

Defence outlays and defence industry in the 1930s*

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In this chapter we aim to show the changing economic significance of defence outlays in the 1930s. This was a decade of rapid rearmament, but its pace and character were highly variable. Phases of rapid progress for the defence sector were interrupted by episodes of difficulty and setback. These phases were not at all synchronised with overall developments in the economy.

Between 1928 and 1940 Soviet real incomes per head of the population rose by roughly 60 percent. There was also substantial change in the structure of production, and the share of industry, construction, and transport rose over the same period from 28 to 46 per cent of net value added.¹ These were turbulent years in which little went smoothly. Until 1928 the Soviet economy was still recovering from World War I and the Civil War. Under the first five-year plan (1928-32) there was rapid industrialisation but real GNP per head rose little because of setbacks in agriculture. Nearly all the interwar growth of average incomes took place under the second five-year plan (1933-7), and especially in what Naum Jasny called the 'three good years' of 1934-6, which were years of good harvests, rapidly rising production, de-rationing of consumer markets, and rising wages and farm incomes.² Under the third five-year plan (1938-42), there was renewed stagnation of incomes until it was interrupted by war in mid-1941.

The defence sector grew rapidly in most of these years, but the evidence advanced below is that real outlays (especially on munitions) grew most rapidly in the early and late 1930s. The 'three good years' on the other hand, were for defence industry years of struggle and tribulation.

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¹ Davies, Harrison, and Wheatcroft, eds (1994), 269, 272.

² Jasny (1961), 14.

What the budget figures show

Reliability of defence data

Between 1931 and 1934, the published Soviet figures for defence expenditure were considerably underestimated. In 1933, the first year of the second five-year plan, the published figure for expenditure of the People's Commissariat for Military and Naval Affairs (NKVM, renamed People's Commissariat for Defence or NKO in 1934) was 1421 million rubles but the true figure was 4299 millions.³

In the 1934 budget the deception continued. The published estimate was 1665 million rubles while the true estimate was 5800 millions.⁴ But in September 1934 the Soviet Union joined the League of Nations; and in November of that year the Permanent Commission on Disarmament at Geneva prepared to adopt a far-reaching document on the publication of military budgets. In November and December Litvinov, the People's Commissar for International Affairs, sent memoranda to Voroshilov asking for new instructions about the data to be submitted to the League; Voroshilov was head of the People's Commissariat for Defence (NKO), into which the People's Commissariat for Military and Naval Affairs (NKVM) had been reorganised in the previous June. In Litvinov's memorandum of 21 December, having received no instructions from Moscow, he pointed out that eight countries, including Britain and France, had already submitted budget documents to the League. Litvinov emphasised that the new procedures would involve 'the publication and submission of far more detailed and full information than we submitted in 1932-3 and require a fundamental change of all our system of publishing data on military expenditure'.⁵

On 4 January 1935, a laconic Politburo decision ruled that in the published report on the 1934 budget 'expenditure on the NKO shall be shown in the sum of 5 billion rubles' and that the estimate for NKO in the 1935 budget should be given as 6.5 billions. This decision was formally confirmed three days later by the Sovnarkom.⁶ The Politburo evidently decided that no useful purpose would be served by continuing the gross concealment of defence expenditure practised in the previous

³ See Cooper (1976), 35 and table 1 below. The figure given for 1933 as the actual expenditure in Davies (1993), 593, was evidently the planned estimate, though this was not stated in the archival source.

⁴ See Cooper (1976), 35, and table 1 below.

⁵ For these memoranda see *Vestnik MID*, no. 3 (61), 1990, 70-1.

⁶ RTsKhIDNI, 17/162/17, 119; GARF, 5446/57/35, art. 23/6ss. The Politburo decision was taken by correspondence. A further Politburo decision by correspondence on February 19 resolved that NKO should prepare data on military expenditure for the League of Nations Yearbook and submit it to the Politburo for approval (RTsKhIDNI, 17/162/17, 104). These documents were not available for the account in Davies (1993), 581-2.

three years. Soviet fears of Japanese aggression in the Far East, with which the United States strongly sympathised, and the victory of Hitler and the National Socialists in Germany, provided adequate justification for the substantial military expenditure, and made it necessary to portray the Soviet Union as a formidable military power.

But this was not yet the full truth. The Soviet authorities were anxious to cover up the fact that they had falsified past published figures for defence expenditure. In a memorandum to Litvinov on 11 March 1935, Voroshilov rejected the proposal from the League that expenditure for the previous three years should be recorded.⁷ Moreover, the data now published for 1934 and 1935 were not the whole truth. A memorandum sent to Molotov from the secret department of Narkomfin, the People's Commissariat for Finance, in January 1935 revealed that the actual expenditure in 1934 amounted to 5355 million rubles not 5000 millions, and that the estimate for NKO for 1935 was 7492 not 6500 million rubles.⁸

Publication and reality finally coincided in the 1936 budget. On 15 December 1935, the Politburo resolved that 'expenditure for NKO shall be shown in the budget in full'.⁹ The same figure for 1936 appears both in the published budget and in the archives -- 14 800 million rubles.¹⁰

A separate issue is the coverage of the defence budget administered by NKVM-NKO. The NKO budget figure, even when truthfully published, did not cover all defence-related expenditure. In all years, separate allocations in the budget covered expenditures on special, convoy and NKVD armies, on strategic stockpiles, and defence-related expenditures in civilian commissariats and in local soviets (for example, on mobilisation planning, civil defence, and military R&D). And the substantial expenditure on investment, working capital and subsidies in the armaments industries continued to appear under the 'national economy' heading in the state budget. On 25 March 1935, a Politburo resolution on 'openness in military expenditure' (the Russian word was *glasnost*) agreed that the military expenditures of the civilian People's Commissariats and local agencies could be reported to the League. But it also insisted that information on investment in the armaments industries should not be provided, except in the case of subsidies to armaments factories in the narrow sense. This was on the plausible grounds that in Western countries private investment in the

⁷ *Vestnik MID*, no. 3 (61), 1990, 76, and the further memorandum from NKO of 4 April (*ibid.*, 79 -- clause 6).

⁸ GARF, 8418/10/148, 5.

⁹ RTsKhIDNI, 17/162/19, 16 (decision by correspondence); the same decision was adopted as a Sovnarkom decree on the following day (GARF 5446/57/38, 183 -- art. 2673/441s).

¹⁰ See Cooper (1976), 35 and table 1 below.

private armaments industry was not reported.¹¹ Thus investment in armaments industries (table 4.10 below) does not form part of the expenditure of the NKO.

So far only patchy information has been traced on defence expenditure under other budget headings. In the 1933 budget, the NKVM appropriation amounted to 4.7 billion rubles, but to this figure may be added other outlays on defence-related items as follows: internal and frontier troops -- 560 million rubles, defence industry investment and subsidies -- 630 million rubles, and defence-related outlays by civilian agencies -- 720 million rubles. Thus the broader defence-related total of 6.6 billion rubles was 40 per cent more than the NKVM subtotal.¹²

Too much should not be made of this point. Except in the years 1931-5, Soviet interwar defence budgets corresponded roughly with a modern western definition of 'defence consumption', and with the measures of defence outlays used in other countries. Other outlays in the broader 'defence-related' category either contributed more to other goals than to defence (for example, the maintenance of large internal security forces the primary task of which was defence of the regime against its internal enemies), or else added to society's ability to sustain a larger military burden in the future through accumulation of fixed assets and the stock of knowledge, rather than contributing to defence in the present. Therefore both consistency and comparability direct our attention first and foremost to the defence budget itself, and only secondarily to wider concepts of defence-related expenditure.

The long-run context

Table 4.1 shows the evolution of defence budget outlays from 1928/29 to 1940. In the first five-year plan period, nominal outlays on defence rose from 880 million rubles in 1928/29 to 4034 million rubles in 1932. At the same time total government spending rose roughly in proportion, so that the defence share, which fell at first, had returned to about 10 per cent by the end of the period. The low point marked in 1931 should not be neglected -- the 7 per cent which our table shows for that year, although much higher than the false figure given out in public, was still the lowest percentage of the whole interwar period. Still, the relative decline of 1930-1 was only temporary, and says more about the growth of government administration and public investment than any absolute decline in the defence sector.

¹¹ RTsKhIDNI, 17/162/17, 159-60 (decision by correspondence).

¹² GARF, 8418/8/137, 11-12 (appendix to Sovnarkom decree dated 5 January 1933). Figures cited by Davies (1993), 593, similarly showed that in January-March 1933 the total allocation to defence purposes was 39.8 per cent greater than the allocation to NKVM. The 1935 budget showed an even higher proportion of non-NKO defence expenditure: GARF, 8418/10/129, 1-2 (decree of Commission of Defence dated 2 April 1935, which does not, however reveal a figure for internal and security troops).

In the early years of the second five-year plan, the proportion of one tenth was maintained. In 1936, however, there was a very sharp increase in the budget share of defence, which rose in one year from 11 to 16 per cent; by 1940, almost one third of the state budget was being allocated to defence, which was now consuming more rubles than the entire state budget of 1934.

The nominal value of defence outlays at currently prevailing ruble prices is not, on its own, particularly interesting (on the other hand, as students of Soviet defence outlays in the 1960s and 1970s are all too well aware, it is certainly a useful start). Knowing how many millions of rubles were expended on defence merely invites the question 'how much is a lot?' The ruble figures give us little impression of underlying change in the scale and cost of defence activity. Nominal values were affected by abrupt changes in the price of goods and services in general and of defence goods in particular. There are various ways of standardising the ruble figures, each of which has its own advantages and difficulties. One obvious method commonly adopted in official documents, already shown in table 4.1, is to compute the defence share of the state budget. But the defence share of the budget requires much interpretation, given the profound changes affecting the role of state finance in the economy as a whole. The share of the state budget in overall economic activity was changing from year to year, and was expanding violently in the first five-year plan period. There are various alternative approaches to the measurement of defence activity in its wider context, each with its own advantages and difficulties.

Real outlays on defence and munitions

Physical indicators

An impressionistic overview of the growth of real resources commanded by the defence budget is provided by tables 4.2 and 4.3. In the 1920s the Soviet Union maintained a regular army and navy of 586 000 (table 4.2). This was a small army, being less than one in a hundred of the potential labour force (the demographic cohort of working age).¹³ There may be some under-counting in so far as these figures do not include the internal security troops of the OGPU-NKVD. Nor do they count the part-time personnel of the territorial army, conscripts engaged in nonmilitary service, or those undergoing military training prior to call-up. In 1926/27 these together would have added 842 000 to the published figure.¹⁴ Of course the military value of these additional numbers was far less than that of the 586 000 regular soldiers. As far as later years are concerned, it is important also to bear in mind that the territorial army units were absorbed into the regular

¹³ For numbers in the labour force (1926/27 -- 83.7m, 1932 -- 88.6m, 1937 -- 89.6m, 1940 -- 100.8m), see Eason (1963), 77.

¹⁴ RGVA, 33988/3/81, 39 (Red Army staff memorandum, 5 August 1927); the authors are grateful to Lennart Samuelson for this reference.

army in 1939. In the case of series A it is not clear whether established or actual strength is intended; the shortfall of series A in 1937 below the census figure of that year shown in series B may reflect recruitment above establishment (it is unlikely to be due to the date of the census, which took place at the beginning of the year).

As table 4.2 shows, the size of the regular armed forces began to grow rapidly after 1931, and numbers more than doubled under the second five-year plan. By 1937 up to 1.7 million men and women were in the ranks (col. 2), almost one in 50 of the labour force. Even so, the rate of growth was about to accelerate again; between 1937 and 1940, the number of regular forces personnel trebled, reaching 4.2 million and one in 25 of the labour force. However, part of the exceptional growth of 1939 and 1940 is explained by absorption of the territorial units into the regular army.

What matters from an economic standpoint is not just the number of soldiers, but the value of the military services which they supplied. This question is usually answered with reference to their opportunity cost, i.e. the wage incomes which armed forces personnel would have attracted in a civilian occupation. In other words, the real value of military services provided by a given number of soldiers tended to rise through time.

At the same time as numbers of service personnel expanded, so too did the supply of weapons and other military stores with which they were equipped. Figures for annual NKO procurement of ground and air weapons from 1930 onwards are now available in somewhat more detail than previously published series, in 18 separate lines of defence products.¹⁵ These figures are combined into an index of the number of weapons supplied to the armed forces, valued at 1937 unit prices, which suggests an increase of more than 20-fold between 1930 and 1940 (table 4.3, col. 1).

It is important to understand the peculiarities of this measure. First, it is an index of defence procurement, not production. The two could differ significantly. Defence procurement was usually less than production by the value of deliveries to industrial stocks of work in progress and finished goods, to industrial testing and experimentation facilities, to the armed forces of the NKVD, and to net exports (e.g. supplies of weapons to Spain in the civil war there, less supplies of warships and other weapons acquired from foreign firms). Because of these factors the relative levels of production and procurement could vary from year to year. However, their long-run trends were unlikely to diverge by much.

Second, as a measure of procurement our index is a short cut at best. It is based on crude numbers more than real values. It combines numbers of fighters, bombers, heavy and light tanks, large- and small-calibre guns, and so on, weighted roughly by relative 1937 unit values. This short cut takes no account of the changing technical level and performance of a fighter aircraft, medium tank, or large-calibre gun (in precisely the same sense as numbers of soldiers tell us nothing about

¹⁵ For these figures see the appendix to Davies, Harrison (1997).

their skills and training). Given that these things generally improved during the period, a number-of-weapons index puts a *lower bound* on our estimate of real growth in munitions procurement. It also omits warships, and so neglects the shipbuilding dimension of interwar rearmament altogether.

Warship construction presents many problems. Available series (gathered from published sources) are reported in table 4.4. They show a more than 40-fold increase in crude tonnage of ships entering service in 1940 compared with 1930 (col. 8). But the series are severely affected by qualitative change, especially the shift in favour of capital warship construction under the third five-year plan, as the striking change in average tonnage of surface ships entering service from 1938 onwards reveals (col. 2). Tonnage entering service was generally highly volatile; for example, more than 40 per cent of deliveries under the whole second five-year plan entered service in a single year, 1936. This reflected in part the construction period required for finished warships, which was both long and variable, resulting in year-to-year fluctuations in work in progress which were large relative to annual value added. A measure of naval shipyard production or value added in shipbuilding would presumably rise much more smoothly. For these reasons we do not try to incorporate shipbuilding into our aggregate measure of munitions procurement.

The number-of-weapons index shown in table 4.3 (col. 1) suggests that the real procurement of munitions nearly doubled from the end of the first to the end of the second five-year plan (1932-7). The pace of change was slow, however, compared with the rates of expansion recorded before and after, when munitions output measured in this way quadrupled in two years (1930-2), and nearly trebled in three (1937-40).

The usefulness of the number-of-weapons index can be pursued in two confrontations. One is a with an index of defence procurements originally computed by Moorsteen and Powell using a variety of indirect evidence to fill the gaps in Bergson's series; the other comparison is with available budget series for defence procurements at currently prevailing prices. In table 4.3 our present estimate (col. 1) is contrasted with the index of Moorsteen and Powell (col. 2). The Moorsteen/Powell index suggests that munitions procurement grew 14 times over the period from 1930-2 to 1937, and 40 times over the decade. It contains a lot of interpolation, so its precise year-to-year movement is not particularly significant, but its level in the early 1930s is very clearly understated because its authors did not know about the official concealment of weapon procurements in those years. Our index shows more modest growth comparing 1937 with 1930, with a far higher proportion of this growth taking place in the early 1930s under the cloak of secrecy. On the other hand, it should be born in mind that our own figures certainly understate the long-run growth of real procurements. Comparing 1940 with 1937 the two indexes are roughly in agreement.

The second confrontation is between volumes and values. In table 4.5 the number-of-weapons index (col. 1) is compared with an index of defence procurements (col. 2) at currently prevailing prices. When real

outlays are divided by nominal outlays, an implicit unit price deflator is the product (col 3). The comparison suggests that from 1930 through to 1933 the unit price of a typical weapon was probably falling; this is consistent with the available evidence of official estimates, and also of heavy downward administrative pressure on industry. After 1933 unit prices began to rise, a trend which persisted until the outbreak of the second world war.¹⁶ Again, we know of particular cases where the prices of existing weapons rose markedly in the mid-1930s, and we can also presume that the price of the typical weapon was rising because the assortment of weapons was shifting rapidly towards much more complicated, costly items. If we take into account the improvement in product technology and complexity over this period, however, the quality-adjusted price level may have been rising more slowly, stable, or even falling.

However it is measured, defence production grew far more rapidly than either GNP or civilian industry. Between 1930 and 1940, the supply of munitions grew many times -- 20-fold or more. Over a slightly longer period, 1928-40, civilian industry value added grew by two and a half times, and GNP doubled.¹⁷ If we confine our attention to the second five-year plan (i.e. comparing 1937 with 1932), the development of these different branches was somewhat more in proportion. The number of weapons supplied doubled, while civilian industry value added, and GNP as a whole, both grew by roughly two thirds.

Official documents also reveal that the main increase in the number of the defence industry's plants and innovation facilities took place between 1927/28 and 1936. At the end of the 1920s a mere 45 establishments were counted in the secret core of the defence industry complex.¹⁸ At the moment of handover from Narkomtiazhprom to the new Narkomoboronprom in December 1936 their number had grown to 183 -- a fourfold increase. There was little further increase in their numbers before the second world war; when Narkomoboronprom was broken up in 1939, 218 factories were transferred to the specialised defence industry commissariats.¹⁹

This picture, too, may be somewhat understated. First, the typical defence establishment of 1936 was certainly much larger and better equipped than its equivalent from the end of the 1920s. What pointed in this direction was not only the normal processes of industrial growth, but also the changing composition of the defence industry, and especially the rise of huge, vertically integrated aircraft production

¹⁶ The result is notably in agreement with the index of munitions procurement prices computed independently by Bergson (1961), 72, which showed 1928 as 60 per cent of 1937, and 1940 as 120 per cent.

¹⁷ Moorsteen, Powell (1966), 622-3.

¹⁸ RGAE, 2097/1/1051, 17-18 (15 November 1929).

¹⁹ For further detail see Simonov (1996), 38-41.

complexes. Second, the growth of the defence industry after 1936 may be understated by the number of factories because the increase of defence orders for weapons and military equipment was so rapid that it could not be met by existing specialised defence producers and resulted in a great increase in subcontracting of defence orders to civilian industry.²⁰

All such figures neglect the great qualitative transformation of the defence industry in the period. But they do tend to confirm the idea of a break in the pace of defence mobilisation in 1935, when the numbers produced of many important types of weapons fell, e.g. rifles, medium and large-calibre artillery, medium tanks, and all aircraft other than fighters. The two issues -- the qualitative transformation of the mid-1930s, and the production break in 1935 -- are closely related. The assortment of weapons and the techniques of production were both in a state of flux.

As far as the product assortment is concerned, fighter aircraft can serve as an example. According to the chief of the aircraft industry, thirteen new types of aircraft were being introduced in 1934 and 1935.²¹ What this meant can be illustrated in the case of fighter aircraft. In 1933 the number of fighter aircraft ordered was 360, of which 321 (90 per cent) were I-5s. By 1935 fighter production had risen to 839, but I-5s had been completely phased out, and now 800 (95 per cent) of the 839 ordered were I-15s and I-16s, none of which were being produced in 1933.²² The I-5 was a biplane with a maximum airspeed of 286kph. The I-15, also a biplane, could attain a maximum of 360kph, while the top speed of the I-16, a monoplane, was faster still at 454kph.²³ The introduction of newer, more sophisticated models of aircraft and tanks with more demanding production requirements goes a long way towards explaining the sudden dip in the number of weapons being produced in 1935 -- partly because of the sharp increase in the value of each weapon, partly because of the disruptive influence of widespread technological restructuring of the production process. To give a single but not untypical example, in 1935 and 1936, when the old TB-3 bomber was being replaced by the new SB and DB-3, planned procurement of bombers was fulfilled by just 26 and 36 per cent in each year respectively.²⁴

In other branches of defence industry the pace of product modernisation was less hectic, but attempts were made to bring about rapid change in process technologies. In 1933 a broad subsector of the defence industry comprising artillery, small arms, ammunition, tank

²⁰ Tupper (1982).

²¹ GARF, 8418/10/31, 52 (14 October 1935).

²² Kostyrchenko (1992), 432-3.

²³ Iakovlev (1979), 24, 32.

²⁴ Simonov (1996), 91-2.

armament, and optical equipment began a changeover to 'production according to Type "B" specifications' (*chertezhi lit. 'B'*), with the aim of setting higher standards of adherence to specifications, uniformity of measures and materials across the range of producers of identical or related products, and interchangeability of parts. Two main benefits were expected to flow from widespread adoption of Type 'B' specifications. One was a great reduction in unit costs. The other was much easier enforcement of product quality standards. The changeover was supposed to be completed in 1935, but in practice was accompanied by much disruption, footdragging from the side of industry, and delay.²⁵

Deflating the value of outlays

Table 4.6 shows alternative estimates of real defence outlays provided by Abram Bergson. He estimated that, if defence outlays are deflated to constant prices of 1937 (col. 1), then by 1937 the real volume of defence activity was 10 times the level of 1928, and that between 1937 and 1940 there was a 2.7-fold further increase. This estimate confirms striking real growth, although not on the scale of the nominal budget figures -- over the same subperiods, the ruble value of defence outlays at current prices rose 20 times and 3 times respectively. However, a Gerschenkron effect is present. Bergson also calculated the series up to 1937 in 1928 prices (col. 3). In 1928, capital was scarce and capital-intensive machinery expensive relative to later years. Since machinery was substituted for labour-intensive goods and services as it became relatively cheaper during the 1930s, series for real outlays based on early-year weights grow more rapidly than the same weighted by late-year prices.

The principles of Bergson's methodology were sound. He attempted to break down nominal defence outlays into their separate components (maintenance of personnel and facilities, the purchase of weapons and military equipment, defence construction costs, and so on), and compiled separate price deflators for each component in order to reevaluate them in prices or costs of a given year. From our point of view one significant disadvantage of Bergson's series is that it was computed only for periodic benchmark years, with no figure for the early 1930s, and did not capture the turning points which would be revealed by annual series.²⁶ It used fruitfully the data available at the

²⁵ These difficulties are attested by a variety of reports and memoranda in RGVA, 4/14/1298, 140-44 (Efimov to Voroshilov, 9 September 1935), 145 (Voroshilov to Piatakov, 2 December 1935), 147 (Kaganovich to Molotov), 150 (Gamarnik to Molotov, October 1935), 151-2 (Efimov to Tukhachevskii and Pavlunovskii, 31 January 1935); RGVA, 4/14/1315, 198-201 (Pavlunovskii to Voroshilov, 4 November 1935).

²⁶ Holland Hunter and Janusz M. Szyrmer have recently produced a new estimate of real defence outlays estimate in annual series between 1928 and 1940 (Hunter, Szyrmer (1992), 41). This estimate therefore

time, but has not proved particularly robust in the light of the archival evidence. This point is best illustrated by the example of defence orders for weapons and military equipment.

Table 4.7 presents the series now available for budget defence outlays over the second five-year plan, distributed among military equipment (weapons and other military stores), construction (barracks and other troop facilities, fortifications, airfields and so on), and maintenance (the the running costs of the armed forces: the pay and subsistence of troops, their personal kit, the costs of military transport, operations, and equipment repairs). This table confirms a near fourfold increase in ruble outlays on the procurement of weaponry between 1932 and 1937, the final years of the first and second five-year plan periods. The figures also show that military equipment was a sizeable proportion of the defence total, usually around one third, but less in particular years such as 1935, and tending to fall towards the end of the period as the demands of modernisation began to yield to the growing urgency of numerical expansion of military personnel.

The deflators which Bergson applied to his estimate of munitions outlays were based on what he thought was happening to input costs and the prices of comparable goods. He used a freehand average of prices for civilian machinery and related material inputs (high-grade steel, rolled nonferrous metal products, and inorganic chemicals), and wages of public sector industrial workers. On this basis, Bergson

fills in the gaps between benchmark years left by Bergson, but contains several disadvantages. Calculated in 'balanced' 1928 prices, it generally confirms a picture of rapid growth (the prices are described as 'balanced' because they are derived from an input/output table after balancing). It shows somewhat less real growth than either of Bergson's (an 8-fold increase over 1928-37, and a 2.3-fold further increase to 1940). This reverse Gerschenkron effect is surprising and implausible. Unlike Bergson, Hunter and Szyrmer did not disaggregate defence outlays and deflate the components independently. Instead, they simply deflated total nominal defence outlays by an index of wages of engineering workers, with the intention 'to capture at least most of the inflation in the cost of military equipment' (Hunter, Szyrmer (1992), 299). The wage index used ended in 1934 and Hunter and Szyrmer extended it to 1940 by guesswork. Regardless of the reliability of the wage index, this meant assuming in addition that wage earnings in engineering and the defence industry moved together, that unit total costs in the defence industry moved in proportion to wage earnings, and that the costs of maintenance and operation of the armed forces moved in line with weapon costs. It appears likely that Hunter and Szyrmer underestimated the true change in the volume of defence activity by understating productivity growth and cost reductions in the defence industry, if for no other reason. For the early 1930s the Hunter/Szyrmer series also suffers from the official concealment of rearmament: there is therefore a false break in the series in 1934, when official distortion ended. It appears, however, to confirm a true break in 1936, with a 60 per cent estimated increase in real defence spending in a single year.

suggested, munitions prices must have risen by roughly two thirds between 1928 and 1937, and by another one fifth up to 1940.

The evidence of official documents suggests that price trends affecting munitions were at best highly volatile, and at worst virtually impossible to pin down into a quantitative overall measure. Superficial indications are that they fell from the late 1920s through to 1932 or 1933, and thereafter rose. Thus, for their own purposes defence officials often calculated the cost of the current year's procurements at prices of the previous year to illustrate how much of the change was attributable to price inflation or deflation. The price changes taken into account probably only covered the subset of products procured in both years, and therefore could either overstate or (more likely) understate the underlying change. These calculations suggested a price level which fell continuously from 1928/29 through to 1933.²⁷

For the mid-1930s we depend on available documentation of the changing prices of individual weapons, which is necessarily anecdotal in character. Thus between 1932 and 1935 there is fragmentary evidence of substantial inflation in the prices of particular weapons.²⁸ The same kind of incomplete evidence may suggest some reversal of the upward trend in 1936 and 1937.²⁹ However, more general indications are that the inflation continued. In November 1936 the chief of the General Staff complained that 'there is no military item for which we have not had a price increase by 10, 20, 30 or more per cent' during the year.³⁰ A Gosplan document, however, put the increase in armament prices at 8.6 per cent in 1936 compared with 1935.³¹

All these indications suffer from a common defect. To what extent may the prices of goods which remained in serial production from one year to another be thought of as proxies for the prices of all goods? They were only a part of the overall product assortment, a highly variable part, sometimes only a small part. New products ought to be

²⁷ RGAE, 4372/91/2196, 1-2 (report from the head of the special sector of TsUNKhU to the head of the defence sector of Gosplan, 4 January 1934).

²⁸ This arises from a comparison of prices given in RGVA, 4/14/880, 13-14 (Khrulev to Voroshilov, 17 January 1933) with prices listed by sources given in note 27.

²⁹ RGVA, 4/14/1626, 9 (Red Army General Staff memorandum dated 25 August 1936); RGAE, 7733/36/40, 109 (appendix to Sovnarkom decree dated 17 December 1936); RGVA, 51/2/441, 62-3 (decree no. 108 of the Sovnarkom defence committee of 3 September 1937).

³⁰ RGVA, 4/14/1626, 15 (Egorov to Voroshilov, 3 November 1936).

³¹ RGAE, 4372/91/3106, 94-3 (dated 12 December 1936) (510 million rubles out of a total of 5912 million was attributed to price increases).

incorporated into any measure of overall price change at prices 'comparable' with existing products, but what comparability means in practice may be difficult if not impossible to determine. For overall price stability, the same proportionality between price and user quality for new as for existing products is required; products introduced at higher price/quality ratios may have contributed to price inflation even if the prices of defence products already in serial production were being held stable from year to year or forced down.

Above, we gave the example of the wholesale conversion of the aircraft industry in 1933-5 from I-5 fighters to a new generation of I-15s and I-16s. As it happens, the factory price of an I-16 in 1936 was 86 000 rubles, whereas the price of an I-5 in 1934 had been 56 400 rubles.³² Thus, in two years the price of a 'typical' fighter aircraft rose by one half. However, what matters to us is not the increase in the ruble price, but the proportion between the prices of the two aircraft and their real production requirements in plywood and metallic sheets and spars, instruments and controls, machining, assembly, spares, and so forth. Whether this proportion rose or fell cannot be judged on present information.

1935: setback and transition

What was happening in the mid-1930s? The year 1935 was intended to be one of sweeping modernisation in defence industry. Modernisation was to have been reflected in both the product assortment and in the techniques of production. Revolutionary change in the product assortment was foreshadowed in the planned turnover to new models of tanks and aircraft. The revolutionisation of production itself was blueprinted in the wholesale transfer to Type 'B' specifications already noted, which was intended to shake Soviet war production out of its craft traditions and bring it into a new era of standardised mass production.

This vast programme soon got into trouble. By September 5 only 29 out of 139 items in the artillery and ammunitions industries had been transferred to Type 'B' specifications, and these not completely.³³ The industry urgently demanded that the transfer should be delayed; otherwise factories would have to temporarily cease production.³⁴ The military objected. On behalf of NKO, Gamarnik triumphantly sent Molotov a copy of a telegram he had acquired in which Pavlunovskii, then head of the defence industry, ordered a factory director to

³² For the I-16 in 1936 see Simonov (1996), 104, and for the I-5 in 1934, RGVA, 4/14/1287, 132-4 (undated memorandum) (according to RGVA, 4/14/880, 14, the 1932 price of an I-5 had been only 24 500 rubles).

³³ RGVA, 4/14/1298, 142 (memorandum by Efimov to Voroshilov, 9 September 1935).

³⁴ RGVA, 4/14/1298, 147 (M. Kaganovich, deputy people's commissar for heavy industry, to Molotov, 9 September 1935).

abandon the planned transfer to Type 'B' specifications for the sake of fulfilling the current output quota:

The main programme must be fulfilled...If you don't prepare Type 'B', use drawings of current production.³⁵

The difficulties were compounded by the switch to new types of armaments. In the aircraft industry, as late as October 1935 some factories were still struggling with the orders for 1934. Then in November, Voroshilov complained to Molotov and Stalin that only 859 of the 1334 aircraft planned for January-October had been delivered; and this included only a single aircraft out of the three key new types scheduled to be produced in 1935.³⁶ In 1935 NKO outlays on orders from the aviation industry was actually lower than in 1934 (table 4.8). The Commission for Defence, on Stalin's proposal, replaced the head of the aircraft industry by M.M. Kaganovich, with Tupolev as chief engineer.³⁷

Armaments production as a whole was also unsatisfactory. The production of the armaments industries as a whole, measured in 1926/27 prices, including civilian production, greatly increased (table 4.9), but this was largely a result of the expansion of civilian production by these industries, not of armaments. Even shipbuilding, a success story in 1934, increased production by only 12 per cent.³⁸ Total military equipment orders measured in current prices increased by only 14 per cent (table 4.7); and the number-of-weapons index (table 4.3) shows a substantial decline in the number of weapons purchased by NKO.

While the armaments modernisation programme largely failed in 1935, defence investments reflect the intensification of the defence effort (table 4.10). The initial plan for the national economy as a whole proposed an absolute decline in investment; within this total the allocation to construction in NKO (628 million rubles) was also lower than actual expenditure in 1934. But during 1935 the allocation was increased to 1174 million;³⁹ and credits of 1186 million were eventually provided, of which 1086 were eventually utilised (table 4.7). Similarly the initial plan for investment in the armaments industries envisaged a

³⁵ RGVA, 4/14/1298, 149 (Pavlunovskii to Premudrov in Molotovo, 12-13 August 1935); for Gamarnik's letters of October 1935 see *ibid.* 148, 150.

³⁶ GARF, 8418/10/31, 65, 65ob, 66 (dated November 11).

³⁷ GARF, 8418/10/31, 9 (decision dated 2 December 1935).

³⁸ RGVA, 4/14/1883, 25 (report dated 7 January 1937).

³⁹ See RGVA, 4/14/1667, 11 (report to Voroshilov from the financial department of NKO, dated 14 December 1935).

sharp decline;⁴⁰ eventually, however, they received 19 per cent more than in 1934. Total investment in NKO and the armaments industries increased from 6.5 per cent of all investment in 1934 to 8.1 per cent in 1935 (table 4.11).

The programme of modernisation already designated for implementation in 1935 became all the more urgent in so far as this was also a year of change for the worse in Soviet threat perceptions. In the course of 1935 Nazi Germany adopted an increasingly aggressive stance, introducing conscription in March; Italy invaded Abyssinia in October; a Berlin-Tokyo axis loomed on the horizon. On 31 March *Pravda* reported on the state of German rearmament in alarming detail.⁴¹ In December Litvinov warned Stalin that Hjalmar Schacht, President of the Reichsbank and supreme Economics Minister, had privately told a French banker that Germany intended to divide up the Soviet Ukraine with Poland.⁴² The armed forces' establishment strength was raised and the conscription age lowered.⁴³

In the economy, the practical effect of these heightened fears were reflected practically in 1936 and the subsequent years remaining before World War II. In 1936 alone capital construction by NKO, measured in current prices, increased by as much as 114 per cent, and investment in the armaments industries by 62 per cent (tables 4.7 and 4.10). NKO and armaments investment taken together increased from 8.1 to 11.9 per cent of all investment (table 4.11). Moreover, in 1936, in contrast to 1935, a large increase in armaments production was achieved. Military equipment orders in current prices increased by 105 per cent (table 4.7); the orders achieved amounted to 77 per cent of the revised planned figure, as compared with only 70 per cent in the previous year. The real increase in defence production in 1936 was certainly less than 105 per cent. But even our number-of-weapons index, which does not allow for technical improvements, shows a rise in production of 62 per cent (table 4.3).

Thus in 1935 the stage was being set for recovery and sustained rapid growth of war production on a new technological basis in the following years. However, such qualitative changes make purely quantitative comparisons of production and capacity in the late 1930s

⁴⁰ According to a decree of the Defence Committee dated 2 April 1935, it was planned at only 494 million rubles, a cut of 35 per cent (GARF, 8418/10/129, 1-2).

⁴¹ The article was written by Tukhachevskii and personally edited by Stalin. For Stalin's corrections, see *Izvestiia TsK*, no. 1, 1990, pp. 160-70.

⁴² *Izvestiia TsK*, no. 2, 1990, pp. 211-2; in his letter Litvinov criticised the Soviet press for its 'Tolstoian position of non-resistance to evil' in relation to Germany.

⁴³ RTsKhIDNI, 17/162/18, 24 and 35-7 (dated May 10), and 123 (dated August 28).

very difficult in relationship to the earlier years of the same decade, and in some respects not very meaningful.

Trends in the defence burden

If the size of the armed forces grew more rapidly than overall labour resources, and if defence production grew more rapidly than total output, it follows that defence outlays as a whole probably grew more rapidly than national resources. From this an increase in the defence burden is inferred. Here we touch on another approach to measuring the economic impact of defence activities -- a direct comparison of defence outlays with national income. This can be done using either the Soviet net material product (NMP) concept or a western gross national product (GNP) measure. It can also be done at either current or constant prices.

When budget defence spending is compared with NMP, it tells us something about the burden of defence upon the material production sphere. NMP measures the total value of final goods, including intermediate services (e.g. freight transport) but not final services (e.g. passenger transport). Part of the defence budget is expended on final services such as the military services provided by armed forces personnel, but servicemen are enabled to supply their services because they are supported by the material production sphere. On the other hand budget spending can also be compared with GNP, and shows how society allocates its total of resources available among civilian and defence tasks, without making arbitrary judgements as to whether services are more or less basic to economic life than goods.

The defence burden can be measured in current or constant prices, and a different meaning is implied in each case. When both defence spending and national income are valued at constant prices, their changing proportion shows the changing relative scales of defence production and total output. However, a rising defence share of GNP at constant prices need not necessarily mean rising civilian sacrifice. For example, if defence goods became relatively cheaper, then more of defence goods could be supplied without detracting from resources allocated to civilian objectives; on the other hand, if they became relatively more expensive, then the same volume of defence goods would involve a rising opportunity cost in terms of other goals. This is revealed when the defence burden is calculated at currently prevailing prices. In short, the defence burden at constant prices shows changing relative volumes of production, but the same ratio at current prices suggests the welfare implications.

Defence and national income

It is much harder to compare defence spending with national resources than with the resources in the hands of government, as was done in table 4.1. One reason is that our national income measures for the mid-1930s are highly imperfect. National income at prevailing prices may be readily compared with budget totals and subtotals, but the figures available contain huge gaps. The official (or at least, officially accepted) series for net material product at prevailing prices is broken for 1931

and 1933-6. Abram Bergson calculated GNP at prevailing prices, but only for the benchmark years 1928 and 1937. The feasible comparisons are presented in table 4.12. Official figures based on an NMP accountancy (col. 1) make possible the following observations: in the late 1920s the defence burden on welfare was relatively low at 3 per cent or so, by comparison with the prerevolutionary benchmark of 1913, but the latter had been exceeded by 1932, and in 1937-40 the burden climbed to a level unprecedented in peacetime. If it had taken 7 years to double the defence share of the budget between 1930 and 1937, it took only 3 years to double it again between 1937 and 1940, when almost 15 per cent of national income was being consumed by defence. The recasting of national income at prevailing prices to a GNP basis by Bergson (col. 2) does not significantly alter this view; since the ruble value of GNP was a little larger than NMP, the level of the defence burden appears slightly lower, and its dynamic is the same.

Comparisons may also be carried out in real terms (i.e. at constant prices or costs), but again there are fundamental difficulties. Official figures of NMP expressed in the 'unchanged' prices of 1926/27 are generally considered unreliable and are not considered here. Western estimates of real Soviet GNP are preferable on this and other grounds. However, for our purposes defence outlays must first be computed in the same prices or costs as GNP. Bergson estimated GNP by end-use (including defence outlays) at adjusted factor costs of both 1928 and 1937, but only for those years. Moorsteen and Powell estimated GNP by sector of origin for every year after 1928, but there was no annual series for overall real defence outlays (as distinct from the procurement of weapons) to be compared with GNP.

Bergson's figures for GNP and defence outlays at constant 1937 factor costs are shown in table 4.12 (col. 3). In comparison with the defence share at prevailing prices (col. 2), these suggest a lower defence burden (1.3 per cent) in 1928, and a greater subsequent increase in the real volume of defence goods and services relative to total real output. The comparison shows that the welfare impact of the increase in the relative volume of defence activity was softened by the relative cheapening of defence items.

Defence and wage incomes

In order to find annual series which will throw at least some light on the dynamic of the defence burden during the second five-year plan period, we make use of a compromise measure of the defence burden on welfare: the total defence budget, divided by total employment, expressed relative to public sector wage earnings. The advantage of these figures is that they are available in annual series, and each series is relatively robust, but their drawback is that they do not give a full picture, since overall economic welfare is only imperfectly associated with wage incomes, and besides not all employees received the public sector wage (collective farmers were the most numerous exception). The percentages which are computed do not mean that defence outlays were paid out of wages, only that the ratio between them can be expressed numerically.

The results of this comparison are shown in table 4.13 (col. 3). They show clearly a doubling of the defence burden -- but from a low level -- in the course of the first five-year plan. In 1932-5 this burden remained roughly flat at 5 per cent or so. In 1936 a sharp increase was marked, and the level of the burden now rose continuously, if unsteadily, to the unprecedented 'peacetime' level of 18 per cent in 1940.

Conclusion

The evolution of Soviet interwar defence spending can be divided into three phases. The first phase was one of economic demobilisation after the Civil War. After the immediate post-Civil War cutbacks defence outlays tended to drift upwards, but with economic recovery and the growth of the public sector the burden of defence on both national income and fiscal revenues tended to go on falling. This phase lasted until 1930.

In the second phase, which began in 1931, there was rapid rearmament and the real burden of defence outlays on national resources shifted to a higher level. The burden on government resources did not grow, because the government's share in national resources was now far larger than before. At the same time the change in pace of defence activity was greater than might appear on the surface from purely quantitative measures. There was an increased rate of military-technical innovation, and obsolete weaponry was phased out, so that rearmament in the third phase would be based on new weapons of a much higher technical level.

Thus the second phase was no more than a brief transition to the third phase which began in 1936. In the third phase the growth of real defence spending accelerated sharply. Its relative burden also grew markedly and became unprecedentedly heavy by peacetime standards. Rapid rearmament gave way to intense mobilisation.

The period of the second five year plan must therefore be seen in its context. It began with rapid rearmament already under way. Before it was over, it also witnessed the transition from rapid rearmament to intense mobilisation, which came in 1936. This transition was one of considerable difficulty for the defence sector. The years 1934-6 were 'three good years' for production and living standards generally, but the armed forces struggled to achieve their programmes, lurching from setback to crisis before successfully forcing defence activity to a higher level in both quantity and quality.

Table 4.1. Budget outlays, total and on defence, 1928/29-1940 (million rubles and per cent)

	Budget total, million rubles	Defence outlays	
		million rubles	% of budget
	(1)	(2)	(3)
1928/29	8 784	880	10.0
1929/30	13 322	1 046	7.9
1930(4)	5 038	434	8.6
1931	25 097	1 790	7.1
1932	37 995	4 034	10.6
1933	42 081	4 299	10.2
1934	55 445	5 393	9.7
1935	73 572	8 174	11.1
1936	92 480	14 858	16.1
1937	106 238	17 481	16.5
1938	124 039	23 200	18.7
1939	153 299	39 200	25.6
1940	174 350	56 752	32.6

Sources: Plotnikov (1955), 92, 132, 206, 215, 255, 261, 324, 423, 433, except 1931 from Davies (1993), 593, and 1932-6 for which see archival figures in table 4.7 (col. 4). Differences between archival and published figures are trivial for 1935 and 1936, and for 1937 the two coincide.

Table 4.2. Personnel of the Soviet regular armed forces (thousands)

	Series A	Series B
	(1)	(2)
1926/27	586	..
1928	..	..
1929	..	..
1930	..	..
1931	562	..
1932	638	..
1933	885	..
1934	940	..
1935	1 067	..
1936	1 300	..
1937	1 433	1 683
1938	1 513	..
1939	..	2 099
1940	4 207	..

Sources:

(1) Hunter, Szyrmer (1992), 138.

(2) AN SSSR (1991), 164; 1939: RAN (1992), 241, 244.

Table 4.3. Alternative measures of the real growth of munitions procurement, 1928-1940 (1937 prices and per cent of 1937)

	Number of weapons procured (present estimate)	Munitions Procurement from Moorsteen and Powell
	(1)	(2)
1928	..	4.5
1929	..	5
1930	13.7	7
1931	25.0	7
1932	53.5	7
1933	80.5	7
1934	80.8	30
1935	58.0	50
1936	94.2	90
1937	100.0	100
1938	171.4	135
1939	246.0	200
1940	287.8	282

Sources:

(1) Table A-7, appendix to Davies, Harrison (1997).

(2) Moorsteen, Powell (1966), 629.

Table 4.4. Ships entering service with the Soviet Navy, 1930-41 (units and tons)

	Surface ships: tons			Submarines: tons			Combined tonnage	% of 1937
	units	total	per ship	units	total	per ship	total	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1930	1	600	600	1	934	934	1 534	22
1931	1	600	600	5	4 690	938	5 290	75
1932	5	3 000	600	..	..	..	3 000	43
1933	1	600	600	15	10 845	723	11 445	163
1934	3	1 452	484	34	7 828	230	9 280	132
1935	3	1 463	488	32	13 777	431	15 240	217
1936	13	7 360	566	46	25 110	546	32 470	462
1937	6	2 156	359	9	4 869	541	7 025	100
1938	16	40 474	2 530	14	8 800	629	49 274	701
1939	14	32 048	2 289	14	8 845	632	40 893	582
1940	8	45 058	5 632	24	16 390	683	61 448	875
1941 (Jan.- Jun.)	2	23 230	11 615	7	3 980	569	27 210	387

Sources:

Calculated from Korabli (1988), Dmitriev (1990) (figures supplied to the authors by Julian Cooper). Surface ships were light cruisers, battleships, destroyers, patrol boats, minesweepers, and gunboats.

Table 4.5. Nominal NKO outlays on military equipment compared with the number of weapons procured, 1930-40 (per cent of 1937)

	Number of weapons procured (present estimate)	Nominal NKO outlays on military equipment	'Typical unit' price index (col. 2 ÷ col. 1)
	(1)	(2)	(3)
1930	14	6-9	44-66
1931	25	15	60
1932	53	27	51
1933	80	27	33
1934	81	34	43
1935	58	39	68
1936	94	81	86
1937	100	100	100
1940	288	345	120

Sources:

(1) Table A-7, appendix to Davies, Harrison (1997).

(2) As Davies (1993), 594; 1932-7: table 4.7; 1940: Harrison (1996), 284.

(3) Col. 2 divided by col. 1.

Table 4.6. Real defence outlays according to Bergson, 1928-40 (billion rubles and per cent of 1937)

	At 1937 prices:		At 1928 prices:	
	billion rubles	% of 1937	billion rubles	% of 1937
	(1)	(2)	(3)	(4)
1928	1.7	10%	0.74	7%
1937	17.0	100%	10.60	100%
1940	45.2	266%	..	..

Source: Bergson (1961), 128, 153.

Table 4.7. State budget appropriations to the NKVM/NKO (the defence budget), 1932-7 (million rubles at current prices and percent)

	Military equipment	Construction	Maintenance	Total	of which, % on equipment
	(1)	(2)	(3)	(4)	(5)
1932					
Actual	1 532	900	1 602	4 034	38
1933					
Budget	..	..	..	..
amended	1 753	678	2 307	4 738	
Actual	1 506	620	2 173	4 299	35
1934					
Budget	2 494	812	2 494	5 800	
amended	2 292	745	2 764	5 801	
Actual	1 948	717	2 729	5 393	36
1935					
Budget	2 662	628	4 202	7 492	
amended	3 194	1 108	4 983	9 285	
Actual	2 226	1 186	4 762	8 174	27
1936					
Budget	5 420	2 036	7 349	14 805	
amended	5 914	2 428	8 180	16 522	
Actual	4 558	2 518	7 782	14 858	31
1937					
Budget	7 594	1 875	10 569	20 038	
amended	8 108	1 925	10 588	20 621	
Actual	5 658	1 936	10 472	18 066	31

Sources:

- 1932 Military equipment is from RGVA, 4/14/1667, 20 (dated 10 January 1936). For construction see Davies (1993), 593 -- this is probably a planned figure, and therefore too high. The total figure is from GARF, 8418/10/148, 5 (report from the secret department of Narkomfin to Molotov, January 1935).
- 1933-5 For the amended budget and actual figures see RGAE, 4372/91/3217, 4 (report from the defence sector of Gosplan, dated 11 May 1937).
- 1934 The budget figure is from RGAE, 4372/91/1824, 56-5 (Gosplan report, dated 31 January 1934); ruble sums for separate items are calculated by us from percentages given in the source.
- 1935 The budget figure is from RGVA, 4/14/1667, 16 (report dated 26 December 1935). Another report in this file dated 3 January 1936 (ibid., 17) gives the final budget as 9635 million rubles.

- 1936 RGVA, 51/2/444, 2-12 (report of the financial department of NKO, dated 26 February 1937); we have estimated actual outlays as credits opened less those unutilised. These figures exclude foreign currency outlays (11 million rubles in the original budget; 43 million as amended, and 24 million actually spent).
- 1937 For the original and amended budgets, see RGVA, 51/2/445, 1, 11, and for actual outlays *ibid.*, 13-14 (report of the financial department of NKO, dated 13 June 1938). These figures include foreign currency outlays (17 million in the original and revised budgets, and 11 million actually spent)

Note: construction expenditure is given as credits opened for construction. Credits utilised were lower (from RGAE, 4372/91/3217, 3) (million rubles):

1933	532
1934	704
1935	1 086
1936	2 323

*Table 4.8. Military equipment orders of NKVM-NKO, 1932-1937
(million rubles at current prices)*

	Aircraft	Vehicles and tanks	Artillery stores	Chemical stores	Shipbuilding and naval aviation
	(1)	(2)	(3)	(4)	(5)
1932					
plan	312	428	791	74	322
actual	246	229	580	58	316
1933					
plan	417	341	500	48	351
actual	347	279	448	39	275
1934					
plan	510	345	568	49	565
actual	440	354	470	30	544
1935					
plan	611	475	956	62	881
actual	427	448	563	44	591
1936					
plan	1 608	1 085	1 391	87	1 332
actual	1 104	937	1 102	49	1 000
1937					
plan	2 740	1 037	2 093	106	2 194
actual	1 816	871	1 403	75	1 114

Continued.

Table 4.8 (continued)

	Railways	Experimental	Communications and technical stores	Engineering stores	Total
	(6)	(7)	(8)	(9)	(10)
1932					
plan	4	..	88	37	2 057
actual	3	..	64	35	1 532
1933					
plan	6	..	67	55	1 784
actual	5	..	62	43	1 498
1934					
plan	15	..	92	49	2 184
actual	7	..	56	46	1 948
1935					
plan	14	..	77+26	55	3 158
actual	13	..	73+12	56	2 228
1936					
plan	46	119	116+32	96	5 914
actual	39	88	112+33	92	4 588
1937					
plan	38	136	149+23	118	8 274
actual	30	67	134+30	92	5 657

Sources:

- 1932-5 RGVA, 4/14/1667, 20 (report of the financial department of NKO, dated 10 January 1936).
- 1936 RGVA: 51/2/444, 2ob-4 (report of the financial department of NKO, dated 26 February 1937).
- 1937 RGVA, 51/2/445, 66ob-68 (report of the financial department of NKO, dated 13 June 1938); includes small sums received for 'restoration of credits'. In addition to sums listed, 41 million rubles was allocated to 'packing for fuel', and 27 million rubles spent. The plan was cut by 400 million rubles (from 8674 to 8274 million) on account of planned price reductions.

Table 4.9. Gross production of armament industries, 1932-7 (million rubles at 'unchanged' 1926/27 prices)

	Series A:		Series B:		Series C:	
	arma- ment (1)	total (2)	arma- ment (3)	total (4)	arma- ment (5)	total (6)
1932	1 500	2 900	..	..	..	..
1932	..	..	1 094	2 084	..	2 795
1933	..	..	1 265	2 083	..	2 387
1934	..	..	1 414	2 742	..	3 015
1935	..	..	..	..	..	4 319
1936	..	..	..	..	3 846	6 620
1937 plan	6 550	9 140	..	..	6 558	9 054

Sources:

- Series A RGAE, 4372/91/ 3217, 114-3 (report from the defence sector of Gosplan to the head of Gosplan, dated 20 May 1937).
 Series B GARF, 8418/10/148, 13 (report to Molotov, dated 11 January 1935); 1934 is preliminary.
 Series C RGAE, 4372/91/3217, 118-6 (20 May 1937).

*Table 4.10. Capital investment in armament industries, 1932-7
(million rubles at current prices)*

	Plan	Fulfilment
	(1)	(2)
1932	702	778
1933	560	604
1934	874	761
1935	..	905
1936	1 918	1 467
1937	2 972	..

Sources:

1932 plan: GARF, 5446/57/16, 157 ('other', Sovnarkom decree dated 13 December 1931).

1932-6 fulfilment, 1937 plan: RGAE, 4372/91/3217, 115 (report of defence sector of Gosplan to head of Gosplan, dated 20 May 1937).

1933 plan: GARF, 5446/1/71, 63 ('other', Sovnarkom decree dated 5 January 1933).

1934 plan: GARF, 8418/9/200, 1-2 (appendix, dated 16 February 1934, to Sovnarkom decree, dated 2 January 1934).

1936 plan: GARF, 5446/57/40, 139-41 (Sovnarkom decree, dated 8 February 1936).

Note: on 17 January 1937, the Politburo approved 3015 million rubles for the 1937 plan (see text).

Table 4.11. The share of defence in investment, 1932-1937 (per cent)

	% of total investment			% of industrial investment by
	by NKO	by armament industries	by both	armament industries
	(1)	(2)	(3)	(4)
1932				
plan	..	..	..	..
fulfilment	4.4	3.8	8.2	7.5
1933				
plan	3.8	3.1	6.9	5.5
fulfilment	3.0	3.4	6.4	6.0
1934				
plan	3.2	3.5	6.7	6.8
fulfilment	3.1	3.4	6.5	6.5
1935				
plan	3.0	..	..	..
fulfilment	4.4	3.7	8.1	7.2
1936				
plan	6.3	8.4	14.7	13.7
fulfilment	7.3	4.6	11.9	10.3
1937				
plan	5.6	9.1	14.8	21.3
fulfilment	6.4	..	..	..

Sources:

Defence construction: table 4.7 (credits actually utilised).

Defence industry investment: table 4.10.

Total and industrial investment, 1932: Davies (1996), 506; 1933-7: Zaleski (1980), 647-58.

Table 4.12. The defence burden, from TsSU and Bergson, 1928-40 (per cent)

	TsSU, % of	Bergson, % of GNP:	
	NMP at prevailing prices	at prevailing prices	at factor costs of 1937
	(1)	(2)	(3)
1913	4.5	..	..
1928	3.0	2.4	1.3
1929	3.1	..	..
1930	3.2	..	..
1931	..	..	..
1932	4.5-4.8	..	..
1933	..	..	..
1934	..	..	..
1935	..	..	..
1936	..	..	..
1937	7.2	6.2	7.9
1938	9.0	..	..
1939	11.9	..	..
1940	14.7	13.0	17.3

Sources:

- (1) The defence share in 1913, calculated from Davies (1993), 602 (outlays of the War Ministry only). NMP in 1928-30 from Wheatcroft, Davies (1985), 127; in 1932 from Davies (1996), 505; in 1937-45 from RGAE, 4372/95/168, 79-80. Defence outlays in 1913 from Davies (1958), 65; other years from table 4.1, cols 2, 3, adjusted to calendar year.
- (2, 3) Calculated from Bergson (1961), 46, 128.

Table 4.13. The defence burden in proportion to labour incomes, 1928-40

	Public sector annual earnings, rubles	Total employment, thou.	Defence outlays per person in employment, full time equivalent	
			rubles	% of earnings
	(1)	(2)	(3)	(4)
1929	800	51 100	19.66	2.5%
1930	936	51 500	23.65	2.5%
1931	1 127	52 800	33.90	3.0%
1932	1 427	53 400	75.54	5.3%
1933	1 566	54 200	79.32	5.1%
1934	1 858	57 700	93.47	5.0%
1935	2 274	62 800	130.35	5.7%
1936	2 770	62 300	238.89	8.6%
1937	3 047	66 000	264.86	8.7%
1938	3 467	69 100	335.75	9.7%
1939	3 867	71 600	..	..
1940	3 972	79 100	717.47	18.1%

Sources:

- (1) Zaleski (1971), 344-5; Zaleski (1980), 562-3, 592-3.
- (2) Total employment (full time equivalents) from Moorsteen, Powell (1966), 643.
- (3) Defence outlays from table 4.1, cols 2, 3, adjusted to calendar year, divided by col. 2.
- (4) Col. 3, divided by col. 1.