(9) Total Final Demand	(10) Gross Output	(11) Total Intermediate Inputs	(12) Value Added
From:													
(1) Specialised Consumables		–	–	–	$\alpha_{14}X_4$	$A_1$	$C_1$	–	–	$F_1$	$X_1$	$\alpha_{i1}X_1$	$V_1$
(2) General Purpose Products		$\alpha_{21}X_1$	–	$\alpha_{23}X_3$	$\alpha_{24}X_4$	$A_2$	$C_2$	$I_2$	–	$F_2$	$X_2$	–	$V_2$
(3) Specialised Machinery		–	–	–	$\alpha_{34}X_4$	$A_3$	–	$I_3$	–	$F_3$	$X_3$	$\alpha_{i3}X_3$	$V_3$
(4) Military Services		–	–	–	–	–	–	–	$M_4$	$F_4$	$X_4$	$\alpha_{i4}X_4$	$V_4$
(5) Total Intermediate Inputs		$\alpha_{i1}X_1$	–	$\alpha_{i3}X_3$	$\alpha_{i4}X_4$	$A$	–	–	–	–	–	$A$	–
(6) Wages		$w_R\lambda_1X_1$	$w_R\lambda_2X_2$	$w_R\lambda_3X_3$	$w_C\lambda_4X_4$	–	–	–	–	–	–	–	$W$
(7) Profits		$\Pi_1$	$\Pi_2$	$\Pi_3$	$\Pi_4$	–	–	–	–	–	–	–	$\Pi$
(8) Total Outlays		$X_1$	$X_2$	$X_3$	$X_4$	–	$C$	$I$	$M$	$F$	$X$	–	$V$

*Key to Table 1.1*

$X = \sum_i X_i$  is total gross output of the economy;  $X_i$  is gross output of the  $i$ th industry and  $X_i = A_i + F_i$ .

$A = \sum_i A_i$  is total intermediate demand in the economy;  $A_i$  is total intermediate demand for output of the  $i$ th industry,  $A_i = \sum_j \alpha_{ij} X_j$ , and  $\alpha_{ij}$  is the sale of output of the  $i$ th industry to the  $j$ th industry arising from a unit of output of  $X_j$ .

$F = \sum_i F_i$  is total final demand or national income;  $F_i$  is the final demand for output of the  $i$ th industry and  $F_i = C_i + I_i + M_i$ .

$V = \sum_i V_i$  is total value added or national income;  $V_i$  is value added by the  $i$ th industry,  $V_i = X_i - \sum_j \alpha_{ji} X_j$ , and  $V = F$ .

$C = \sum_i C_i$  is total final civilian consumption;  $C_i$  is the output of the  $i$ th industry that is consumed.

$I = \sum_i I_i$  is total final civilian investment;  $I_i$  is the output of the  $i$ th industry that is invested.

$M$  is total final outlays on military services;  $M = M_4 = F_4 = X_4$  is the output of the armed forces.

$W = \sum_i w_i \lambda_i X_i$  is the total wage bill of the economy;  $\lambda_i$  and  $w_i$  are the labour intensity of gross output and the wage rate in the  $i$ th industry respectively.

$\Pi = \sum_i \Pi_i$  is total profit in the economy;  $\Pi_i$  is profit of the  $i$ th industry,  $\Pi_i = V_i - w_i \lambda_i X_i$ ;  $w_4 \lambda_4 X_4 = V_4$  and  $\Pi_4 = 0$ .

## Appendix 2

All tables are from Konoplev (1981); all figures are given as in the source unless otherwise noted.

*Table 2.1. Maintenance of the Armed Forces*

	Strategic Missile Forces		Ground Forces		Air Force		Navy		Total, Billion Rubles
	Billion Rubles	Per Cent of Column Total	Billion Rubles	Per Cent of Column Total	Billion Rubles	Per Cent of Column Total	Billion Rubles	Per Cent of Column Total	
Pay of Service Personnel	20.679	20	18.464	15 <sup>a</sup>	11.698	18	8.508	16	59.349
Other Wages	5.17	5	3.692	5	2.599	4	3.722	7	15.183
Food	10.339	10	11.078	15	5.849	9	4.785	9	32.051
Personal Kit	10.339	10	7.385	10	4.549	7	4.254	8	26.527
Payment for and Storage of Fuel and Flammables	6.203	6	8.862	12	10.398	16	7.976	15	33.439
Repair of Weapons, Military Equipment, and Stores	4.135	4	6.647	9	9.099	14	2.658	5	22.539
Transport Costs	3.101	3	2.215	3	1.299	2	0	0	6.615
Power Line Rentals	2.067	2	2.954	4	3.899	6	0	0	8.92
Maintenance of Space Launch Sites and Special-Purpose Ranges, Bases, and Depots	31.019	30	7.385	10	12.998	20	18.611 <sup>b</sup>	35	70.013
Operational, Business, and Other Costs	10.339	10	5.169	7	2.599	4	2.658	5	20.765
Column Total	103.391	100	73.851	90	64.987	100	53.172	100	295.401
Total Given in Source	103.398	..	73.856	..	64.993	..	53.176	..	295.424

Notes: <sup>a</sup> As given in the original; 25 per cent is evidently intended. <sup>b</sup> "Within the borders of the USSR".



*Table 2.4. Capital Construction and Capital Repair, and Special-Purpose and Residential Construction*

	Strategic Missile Forces		Ground Forces		Air Force		Navy		Total, Billion Rubles
	Billion Rubles	Per Cent of Row Total	Billion Rubles	Per Cent of Row Total	Billion Rubles	Per Cent of Row Total	Billion Rubles	Per Cent of Row Total	
Nonresidential Construction	31.412	40	19.463	25	10.899	14	9.342	12	71.116
Residential Construction	..	..	..	..	..	..	..	..	7.006
Column Total	..	..	..	..	..	..	..	..	78.122
Total Given in Source (1)	..	..	..	..	..	..	..	..	77.855
Total Given in Source (2)	..	..	..	..	..	..	..	..	73.855

Note. Total given in source (1) is that given on the same page; (2) is as table 3.

*Table 2.5. Maintenance of Armed Forces Within the Provisions of the Organisation of the Warsaw Treaty and Treaties for Mutual Defence*

	Billion Rubles	Per Cent of Column Total
East Germany	11.000	20
Poland	8.250	15
Czechoslovakia	8.250	15
Hungary	4.950	9
Mongolia	1.650	3
Bulgaria	3.850	7
North Korea	0.550	1
Afghanistan	16.500	30
Column Total	55.000	100
Total Given in Source	55.000	..

*Table 2.6. Maintenance of Soviet Personnel and Establishment of Military Advisers in Foreign States Within the Provisions of Treaties for Friendship and Mutual Aid and Special-Purpose Agreements*

	Billion Rubles	Per Cent of Column Total
Vietnam	0.437	6
Laos	0.072	1
India	0.291	4
South Yemen	0.145	2
North Yemen	0.291	4
Ethiopia	0.364	5
Tanzania	0.145	2
Zambia	0.072	1
Mozambique	0.51	7
Angola	0.582	8
Madagascar	0.072	1
Congo	0.072	1
Nigeria	0.072	1
Benin	0.072	1
Mali	0.072	1
Algeria	0.145	2
Libya	0.655	9
Cuba	2.55	35
Nicaragua	0.582	8
Peru	0.072	1
Column Total	7.273	100
Total Given in Source	7.286	..

*Table 2.7. Partial Repayment of Rent for Utilisation of Air Force Bases and Foreign Ports*

	Billion Rubles	Per Cent of Column Total
Vietnam	8.01	18
North Yemen	6.23	14
Ethiopia	4.00	9
Angola	5.79	13
Syria	1.78	4
Libya	7.12	16
Guinea	1.34	3
Seychelles	1.34	3
Column Total	35.61	80
Total Given in Source	44.50	..

Note. The source states: "the budget was 79% fulfilled".

*Table 2.8. Maintenance of Special Forces*

	Billion Rubles	Per Cent of Column Total
Weapons	0.337	15
Operational-Technical Means	0.561	25
Special-Purpose Ranges	0.898	40
Special-Purpose Equipment	0.449	20
Column Total	2.245	100
Total Given in Source (1)	2.244	..
Total Given in Source (2)	1.477	..

Note. Total given in source (1) is that given on the same page; (2) is as table 4.

*Table 2.9. Nuclear Weapons and Means of Delivery*

	Billion Rubles	Per Cent of Column Total
Intercontinental Ballistic Missiles	12.707	35
Intermediate Range Missiles	9.077	25
Tactical Missiles	5.446	15
Air Launched Missiles	3.63	10
Sea Launched Missiles	3.63	10
Artillery Shells	1.815	5
Column Total	36.305	100
Total Given in Source	36.307	..

## References

- Abelshauser, Werner (1998), "Germany: Guns, Butter, and Economic Miracles", in Mark Harrison, ed., *The Economics of World War II: Six Great Powers in International Comparison*, Cambridge: Cambridge University Press, 122–76
- Anderton, Charles H. (1993), "Arms Race Modelling and Economic Growth", in James E. Payne and Anandi P. Sahu, eds, *Defense Spending and Economic Growth*, Boulder, CO: Westview Press, 55–82
- Barber, John, Mark Harrison, N.S. Simonov, and B.S. Starkov (2000), "The Structure and Development of the Defence–Industry Complex", in John Barber and Mark Harrison, eds, *The Soviet Defence–Industry Complex from Stalin to Khrushchev*, London and Basingstoke: Macmillan, 3–29
- Becker, Abraham S. (1964), *Soviet Military Outlays since 1958*, Santa Monica, CA: The RAND Corporation, RM–3886–PR
- Bergson, Abram (1948), "Russian Defense Expenditures", *Foreign Affairs*, 26(2), 373–6
- Burton, Donald F. (1983), "Estimating Soviet Defense Spending", *Problems of Communism*, 32(2), 85–93
- CEC et al. (1993): Commission of the European Communities, International Monetary Fund, Organisation for Economic Co–operation and Development, United Nations, World Bank, *System of National Accounts 1993*, Brussels/Luxembourg– New York, NY–Paris–Washington, DC
- CIA (1976): United States Central Intelligence Agency, *Estimated Soviet Defense Spending in Rubles, 1970–1975*, SR76-10121U, Washington, DC: US GPO
- CIA (1990): United States Central Intelligence Agency, *Measures of Soviet Gross National Product in 1982 Prices*, Washington, DC: US GPO
- Cooper, Julian (1998), "The Military Expenditure of the USSR and the Russian Federation, 1987–97", in *SIPRI Yearbook 1998*, Stockholm: Stockholm International Peace Research Institute, 243–56
- Davies, R.W. (1958), *The Development of the Soviet Budgetary System*, Cambridge: Cambridge University Press
- Davies, R.W., Melanie Ilić, and Oleg Khlevniuk (2002), "Stalin, the Politburo and Economic Policy", University of Birmingham, Centre for Russian and East European Studies.
- Davies, R.W. (1993), "Soviet Military Expenditure and the Armaments Industry, 1929–33: a Reconsideration", *Europe–Asia Studies*, 45(4), 577–608
- Davies, R.W. (2001), "Making Economic Policy", in Paul R. Gregory, ed., *Behind the Façade of Stalin's Command Economy*, Stanford, CA: Hoover Institution Press, 61–80
- Davies, R.W., and Mark Harrison (1997), "The Soviet Military–Economic Effort under the Second Five–Year Plan (1933–1937)", *Europe–Asia Studies*, 49(3), 369–406
- Davis, Christopher (2002, "The Defence Sector in the Economy of a Declining Superpower: Soviet Union and Russia, 1965–2000", *Defence and Peace Economics*, forthcoming
- Doe, Frank (1982), "Understanding the Soviet View of Military Expenditures", US Defence Intelligence Agency, Paper prepared for the Joint Economic Committee/Congressional Research Service
- Duchêne, Gerard (1987), "How Much Do the Soviets Spend on Defence?", in Carl G. Jacobsen, ed., *The Soviet Defence Enigma: Estimating Costs and Burden*, Oxford: Oxford University Press, 95–115
- Duchêne, Gerard, and Dmitri Steinberg, (1987), "Soviet National Accounts", in Carl G. Jacobsen, ed., *The Soviet Defence Enigma: Estimating Costs and Burden*, Oxford: Oxford University Press, 11–23

- Easterly, William, and Stanley Fischer (1995), "The Soviet Economic Decline", *World Bank Economic Review*, 9(3), 341–71
- Eloranta, Jari (2002), "The Demand for External Security by Domestic Choices: Military Spending as an Impure Public Good Among Eleven European States, 1920–1938", PhD Dissertation, European University Institute, San Domenico di Fiesole
- Epstein, David F. (1990), "The Economic Cost of Soviet Security and Empire", in Henry S. Rowen and Charles Wolf, eds, *The Impoverished Superpower: Perestroika and the Soviet Military Burden*, San Francisco, CA: Institute for Contemporary Studies, 127–54
- Evans, Richard J. (2002), *Telling Lies About Hitler: The Holocaust, History, and the David Irving Trial*, London: Verso
- Firth, Noel E., and James H. Noren (1998), *Soviet Defense Spending: a History of CIA Estimates, 1950–1990*, College Station, TX: Texas A & M University Press
- Gams, E., and V. Makarenko (1990), "Razmyshleniia o rakhodakh obschestva na oboronu, voennom biudzhete i biudzhete ministerstva oborony", *Voprosy ekonomiki*, no. 10 (October), 149–53
- Garvy, George (1977), *Money, Financial Flows, and Credit in the Soviet Union*, Cambridge, MA: Ballinger and National Bureau of Economic Research
- Gorbachev, Mikhail (1996), *Memoirs*, London: Doubleday
- Goskomstat SSSR (1987), *Narodnoe khoziaistvo SSSR za 70 let. Iubileinyi statisticheskii ezhegodnik*, Moscow: Finansy i Statistika
- Goskomstat SSSR (1990), *Narodnoe khoziaistvo SSSR v 1989 godu. Statisticheskii ezhegodnik*, Moscow: Finansy i Statistika
- Gregory, Paul R. (2001); "The Dictator's Orders", in Paul R. Gregory, ed., *Behind the Façade of Stalin's Command Economy*, Stanford, CA: Hoover Institution Press, 11–34
- Gregory, Paul R. (2002), "Why Was Soviet Defense Planning So Far Off the Mark?", University of Houston, Department of Economics
- Harrison, Mark (1990), "The Volume of Soviet Munitions Output, 1937–1945: A Reevaluation", *Journal of Economic History*, 50(3), 569–89
- Harrison, Mark (1996), *Accounting for War: Soviet Production, Employment, and the Defence Burden, 1940–1945*, Cambridge: Cambridge University Press,
- Harrison, Mark (1998), "The Economics of World War II: an Overview", in Mark Harrison, ed., *The Economics of World War II: Six Great Powers in International Comparison*, Cambridge: Cambridge University Press, 1–42
- Harrison, Mark (2002), "Economic Growth and Slowdown", in Edwin Bacon and Mark Sandle, eds, *Brezhnev Reconsidered*, Basingstoke and London: Palgrave, 38–67
- Harrison, Mark, and Byung–Yeon Kim (2001), "Plan, Siphoning, and Corruption in the Soviet Command Economy", University of Warwick, Department of Economics The Warwick Economics Research Paper Series no. 606
- Holzman, Franklyn D. (1980), "Are the Soviets Really Outspending the U.S. on Defense?", *International Security*, 4(4), 86–104
- Kennedy, Paul (1988), *The Rise and Fall of the Great Powers : Economic Change and Military Conflict from 1500 to 2000*, London: Unwin
- Khlevniuk, O.V., I. Gorlitskii [Yoram Gorlizki], L.P. Kosheleva, A.I. Miniuk, M.Iu. Prozumenshchikov, L.A. Rogovaia, and S.V. Somonova, eds (2002), *Politbiuro TsK VPK(b) i Sovet Ministrov SSSR. 1945–1953*, Moscow: ROSSPen
- Konoplev, B.V. (1981), *Otchet Voенно-promyshlennoi komissii VS SSSR TsK KPSS ob ispol'zovanii assignovanii na oborony za piatiletku (1976–1981 gg.)*, typescript photocopy:  
 URL <http://www.warwick.ac.uk/fac/soc/economics/staff/faculty/harrison/papers/konoplev.pdf>

- Konoplev, B.V. (2002), "Bylo tak, kak ia govoriu" and "Zdes' ia ne zabyt", *Novyi kompan'on*, nos 8(204) and 9(205), Perm', 12 and 19 March: URL <http://nk.kama.ru/>
- Kontorovich, Vladimir (1988), "The Soviet Investment Process and Capital-Labor Substitution", in John P. Hardt and Carl H. MacMillan, eds, *Planned Economies: Confronting the Challenges of the 1980s*, Cambridge: Cambridge University Press, 13-27
- Landau, Daniel (1993), "The Economic Impact of Military Expenditures", The World Bank: Washington, DC, Policy Research Working Paper no. 1138
- Lee, William T. (1977), *The Estimation of Soviet Military Expenditures, 1955-1977: an Unconventional Approach*, New York: Praeger
- Lee, William T. (1995), *CIA Estimates of Soviet Military Expenditures: Errors and Waste*, An Intelligence Oversight Study, Washington, DC: American Enterprise Institute for Public Policy Research
- Masliukov, Iu.D., and E.S. Glubokov (1999), "Planirovanie i finansirovanie voennoi promyshlennosti v SSSR", in A.V. Minaev, ed., *Sovetskaia voennaia moshch' ot Stalina do Gorbacheva*, Moscow: Voennyi parad, 82-129
- Michaud, Norbert D. (1990), "The Paradox of Current Soviet Military Spending", in Henry S. Rowen and Charles Wolf, eds, *The Impoverished Superpower: Perestroika and the Soviet Military Burden*, San Francisco, CA: Institute for Contemporary Studies, 111-26
- Minaev, A.V. (1999), "Istoki sovetsoi voennoi moshchi", in A.V. Minaev, ed., *Sovetskaia voennaia moshch' ot Stalina do Gorbacheva*, Moscow: Voennyi parad, 18-35
- Mochizuki Kiichi (1987), "Estimating Soviet Defence Expenditures From National Accounts", in Carl G. Jacobsen, ed., *The Soviet Defence Enigma: Estimating Costs and Burden*, Oxford: Oxford University Press, 117-35
- Noren, James H. (1995), "The Controversy Over Western Measures of Soviet Defense Expenditures", *Post-Soviet Affairs*, 11(3), 238-76
- Overy, R.J. (1994), *War and Economy in the Third Reich*, Oxford: Oxford University Press
- Plotnikov, K.N. (1945), *Biudzheth sovetskogo gosudarstva*, Moscow: Gosfinizdat
- Rosefielde, Steven (1982/87), *False Science: Underestimating the Soviet Arms Buildup. An Appraisal of the CIA's Direct Costing Effort, 1960-1980*, New Brunswick, NJ: Transaction Books, first edn; *False Science: Underestimating the Soviet Arms Buildup. An Appraisal of the CIA's Direct Costing Effort, 1960-1985*, New Brunswick, NJ: Transaction Books, second edn
- Rosefielde, Steven (1990), "Soviet Defence Spending: the Contribution of the New Accountancy", *Soviet Studies*, 42(1), 59-80
- Steinberg, Dmitri (1987), "Estimating Total Soviet Military Expenditures: An Alternative Approach Based on Reconstructed Soviet National Accounts", in Carl G. Jacobsen, ed., *The Soviet Defence Enigma: Estimating Costs and Burden*, Oxford: Oxford University Press, 27-57
- Steinberg, Dmitri (1990a), "Trends in Soviet Military Expenditure", *Soviet Studies*, 42(4), 675-699
- Steinberg, Dmitri (1990b), *The Soviet Economy, 1970-1990: a Statistical Analysis*, San Francisco, CA: International Trade Press
- Steinberg, Dmitri (1992), "The Soviet Defence Burden: Estimating Hidden Defence Costs", *Europe-Asia Studies*, 44(2), 237-63
- Swain, D. Derk (1990), "The Soviet Military Sector: How It is Defined and Measured", in Henry S. Rowen and Charles Wolf, eds, *The Impoverished Superpower: Perestroika and the Soviet Military Burden*, San Francisco, CA: Institute for Contemporary Studies, 93-110
- Terpilovskii, M.V. (1967), ed., *Finansovaia sluzhba Vooruzhennykh Sil SSSR v period voiny*, Moscow: Voenizdat

- TsSU (1981): Tsentral'noe Statisticheskoe Upravlenie SSSR, *Narodnoe khoziaistvo SSSR v 1980 god. Statisticheskii ezhegodnik*. Moscow: Finansy i statistika
- TsSU (1982): Tsentral'noe Statisticheskoe Upravlenie SSSR, *Narodnoe khoziaistvo SSSR. 1922– 1982. Iubileinyi statisticheskii ezhegodnik*. Moscow: Finansy i statistika
- UN (2000): United Nations, *Classification of Expenditures According to Purpose*, New York, NY: United Nations Department of Economic and Social Affairs, Statistics Division, Statistical Papers, Series M No. 84
- Voznesenskii, N.A. (1947), *Voennaia ekonomika SSSR v period Otechestvennoi voiny*, Moscow: Gospolitizdat
- Wiles, P.J.D. (1987), “How Soviet Defence Expenditure Fits into the National Income Accounts”, in Carl G. Jacobsen, ed., *The Soviet Defence Enigma: Estimating Costs and Burden*, Oxford: Oxford University Press, 59–94
- Wiles, P.J.D., and Moshe Efrat, (1985), *The Economics of Soviet Arms (Some Probable Magnitudes)*, London: London School of Economics, Suntory Toyota International Centre for Economics and Related Disciplines
- Wolfson, Murray (1985), “Notes on Economic Warfare”, *Conflict Management and Peace Science*, 8(2), 1–20