

The structure and development of the Soviet defence-industry complex*

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Defence was of paramount concern to the leaders of the Soviet state from its inception. The Bolshevik Revolution of October 1917 took place as World War I began its final climactic year, amid fears of a renewed German offensive against Russia on the eastern front. As the Soviet government entered into a humiliating peace with Germany, Russia descended rapidly into a bitter Civil War of Reds versus Whites. At the same time the former Allies of the old regime weighed in on the side of the Whites to oust the Bolsheviks and restore Russia to a state of war with Germany. Military issues continually crowded the Bolshevik agenda. The Civil War ended in a victory for the Soviet side, and a sharp contraction of the Red Army and of Soviet defence expenditures followed. At the same time the legacy of the civil war experience was of a siege mentality and a perception of unceasing threats from every quarter of the capitalist world. This legacy would persist throughout the entire Soviet period.

It was in the second half of the 1920s that the key decisions were taken to promote the development of the Soviet Union's industrial capacity for mass production of modern weapons and combat equipment. We now have a clear picture of the context and motivation of these decisions (for further evidence and discussion see chapters 2 and 3). First, for Moscow the late 1920s were a period of renewed international tension, including specifically the 'war alarm' of 1927. At the same time Soviet leaders had no reason to anticipate, and did not anticipate, an immediate war. The war for which they began to plan lay, as yet, some years in the future -- certainly, beyond the five-year horizon of consecutive national economic plans. Uncertainty dominated their calculations. This was a war which they feared, expected others to initiate, and did not plan to initiate themselves.

* This paper appeared as a chapter in *The Soviet Defence Industry Complex from Stalin to Khrushchev*, pp. 3-32. Edited by John Barber and Mark Harrison. Basingstoke and London: Macmillan Press, 2000.

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There was no plan to rearm in order themselves to undertake either a war of expansion, or a preventive war. A defensive motivation was strongly felt. At the same time they also wished to be ready to take advantage of any opportunities whether for expansion or for the export of revolution, which the aggressive action of others might present to them. At various times they also wished to be in a position to undertake preemptive action to forestall others' aggression if the need arose.

By the late 1920s, Soviet leaders had also thoroughly absorbed the lessons of European warfare since the Crimean War, and above all of World War I. In the modern era, the outcome of wars would be decided by industrial power as much as by fighting spirit. The quantities of guns, shells, tanks, and aircraft which each side could deploy on the frontline would be critical. Moreover, given the murderous conditions of the twentieth century battlefield, the decisive quantities would include not only those accumulated in peacetime and available when war broke out, but also those produced in wartime to replace initial losses and swell the numbers on the front line as counters to the enemy's economic mobilisation when the war was already in progress. In the Soviet Union these calculations formed powerful motives for the urgent development both of a specialised, largescale defence industry and of industrialisation of the whole economy in a more general sense.

The international tensions of the late 1920s were used to promote the radical transformation of the whole social and economic system under the first Stalinist five-year plan (1928-32). By the late 1920s the regime was locked in a struggle with the peasantry eerily reminiscent of the contradictions which had destroyed the economy of Imperial Russia in World War I. Russia had entered the war in 1914 a great power but a poor country, with a large surplus of food for export produced in low-income peasant agriculture. Mobilisation for the war diverted scarce resources from agricultural production and consumption to war production and military service. The result was a breakdown of urban-rural trade and a collapse of the rural food surplus. Russia could no longer feed its own soldiers and workers. This vicious circle was not broken by the 1917 Revolution. Soviet Russia survived the ensuing Civil War not having solved its food problem, and triumphed only because the enemy's weaknesses were even greater. Only the end of the Civil War in 1921 permitted recovery. By the end of the 1920s, however, a second mobilisation, not for war but for rapid industrialisation, was once again undermining Soviet urban-rural trade and the rural food surplus. With history fresh in their minds, military and political leaders were sharply aware that the Soviet Union was in no condition to face a renewal of international conflict.

From the late 1920s onwards the Soviet Union was engaged in preparation for war. The preparations were defensive, but also active. They were not limited to development of the armed forces themselves, but also embraced largescale construction of specialised defence industry facilities. The forced-march industrialisation programme could also be understood as contributing to the preparation of the country for war, by enlarging its potential for war production. Lastly, the new collective-farm system for food production and procurement was intended in part to break the power of the peasantry to hold the

country to ransom in time of war. And it may be argued that, although the collectivisation of agriculture was costly far beyond Soviet leaders' expectations, and was disastrous for peacetime economic and social development, when the anticipated war finally broke out in 1941 the peasantry was no longer in a position to prevent the regime from imposing wartime priorities and mobilising everything for war, even when there was not enough food available to keep everyone alive.

It would be quite wrong to suppose, however, that purely military motivations are sufficient to explain the Soviet social and economic transformation of the interwar years in its entirety. The Soviet Union was never ruled by its military commanders. Behind rapid state-socialist industrialisation and farm collectivisation was clearly a coalition of interests which came together to form a distinct entity. Sometimes this coalition has been described as the Soviet 'military-industrial complex'. Whether or not this is the right term is a question to which we return at the end of the present chapter.

For the time being we employ the term 'defence-industry complex' to signify our own more limited agenda. Our main interest is in the Soviet defence industry -- its production and R&D facilities, its workforce and management, its institutions and leaders and their interaction with others. We call it a 'complex' to the extent that its composite elements came together to form a complex unity differentiated from other elements of the Soviet social, economic, and political system. In the present state of our knowledge about Soviet history and society we believe that the defence industry is a prime subject for scholarly investigation, and the purpose of this chapter is essentially to explain why. Our first task is therefore the difficult one of defining the scope and limits of the defence-industry complex.

The production of the means of destruction

What made the defence-industry complex a special part of the Soviet economy? The most obvious way of distinguishing the Soviet defence-industry complex is by its product. The customer of defence industry was the Soviet armed forces, and the basic product which changed hands among them was 'the means of destruction'.

There are some subtle differences in what is implied by such a relationship in the divergent schools of classical economics, western and Marxist. In the Marxist scheme still widely employed by Russian historians, the economy is portrayed as a system producing two kinds of material commodities, the means of production (sometimes called group 'A') and of consumption (group 'B') respectively. The services sector, being 'nonproductive' from a material commodity standpoint, sits on top of the production base, and is enabled to provide services only because of the redistribution of material commodities to support its activities and workforce. Weapons do not fit easily into this classification, since they are means neither of consumption nor of production, and in the postwar period it became common among Soviet economists to define the defence industry as a third branch (group 'C', for argument's sake) engaged in the production of the material means of destruction.

Such distinctions are not made in present-day western classical (sometimes called 'neoclassical') economics. From a utilitarian standpoint, all goods and services are produced in order to satisfy needs. Society's need for weaponry and military services is not, in principle, different from household needs for consumer goods and services, or firms' needs for materials or investment goods. Thus defence outlays are simply classed as one among many possible final uses of the total output of goods and services.

Sometimes quite detailed practical implications are drawn from these rather philosophical starting points. Marxist economists have tended to view the commitment of resources to military-industrial enterprise as at best a diversion from the objectives of long-run economic development, certainly a fiscal burden on the state, and possibly also directly inflationary. This is because outlays on the means of destruction create incomes among those engaged in group 'C' activity, and therefore provide them with purchasing power which adds to demand, without contributing any equivalent means of production or consumption to the overall supply.

Western classical economists do not, of course, dispute the fiscal burden associated with heavy defence outlays. But they do not see defence spending as different in kind from any other form of government consumption. All forms of public expenditure contribute to the fulfilment of some kind of social need (not necessarily with equal efficiency), however defined, and all require financing.

Each of the alternative approaches has its strengths. On the side of the Marxist approach is anecdotal evidence of the postwar period which suggests that many of the worst performing economies have also carried relatively heavy military burdens (for example the USSR), while some of the most rapidly growing economies (for example Japan) have benefited from light spending on defence. A more systematic approach to the data suggests an inverse U-shaped relationship into which the Soviet case also fits quite well: increasing military spending from a low base boosts economic growth, but beyond a point (roughly 9 per cent of GDP) it starts to drag performance down again.¹

The western classical approach also has strengths. For example, the worst inflations of the twentieth century have not coincided with the periods of heaviest military spending, that is, with rearmament and war. Usually they have come in the aftermath of wars, when military spending fell sharply. The factor precipitating rapid inflation was not the expansion of group 'C' activity, but the explosion of pent-up civilian demands coupled with the collapse of the state's revenue-raising powers. Examples are Germany, Austria-Hungary, and Soviet Russia after World War I; Germany, Italy, Japan, and the Soviet Union after World War II (the Soviet postwar inflation however being successfully repressed and corrected); and the Russian and most other transitional economies after the ending of the Cold War.

Thus the distinctiveness of the sector producing the means of destruction is not entirely clear from a purely theoretical standpoint. As

¹ Daniel Landau, cited by Easterly and Fischer (1995), 347.

will be shown in more detail below, our ability to differentiate group 'C' from groups 'A' and 'B' is also rather limited in practice. Delineating the activities giving rise to the production of the means of destruction may be more complicated than would appear at first sight. If we consider the question from the product angle, it is not so hard to find the products which can be used only for armament. But they typically become so *only at the final stage of production*. Before that, they are represented by materials, components, fuels, and labour which have many possible uses, civilian as well as military. From the angle of the production establishment, this amounts to the same thing as saying that military industry is really just a collection of assembly plants which turn the materials, components, and energy produced by the civilian economy into finished weapons. Thus military industry, and that part of the value of finished weapons which represents its value added, are just the tip of the iceberg if we are looking for the entire production apparatus which supports military production. There is always more to group 'C' than meets the eye.

There is also less than meets the eye, in the sense that production establishments with a significant commitment to military production usually have significant sideline involvement in the supply of civilian commodities too. This may arise because it makes market sense (as producers' insurance against volatility in the level of government orders for weapons) or because it helps to defray the budgetary cost of maintaining reserve capacities available for mobilisation in an emergency.

In other words, the 'civilian' economy always participates in military production to the extent that its intermediate products end up embodied in weapons as well as consumer or investment goods. At the same time the 'defence industry' usually maintains a significant profile of products for civilian use.

In summary, neither economic philosophy nor the empirical workings of a specialised exchange economy provide secure grounds for differentiating the defence-industry complex from other components of the production system. Thus the reader should understand that, when we speak of the defence-industry complex, we are not referring to a physical thing which can be readily isolated. The 'defence-industry complex' is not so much a thing as a heuristic concept the validity of which must be judged empirically by its useful results.

Core and periphery

What we mean by the defence-industry complex in the Soviet case is best explained as follows. At its core, specialised defence production was administered by a powerful grouping of supply and user ministries (these were called 'people's commissariats' before 1946). Also within the defence-industry complex, but not, strictly speaking, of the defence industry, should be listed agencies such as *Glavvoenstroï*, the chief administration for defence industry construction, formed in 1941. As part of this complex should also be included the procurement agencies of the user departments, the ministries (or commissariats) of defence and the Navy.

Defence *production* and the defence-industry complex were, therefore, not coterminous. The defence-industry complex included agencies which monitored the work of (or, in the case of Glavvoenstroï, supplied services to) the defence industry without being part of it. It included firms with significant commitments to supply of civilian vehicles, aircraft, ships, and electrical goods. However, with the accelerated pace of rearmament before World War II, the civilian production of the defence-industry complex was probably less important than the growing military production of a widening circle of nominally civilian enterprises outside the defence-industry complex which were in fact being drawn into the defence industry.²

Of course some final products can really only be used in a military context, especially weapons and their modern platforms (aircraft, armoured vehicles, ships, and missiles). The specialisation of industrial processes gave rise to a core of defence industry enterprises which did little else than produce these specialised defence products. But this core shaded into a far wider peripheral circle of dual-purpose and general-purpose products. This is because almost every 'civilian' product, if not itself of potential direct military application, was composed of parts and materials which could be so used when recombined in some other form.

For example, according to an input-output table of the Soviet economy based on the 1941 plan, the goods and services purchased out of the defence budget were supplied *directly* by just 10 of the 22 material production sectors (of which 'defence industry' was the most important, but also including transport and communications, construction, and trade), and just one of the 5 service sectors, which together comprised the whole economy. But we only have to go back through *one stage* of intermediate processing to find *every single branch* of commodity production involved, if not in direct supply of final defence products, then in *indirect* supply of intermediate products for eventual defence use.³

Thus the defence industry was not a tightly defined group of enterprises, but could rather be thought of as a series of concentric rings. At the core lay the big assembly plants permanently specialized in producing finished weapons (guns, shells, aircraft, tanks, missiles, warships). But hundreds of smaller factories produced dual-purpose products which were immediately capable of or easily adaptable to defence use (e.g. road vehicles). Surrounding the assembly plants lay the subcontracting system. This included in particular the suppliers of specialized, weapons-related materials and components (e.g. armour steel, uranium ore), and of high-grade dual-purpose products (e.g. rolled and alloy steels, radioelectronic instruments, aviation fuel). Beyond the periphery, no longer part of the defence industry as such, lay the nonspecialized civilian plants and farm enterprises supplying defence producers, defence subcontractors, and the armed forces with

² See Tupper (1984).

³ Harrison (1996), 241-7 (table F-5).

general-purpose goods and services -- food rations and fuel, electric power, transport services, and general machinery.

There is a obvious sense, therefore, in which the growth of the Soviet Union's overall military-industrial potential was sustained by general economic development. In this sense it could be said that every aspect of the Soviet economic development strategy was of some kind of defence significance. For example, the promotion of the capital goods industries in the early 1930s certainly created additional possibilities for expansion of industrial capacity of kinds -- including that of defence industry -- later in the decade. Investments in roads, railways, and air transport each enhanced the economy's future potential for satisfying all kinds of needs -- including those of defence. But developing a *future* military-industrial potential was not the same thing as developing defence production *in the present*. It would an exaggeration to include every kind of economic activity in the defence-related sphere, as if farm work and aircraft assembly were of equal proximity and significance. The latter lay at the core, whereas the former lay beyond the periphery.

The institutional definition of the core could be blurred, however, by the fact that almost all the capacities specialised in producing narrowly military products were also potentially convertible to peaceful production. Indeed, to avoid the peacetime expense of reserve capacities standing idle, civilian and military products were often produced side by side by the big defence producers.

Cadre and reserve

By the twentieth century all the great powers had developed specialised defence production facilities. These facilities provided an assortment of modern weapons, a base for research and development, and so on. But the traumatic experience of World War I in Russia, Germany, and Britain alike had also demonstrated the complete inadequacy of such specialised facilities -- typically a few public ordnance factories and shipyards collaborating with a narrow 'charmed circle' of big private sector defence contractors -- to meet the huge demands for munitions which transpired as soon as modern armies clashed on the battlefield. In light of this experience 'mobilisation' took on new meaning for the twentieth century -- not just the mobilisation of men to the front line, but the mobilisation of all industrial resources to support war production.

Rethinking the mobilisation of Soviet industry gave rise to the concept of 'cadre' and 'reserve'.⁴ The 'cadre' factories were to be the specialised producers of weapons, with the tasks of building up peacetime combat stocks, sustaining the military-technical innovation process, and (should war break out) replacing early losses in the period

⁴ This basic principle was outlined by the head of the VSNKh chief administration of military industry P.I. Bogdanov and his assistant professor V.S. Mikhailov in a report 'On the organisation of military industry' to a joint session of Revvoensovet, Sovnarkom, and STO, 2 March 1924 (RGAE, 2097/1/64, 8-24).

while the 'reserve' came into play. From 1927 cadre defence factories, and in the 1930s research institutes and design bureaux, were numbered like military units (rather than named like civilian enterprises -- see further below). The 'reserve' factories were the defence-related and part-time defence producers designated under a prewar mobilisation plan, which could be swiftly converted to full-time war production when war broke out.

It might be expected that the pressures of interwar rearmament drove Soviet industry towards expansion of the cadre factories at the expense of the reserve. And we shall see below that the number of cadre factories rose at a rapid rate, while their workforce and output rose still faster. At the same time, Soviet military leaders were mindful that, once World War I had broken out, the great bulk of its demands had been met by factories of the reserve, not the cadre. Therefore the stress of rearmament was not limited to expansion of the cadre factories. Mobilisation planning became a major activity in its own right (see chapters 3 and 11). There were various complicated schemes for categorising factories in groups according to their mobilisation tasks (see for example chapter 8). There was a fluctuating emphasis on the possibility of building up cadre factories' reserve capacities through peacetime orders for civilian products, and on the dispersal of defence orders and subcontracting for defence products across a wide swathe of civilian industry suppliers in order to build up the reserve of potential defence producers.

At least a part of the growth in the number of cadre factories from the end of the 1920s through to the post-Stalin years is captured in the figures reported in table 1.1. These figures are certainly indicative of the general trend. However, the number of enterprises is a very incomplete measure of activity. Moreover, as the table suggests, the numbers are based on a varying and again usually incomplete administrative definition of defence production (for example, by 1956 there were many more than four ministries with core defence production tasks). Therefore, a fuller understanding requires quite a lot of additional explanation.

As far as the interwar period is concerned, in the ten years from 1929 to 1939 the number of defence factories grew roughly fivefold. Output and

employment grew still more rapidly than this. On a comparable definition in 1940 there were roughly 1.2 million defence industry workers, a tenfold increase over 1929; the quantity of weapons produced had risen by between twenty and thirty times at least, probably more, over a similar period (see chapter 4). Thus by the end of the interwar period there were many more defence factories than at the end of the 1920s, and at the same time the typical defence factory was much larger in workforce terms, and larger still in terms of production.

Growth and reorganisation

In the late 1920s under VSNKh there were six military-industrial trusts (the Gun and Arsenal, Rifle and Machine Gun, Shell and Barrel,

Aviation, Military-Chemical, and Military-Acid Trusts, of which the first five in November 1929 deployed 43 factories with 141 700 workers and 40 per cent civilian production.⁵ In April-May 1930 these trusts were liquidated, and, apart from those directly involved in manufacture of guns and explosives, the enterprises were redistributed among civilian agencies. In 1932, however, with the dissolution of VSNKh and formation of Narkomtiazhprom, the defence producers of both cadre and reserve were brought together again under three chief administrations (for the aircraft industry, shipbuilding, and 'military industry', i.e. armament and ammunition), the Military-Chemical, Organic Products, Artificial Fibres, Cartridges, Arsenal, Shell, and Special Engineering (i.e. tankbuilding) Trusts, and the State Association of Optical Mechanics Factories.

In 1936 there began the process of breaking up the administration of heavy industry.⁶ Just as VSNKh had become seen as too unwieldy for managing the early stages of forced industrialisation under the first Five-Year Plan, now it was the turn of Narkomtiazhprom. This was partly in order to improve ministerial controls on resource mobilisation in the enterprise, partly in order to undermine the minister, Sergo Ordzhonikidze. Both purposes were served by breaking up his ministry, creating a large number of fresh ministerial posts, and cutting out layers of bureaucracy between ministers and enterprises in the new, smaller ministerial units. From the standpoint of defence industry enterprise, therefore, the first step was one of concentration: 183 specialised producers were brought together under a new ministry for defence industry (Narkomoboronprom). Under the pressures of rearmament at a growing pace, however, the administrative fission process soon spread to defence industry itself; in 1939, Narkomoboronprom was broken up into four new ministries for the aircraft industry (Narkomaviaprom), shipbuilding (Narkomsudprom), armament (Narkomvooruzheniia), and ammunition (Narkomboepripasov).

Before and during World War II, the relationship between the cadre and reserve factories went through sharp changes. In the last years before the war rearmament accelerated, cadre facilities were increasingly preempted by military orders, and the reserve was increasingly mobilised. Defence orders were widely subcontracted through civilian industry, and the supply of goods for civilian use declined. In the case of the aircraft industry, the cadre-reserve distinction was lost altogether as subcontractors were brought under the direct control of the ministry.⁷

These prewar trends were just a pale foretaste, however, of what transpired in the war years. The cadre-reserve distinction collapsed as

⁵ As source to table 1.1.

⁶ The following account of ministerial reorganisation draws mainly upon Harrison (1985), 267-86, and Crowfoot and Harrison (1990).

⁷ Tupper (1984).

the whole economy was mobilised, and industrial capacity was converted indiscriminately to the production of defence products and products for defence use. The Soviet Union was saved not only by the courage of its soldiers and workers but also by a production and productivity miracle (see chapter 5). Munitions output soared while civilian branches of industry collapsed. The share of specialised defence industry in industry net value added rose from 14 per cent in 1940 to more than 60 per cent in 1942-3. Because this was accompanied by huge productivity gains, the workforce share of defence industry rose by much less, to a little over 30 percent in the same period.⁸ Thus there remained a substantial circle of apparently 'civilian' producers in wartime, but these were engaged to a significant extent in the supply of general-purpose final products to the army and intermediate goods to defence industry.

World War II brought few changes in the ministerial structure; new commissariats were created for tankbuilding and mortar armament, but otherwise the general pattern of ministerial specialisation remained unchanged. More important than ministerial organisation was the tightening of supraministerial controls on key producers. The topic of supraministerial regulation is discussed further below.

The years after World War II were marked by twin processes of demobilisation, and rearmament based around new weapon technologies including atomic weapons, rocketry, jet propulsion, radar, and electronics (see chapters 6 and 7). Some wartime ministries were civilianised. Some cadre factories were handed over to civilian agencies e.g. the ministries of transport engineering, agricultural engineering, heavy engineering, the vehicle and tractor industry) where they were grouped under special military administrations (e.g. ammunition and rocket artillery within agricultural engineering, tanks within transport engineering). Other ministries were conserved, e.g. Minaviaprom, Minvooruzheniia (renamed Minoboronprom in 1954), and Minsudprom. At the same time entirely new industries were being created both under existing ministries such as Minvooruzheniia (rocketry) and Minaviaprom (jet aviation), and under new chief administrations subordinated directly to the council of ministries (atomic weapons, the nuclear industry, radar, and radio-TV-infrared technology). In 1954 the latter were formed into new ministries for the radio industry, electronic industry, and 'medium engineering'.

The demobilisation of defence industry after World War II was accompanied by widespread reconversion of industrial capacity back to peacetime production, and by growth in the civilian output of defence industry facilities. Thus the peacetime 'reserve' was restored, along with the reserve capacities of the 'cadre' factories. By 1950 the civilian products of five military-industrial ministries were planned to account for half the gross value of their output, compared with 15 per cent in

⁸ Harrison (1996), 81, 87.

1945 and a quarter in 1940.⁹ But the simultaneous creation of new weapon systems and specialised industries to produce them meant that by the mid-1950s the specialised apparatus of the defence industry as a whole was larger than ever; just the four ministries represented in table 1.1 alone accounted for 781 factories, more than three times the number of prewar 1939.

Regulation and monitoring

Before the revolution the Russian defence industry had operated in a market environment. Of course there were limits on the scope of market forces. Some were peculiar to a low-income, agrarian economy which had emerged only recently from its medieval phase, and which retained a centralized, bureaucratic mode of government. Other limits on the market for defence products were those which we find even in highly industrialized market economies -- monopsony and monopoly, a significant element of public-sector ownership, barriers against the entry of new private-sector capital, cost-plus pricing, and accompanying tendencies to inflated costs and underutilized capacity.¹⁰

The shortage economy which emerged under Stalin's Five Year Plans wrote most of these tendencies in large on Soviet economic institutions generally. Nonmarket resource allocation now characterized the whole economy, not just the defence industry. Self-interested industrial enterprises generally ceased to respond to price signals in their input choices and cost decisions, since inefficient decisions were no longer subject to economic penalties. They were regulated instead by nonprice controls imposed from above. Nonprice controls reflected the emergence of a widespread 'agency problem' which acquired systemic significance.

In the classic formulation of the principal-agent problem, knowledge is distributed unevenly.¹¹ Principals have good general knowledge, but poor local knowledge of the specific context in which their agents act on their behalf. As a result, in the course of carrying out higher orders, agents acquire scope for discretionary or opportunistic action to reallocate resources towards their own goals. At the same time principals aim to restrict the opportunities for agents' discretionary behaviour by establishing systems of monitoring, reward, and punishment. Meanwhile, agents seek to maintain their discretion while

⁹ RGAE, 4372/6/693, 161-2. The 1950 targets appear to have been somewhat undershot. By 1950 civilian output was accounting for only a quarter of Minaviaprom output (compared with the 40 percent plan), which was back to the level of 1940. For Minvooruzheniia the share was 55 percent compared with planned 60 percent, and both were well above the 15 percent 1940 level. RGAE, 4372/97/536, 29.

¹⁰ Gatrell (1994), 260-90.

¹¹ For discussion of agency problems in the Soviet administrative setting, see Gregory (1990).

at the same time maximising the incentives and satisfying the performance criteria fixed by their principals. This model corresponded to many well known features of Soviet economic life. Managers and workers in the enterprise aimed to live quietly and get paid without too much effort, rather than to add to output or company profits. To counteract this tendency, the state imposed stringent quantitative controls, pressing the firm to raise output and effort even when external supplies could not be guaranteed. In turn, firms sought to protect their autonomy by producing to the letter of the plan, not its spirit, and also by accumulating excess stocks of machinery, labour, and materials, bargaining for increased input allocations, inflating costs, and insuring against external supply failure by unauthorized investment in vertically integrated processes so as to create hidden reserves of production capacity of all kinds.

These tendencies were at work in all spheres of economic life, whether or not they were defence-related, but defence production still had special characteristics. On the supply side, defence needs were given high priority. This gave the defence industry a degree of privilege, protecting it against the worst features of the shortage economy. It also gave defence producers ample scope to create hidden capacity reserves. While privileged on the supply side, however, the defence industry faced demand conditions more challenging than those facing civilian producers. This is because the users of the defence industry's final output were in a much stronger position than the users of civilian goods. Unlike civilian households, the military was technically knowledgeable and politically influential; unlike civilian industrial users, the military was also in a position to refuse defective output, through its military inspectors present in all major defence assembly plants. The military's ability to force industry to share its objectives thus helped to limit the opportunistic behaviour of defence industry management.

In this sense, the armed forces and the defence industry faced each other in the 'market place' for munitions as antagonists. The armed forces' interest in low-cost, combat-effective munitions did not complement the interest of the defence industry in ease of plan fulfilment, the inflation of claims on current resources, and the aggrandisement of capacity reserves.¹² At the same time, both the military and the defence complex shared common interests in the high priority accorded to defence needs, the prestige associated with defence work, and the identification of national security with military power.

The defence-industry complex was at the core of the Soviet regime's priorities. Government policies of public-sector industrial accumulation expressed a strong linkage of self-sufficient economic development with military security and industrialisation. Heavy industry and defence industry benefited alike. Defence industry got the best of everything, but in return suffered the most intense scrutiny from above.

¹² This type of conflict is emphasised by Almquist (1990), 126-7.

The regulatory structure of the defence-industry complex was multi-dimensional and multi-layer. Some element of supraministerial regulation, involving both military and political leadership, was continually present. The most important strategic decisions were taken in the Politburo of the party Central Committee. Within the Politburo there was always a Central Committee secretary heading a department of the Central Committee apparatus responsible for military and military-industrial affairs.

At the next level, there was usually a government agency under the Sovnarkom (after 1946, the Council of Ministers) for supraministerial coordination of the army and defence industry. In the 1920s, for example, this was the function of the Council for Labour and Defence (*Sovet truda i oborony*, or STO). By the late 1930s the same job had been divided between two supraministerial committees, a Defence Committee (*Komitet oborony*), and an Economic Council (the *Ekonomsovet*). The Defence Committee supervised the work of the defence and navy commissariats; its military-industrial commission (*voenno-promyshlennaia kommissiia*, or VPK) had charge of the mobilization readiness of both cadre and reserve industrial facilities. The Economic Council ran several production-branch subcommittees, including one for the defence industry.

During World War II the functions of the Politburo, Defence Council and Economic Council were merged in Stalin's war cabinet, the GKO (*Gosudarstvennyi komitet oborony*) and under it from 1943 the Operations bureau (*Operativnyi biuro*). In the postwar period there was a return to a more conventional arrangement, with the Politburo and Central Committee secretaries on the one hand, and a government Defence Council (*Sovet oborony*) and VPK on the other, playing distinct roles.

The defence industry administrations and ministries themselves formed the hierarchical chain of command. The line of direct, personal, management responsibility for production outcomes (*edinonachalie*) ran from the minister or chief of administration to his deputies, assistant chiefs, and so on, down to the enterprise director. The detailed monitoring of their activity, the tasks of day-to-day coordination, and the troubleshooting of production programmes in case of need, were the prerogative of the defence sector of the State Planning Commission (*Gosplan*).

The regulatory institutions of the defence-industry complex so far described were special mainly in the degree of attention and supervision, not in kind. Civilian producers were also subject to strategic decision making in the Politburo, ministerial and supraministerial regulation, and detailed planning, monitoring, and trouble-shooting. The defence industry was special, however, to the extent that, to a degree unusual in the Soviet economy, the industry was regulated by its customer (NKVM-NKO-MO -- the ministry or, before 1946 the commissariat, of defence).¹³

¹³ The Soviet defence ministry underwent several nominal transformations and reorganisations during the period under review.

Civilian producers produced to satisfy government orders, not the requirements of final users. Final users of civilian products had little or no say in determining product quality or assortment, which were subject only to weak administrative controls, and they were usually grateful to receive anything rather than nothing. There were little or no incentives to reward the introduction of either new products or new processes. In defence industry, in contrast, by the 1930s regulation had evolved in the direction of quasi-market testing for both existing products and for new product designs. For neither case was there a real market, not even an internal one. Nonetheless there were real elements of consumer sovereignty, which were entirely absent from any other sphere of the economy.

As far as current production was concerned, in 1930, the defence commissariat had won the right to appoint its military representatives (*voennye predstaviteli*, or *voenpredy* for short) to work in all the important defence factories, where they were responsible for ensuring war readiness (see chapter 11), and also for chasing the progress of defence orders and accepting (or rejecting) finished output (see chapter 12). The power to reject output was real, and is attested both by persistently high rejection rates and by the strenuous efforts of defence industry managers to deflect the *voenpred* regime. A different system was applied to military R&D in industry which nonetheless had the same result of giving the military the power to pick and choose and giving industry an incentive to please the customer. This was the system of rivalry among competing design bureaux, which were set to compete with each other in coming up with new models and weapon systems to satisfy military specifications. The system did not work in all circumstances, as is shown for the case of long-range rocketry (see

The people's commissariat of military and naval affairs (NKVM -- *narodnyi komissariat voennykh i morskikh del*) was established on 23 November 1917, but between January 1918 and 12 November 1923 it was divided into two commissariats responsible separately one for military affairs (including aviation), the other for the navy. On 15 March 1934 NKVM was renamed the people's commissariat of defence (NKO -- *narodnyi komissariat oborony*). On 30 December 1937 responsibility for the navy was again removed from NKO to a separate commissariat (NKVMF -- *narodnyi komissariat voenno-morskogo flota*); this division was maintained until 25 February 1946 when a unified people's commissariat of the armed forces (NKVS -- *narodnyi komissariat vooruzhennykh sil*) was once more created. In March 1946, all the people's commissariats were renamed ministries (hence, MVS -- *ministerstvo vooruzhennykh sil*). On 25 February 1950 the MVS was renamed the 'war ministry' (*voennoe ministerstvo*), and the navy was hived off for a third time to a new navy ministry (*voenno-morskoe ministerstvo*). A unified ministry of defence (MO -- *ministerstvo oborony*), finally reestablished on 15 March 1953, was then maintained without alteration of name or principal functions until 1991. See 'Ministerstvo oborony' (1978), 294-5. The defence minister through most of the interwar period was the long serving (1925-40) K.E. Voroshilov.

chapter 6). Sometimes the required scale of technological development was too great for rivalry to be permitted; on other occasions, the outcome of rivalry was imposed by the security organs (the NKVD-MVD), a regulatory agency not mentioned yet which oversaw all branches of the economy, military or civilian. Still, subject to some exceptions the competitive R&D system worked reliably on the whole.

Thus institutionalised consumer influence on the defence industry had the effect of further mitigating the inherent tendencies of the shortage economy. In nonmilitary branches indifference to customer requirements led to restricted assortment, low quality, and a conservative product technology. In Soviet defence industry these were avoided, with the result that the army had access to a wide range of up-to-date, modernised weapons which were often at the forefront of global technology and were usually also serviceable in combat.

Although military themes were very prominent in the Soviet economy and political system from the 1930s onwards, civilian leaders (in the first place, Stalin) retained complete authority over the course of rearmament and military-economic policy. Military representation in the highest circles of party and government remained very limited. The supremacy of civilian leadership was reinforced by the extensive purges of 1937-8 in which the security organs stamped their authority on every sphere of public life and every public institution. In the military sphere the purges destroyed preemptively any leanings towards independent political ambition on the part of the Red Army officer corps, and severely weakened its professional autonomy.

At a lower level, however, there was already established and continued to be a pervasive military presence in defence industry, and military influence over its management.

Integration and disintegration

Once a specialised defence-industry complex administration had been established, to what extent could it free its production apparatus from dependence on the civilian economy? This issue has to be understood in relation to the tendency to production autarky in the economic system as a whole. Under the Stalinist five-year plans, despite far-reaching economic centralisation, many important areas of life were still regulated from below. Wherever needs were left unfilled by the planning system, workers, managers and consumers created decentralised mechanisms to fill the gaps and pursue their own objectives. In the machine-building industry a common such mechanism involved the autarkic development by the factory of its own sideline production of metals, components, fuels, tools or electric power. This pursuit of self-reliance may be understood as one more aspect of the agency problem already mentioned; self-reliance fostered the ability of the enterprise to meet objectives imposed from above while at the same time enlarging the opportunities for discretionary use of resources not derived from the plan and often concealed from the planners.

The defence industry certainly shared this tendency to a high degree. In the extreme case, it gave rise to the autarkic development of

huge metallurgical, power, manufacturing, and assembly complexes in the remote interior of the country, and eventually the 'closed' cities which were secret at the time and are discussed further below (see also chapter 10).

On the other hand there were also countervailing tendencies which limited autarky and which were expressed with particular force in defence industry. One thing which lowered the incentive to pursue autarkic development was the priority system itself, which placed defence producers first in the queue for scarce commodities, protecting them against the worst uncertainties of the shortage economy by making them less likely to suffer from interrupted or deficient supply than civilian producers. As a result defence producers were better able to tolerate dependence on external suppliers and faced a weaker incentive than civilian producers to develop a high degree of vertical integration. They could also afford to reap more benefits from specialisation.

A second factor which actively prevented defence producers from achieving autarky was the positioning of the defence industry at the forefront of the expanding Soviet technological frontier. The development and serial production of new products, the establishment of new technologies, and the birth of new largescale industries could not be achieved in an autarkic way on the basis of the existing resources of the defence industry. Each new product or technology turned out to require the wide involvement and collaboration of civilian agencies and suppliers. Every technological breakthrough in the design of tanks, aircraft, aeroengines, missiles, and atomic weaponry (see chapters 6 and 7) required the unanticipated conscription of new cohorts of civilian specialists and enterprises to the ranks of the defence-industry complex.

A third factor which counteracted the trend to self-reliance was the requirements of mass production. When war loomed and the demand for weapons surged, the capacity of the cadre factories was insufficient, and the reserve had to be brought into play. Thus the mobilisation capacity of defence industry in peacetime depended upon a healthy civilian economy. At the same time the peacetime expenses of maintaining the specialised cadre defence factories were defrayed by requiring their participation in sideline production for civilian use.

Priority, privilege, secrecy, terror

The defence-industry complex suffered intense scrutiny from above, but little or no scrutiny from below. This was ensured by the regime of secrecy. Secrecy was applied first of all to production. In 1927 the 'cadre' defence factories were anonymised, their traditional names being replaced by numbers 1 to 56. Thus the Aviakhim aircraft works (Moscow) became factory no. 1, the Kovrov machine-gun works became factory no. 2, the Volodarskii tube and explosive works (Ul'ianovsk) became factory no. 3, and so on. As the number of defence producers rose the numerical range of the list expanded accordingly. As ministries were created and reorganised, the numbered factories were passed from one subordination to another, and were occasionally renumbered,

but more often the number once allocated stuck for many years. From the 1930s onwards many specialised defence research institutes and laboratories were added to the numbered list, sometimes attached to production enterprises and sharing their numbers for purposes of identification.

For purposes of communication, defence producers were often allocated special postal and telegraphic codes which made no reference to real locations or street addresses. Thus, for example, in the 1930s the telegraphic address of aircraft factory no. 16 (Voronezh) was simply '*Krylo*' ('Wing'). In 1946 the production of the atomic bomb was entrusted to KB-11 (design bureau no. 11), '*pochtovyi iashchik* [Post Office box] Arzamas-16' (see chapter 7). Arzamas was a town in the Volga region south of Gor'kii, and Arzamas-16 was somewhere nearby - - but not in Arzamas. This -- the creation of closed cities in the remote regions of the Volga, the Urals, and western Siberia, not marked on any map, entirely specialised in defence production and built for no other purpose -- had its origins in the evacuation of defence industry from the western and southern regions threatened by German occupation to the remote interior in 1941 and 1942, but was greatly reinforced by the extraordinary secrecy attached to the postwar development of new strategic weapons. It became the most exaggerated expression of secrecy in the whole system (see chapter 10).

Walls of secrecy were thrown up not only around the defence-industry complex, but also within it. Thus, in the 1930s defence industry managers waged a stubborn campaign to exclude military representatives from information relevant to the calculation of product costs and prices, on the grounds of 'need to know'; this, despite the defence ministry's right to verify costs and prices on site, previously enshrined in government statute. At the same time, the regulations governing the work of military representatives in defence plant insistently invoked their duty to guard and conceal secret documentation of production and mobilisation plans from all factory personnel not explicitly permitted to have oversight of them (see chapter 12).

In the 1930s statistical secrecy shielded the public from any general knowledge of the scale, character, or direction of defence activity, with the sole exception of a single line in the state budget headed 'expenditures on defence'. The budget was approved annually in a public session of the Supreme Soviet. In the 1940s even this information disappeared temporarily from view. In the 1950s Soviet leaders began to make occasional revelations concerning, for example, numbers of armed forces personnel in various periods; with the 1960s, the pace of serious historical research began to include the disclosure of more detailed statistical information concerning the defence-industry complex in the prewar period and World War II, but not relating to the postwar period itself.

The published information was sometimes intended to mislead. The historical record now shows clearly that the pressure to distort was greatest when Soviet leaders found themselves involved with other states in disarmament processes. Thus in the context of its participation in the World Disarmament Conference at Geneva the

Soviet Union published highly understated figures for budget defence outlays and military force levels for 1931-4 (see chapter 4). The systematic and growing understatement of budget defence outlays which began in 1959 and persisted right through to the end of the Soviet period was likewise associated with the consecutive eras of 'peaceful coexistence' and 'detente'.¹⁴

On the other hand, in the period of prewar rearmament, World War II, and the early Cold War, what little was published was relatively truthful. Of course the published information was extremely scanty, and there was little need to distort since almost every kind of information was simply suppressed. Thus any information which might assist a calculation of the scale, activity, or location of the defence-industry complex was withheld. The statistical system became partially disintegrated; within each planning, statistical, or financial agency, flows of defence-related information were channeled separately through a 'first department' (*pervyi otdel*), thus creating a segregation of military from civilian data. (The 'first department' was the point of contact for the security organs in every establishment.)

It was a serious methodological problem whether to reaggregate the military and civilian data flows at the apex of the statistical system for the purpose of calculating overall indicators and balances of sectoral, regional, and national economic activity. If defence-related flows were excluded altogether from totals (e.g. of the gross output of industry), then the integrity of the planning system would be jeopardised, and economic growth indicators would be seriously distorted. Thus on 8 January 1932 a Politburo resolution required that defence industry production *should* be included in the calculated totals for industry as a whole.¹⁵ But this was still far less than was required for adequate monitoring of defence industry from within the apparatus. In March 1935 the statistical chief N. Osinskii complained that Gosplan's statistical branch was starved of defence-industry data; at the end of that month, Sovnarkom adopted a complicated resolution on the subject which required defence industry to submit full reports of both real and financial outcomes to Gosplan at the centre; of real outcomes, but only in relation to civilian products, to local statistical agencies; and of financial outcomes alone to the Ministry of Finance.¹⁶

The strategy of partial revelation, for example including defence industry production in the totals for industry as a whole, but not as a separate item, was fraught with danger. The risk was that an intelligent observer could deduce the value of the defence component from the published statistics of the total compared with the sum of the subtotals relating to civilian items. Exactly this situation arose in the spring of 1937, when Narkomtiazhprom published figures for the gross output of

¹⁴ On the problem of the postwar budgetary accounting for defence allocations see Jacobsen (1987).

¹⁵ RGAE, 1562/329/120, 37.

¹⁶ RGAE, 7297/38/91, 28.

its civilian products alone, while Gosplan published almost simultaneously the overall gross output of Narkomtiazhprom. There was an alarmed reaction from within Gosplan demanding strict punishment of those responsible.¹⁷ The fears aroused were ironically justified, for an entire cohort of western scholars made its way in the postwar period by analysing exactly such indiscretions, whether noticed or unnoticed by the Soviet regime itself.

The purposes of secrecy were many. Among them was the legitimate strategic purpose of denying sensitive national security information to potential enemies. The strategy of war avoidance pursued by the Soviet Union required secrecy for two reasons. One was the concealment of weaknesses which might give an advantage to some potential aggressor, or tempt an enemy to engage in opportunistic aggression. This consideration was clearly a factor in the interwar period, becoming stronger as the likelihood of war with Japan and Germany increased, and the traumatic experience of Germany's surprise attack in June 1941 magnified it tremendously in the postwar period. The other reason was to make it more difficult for potential aggressors to formulate realistic war plans, by denying them the information which would enable them to predict likely Soviet actions in the event of war. This became especially significant in the context of postwar nuclear deterrence. Additionally, the Soviet Union's own war plans themselves also rested on secrecy, as a condition for the achievement of strategic and tactical deception and surprise.

At the same time it is clear that secrecy in the Soviet defence-industry complex went beyond what was required by strategic considerations alone. Secrecy was used also to prevent popular scrutiny and defend privilege. For example, once Soviet military 'secrets' were known in the west (for example, from defectors' reports) there was no basis in national security to prevent such information from reaching the Soviet population; however, the Soviet censorship was as keen to prevent the leakage of militarily sensitive information into the Soviet public arena from western public sources as it was to prevent leakages from its own closed official circles. Secretiveness was therefore one of the defences protecting the priority and privilege of the military sector generally, and of the defence industry in particular.

The favourable position of the defence industry in the Soviet economy's priority system became entrenched in the 1930s. Probably the formation of Narkomoboronprom in 1936, and the subsequent emergence of still more specialised defence industry ministries, marked a decisive stage in the entrenchment of this priority.¹⁸

The economic priority accorded to Soviet defence agencies has sometimes been viewed in an oversimplified way. For example, the regime was often ready to allocate a disproportionate share of new resources to military goals in its strategic plans and perspectives, so there were many periods when the share of defence in the state budget,

¹⁷ RGAE, 7297/38/91, 66-8.

¹⁸ Thanks to Julian Cooper for making this point.

or in GNP, drifted upwards (for more detail see chapter 4). On the other hand, there were also times when such trends appeared to be against the spirit of the policies written into the plans in advance, the first Five-Year Plan (which anticipated a *declining* defence share) being a case in point. Another period when a peace dividend was anticipated (and not just anticipated but also realised) was the years after World War II. Often enough, when the defence share of total output rose sharply, it disrupted the economy and diverted resources away from other government goals. When overall resources were short and the economy was overstrained, soldiers sometimes had to take a turn in the queue, tailor their designs to the resources available, and make a few sacrifices. But still, the belt-tightening done by the military was usually metaphorical. When famine came it was peasants, not staff officers, who starved to death.

Thus the defence industry was generally privileged relative to other branches. The fact that such privilege remained unquestioned for five decades is surely attributable in significant part to secrecy and censorship. Thus an important function of secrecy was to allow decisions to be taken which gave expression to the priority of defence industry interests and sustained their privilege, without the need to render any public account, or engage in informed discussion other than within the confines of the Politburo and high-level defence agencies.

However, not all aspects of Soviet military-industrial secrecy can be understood as a government conspiracy to subvert public accountability. The walls of secrecy *within* the defence-industry complex do not fit this description. The production data deemed too secret to release to the central planners, the cost data considered too secret to reveal to the soldiers, and so on, reflected the more general agency problem faced by the regime. In the defence-industry complex, secrecy aided agents in their search for discretion and struggle for autonomy at every level. Military secrecy prevented public questioning of regime priorities. At the same time, economic secrecy prevented planners from questioning producer demands for resources, and also stopped soldiers from questioning producer demands for cash. Thus producers eagerly coopted the institutions of secretiveness to increase their opportunities of gaining access to resources and relaxing external constraints on their behaviour.

The dangers of excessive secretiveness were very real. One was the increasing difficulty of mobilising resources and ensuring high performance. Beyond a point, secretiveness inhibited regulation from above as well as scrutiny from below. Another result which followed directly was the increasing powers assumed by the only special agency with the right to inquire into everything, and before whom there could be no secrets -- the security police. Thus secretiveness and terror were also connected. The cycle was completed when those with specialist responsibility for the administration of terror such as Beria in turn became leaders of defence industry (see chapters 9 and 13).

In the Stalin years the distinction between civilian and military information became blurred. Between 1938 and 1956 virtually anything was liable to be made secret. To this extent the defence-industry complex ceased to be special from the standpoint of secretiveness. In

wartime such secretiveness may have been tolerable, and its negative consequences offset at least in part by countervailing forces such as increased national feeling, which made opportunistic behaviour less likely and the need for terroristic repression less self-evident. In peacetime, however, an efficient economy could not be run indefinitely on the basis of secretiveness and terror. Khrushchev in some sense recognised the link between secretiveness and terror in 1956 when he lifted simultaneously the veil of secrecy and the threat of mass repression from civilian affairs. So from 1956 onwards, although neither secretiveness nor repression were eliminated, secrecy was restricted to its previously 'normal' sphere of defence and national security interests (defined rather more broadly than in many other states), and repression was limited to the public critics of the regime.

Conclusion: a 'military-industrial complex'?

What was special about the Soviet defence industry? First, was the defence-industry complex really separate from the civilian economy in the sense of specialised institutions, particular behaviours, and separate resources? Our answer is that this was the case to a considerable extent, but not absolutely. In many ways the special features of the defence-industry complex were just the basic tendencies of the Soviet economy writ large. The multi-layer hierarchical controls, the tendencies of secretiveness and of autarky, were special in degree, not in kind.

Second, what is implied by our inability to be precise in defining the limits of the defence industry? Does it lend support to the idea that the whole economy was driven by the requirements of military activity and was characterised by a primarily military motivation at its core? It is true that there was an interpenetration of civilian and military industrial production. Defence factories relied on the civilian economy for supplies and produced civilian products as well as weapons. Civilian producers were involved in defence industry as suppliers of intermediate products and sideline final military products as well. These were permanent features of Soviet industry, although to a varying degree. But in our view this does not mean that the whole economy should be seen as just a supportive apparatus for the defence industry and nothing more.

For one thing, not all parts of the civilian economy were involved in production for defence to the same degree; some were entirely separate or were involved, if at all, incidentally (for example to the extent that soldiers purchased consumer goods or used civilian services which had not been specifically designated for them). For another, while some major aspects of civilian economic development were undoubtedly influenced by military considerations, some aspects of defence industry development such as the 'excessive' secretiveness described above were really expressions of civilian public interest or even private self-interest for which military justifications were no more than a convenient cloak, while still others had entirely nonmilitary rationales.

The collusion of military and economic interests in the pursuit of common goals and to the detriment of society as a whole has

sometimes been described in the west as giving rise to a 'military-industrial complex'. In a Soviet setting this term has been applied in at least three or four different ways. Many such uses are completely inappropriate and arise from a mistranslation. In English the term 'military-industrial complex' carries the clear implication of a coalition of industrial interests with the interests of the defence ministry and armed forces -- 'military' and 'industrial' carry equal weight as adjectival qualifiers of the 'complex'. It is usually translated into Russian as *voenno-promyshlennyi kompleks* ('VPK' for short). However, the Russian is ambiguous where the English is not, and may be understood not as referring to the military-industrial complex in the broad western sense, but to a narrower complex *of the 'military' (i.e. defence) industry alone* -- the adjectival 'voenno-' (= military) qualifies 'promyshlennyi' (= industrial), not the 'complex'. In that case the Russian 'VPK' should be translated back to English as our own, narrower 'defence-industry complex'. This rule has been followed in the translation of chapters 8, 9, 10, and 13 (but see further discussion in chapter 9).

Here we are interested only in those interpretations of the Soviet military-industrial complex which adhere to the western sense of a broad coalition between military and industrial interests. Most sweeping is the interpretation of Mikhail Agursky and Hannes Adomeit; they found 'a core of truth in the aphorism that "the USA *has* a military-industrial complex, the USSR *is* a military-industrial complex"¹⁹. They based this distinction on the contrast between the United States political structure, open to pressure from interests outside itself, civilian as well as defence-related, and the closed Soviet political structure from which independent civilian interests and values capable of resisting military-industrial pressures were excluded. They went on to say, however, that 'to consider the whole of the Soviet Union as a military-industrial complex is far too broad to be meaningful', a conclusion with which the present authors are certainly in agreement.

A more differentiated view was that of Vernon Aspaturian, who presented two alternative versions or 'prototypes', one weaker and the other stronger.²⁰ The weaker sense is that of the Soviet military-industrial complex as:

a deliberate and symbiotic sharing of interests on the part of the military establishment, industry, and high-ranking political figures, whose collective influence is sufficient to shape decisions to accord with the interests of these groups at the expense of others in Soviet society.

A somewhat stronger interpretation would present the Soviet military-industrial complex as:

¹⁹ Agursky and Adomeit (1978), 6.

²⁰ Aspaturian (1973), 103.

an interlocking and interdependent structure of interests among military, industrial, and political figures, that enables or impels them to behave as a distinctive political actor separate from its individual components. A complex of this type ... would exhibit a high degree of policy unity and act as a single input into the political system.

The second is stronger than the first because of the requirement that the influence of the military-industrial complex is exerted by its representatives acting in unison. In the first, weaker version, its influence arises from the sum of actions of the military, industrial, and political leaders acting separately, although deliberately. Aspaturian's own preference was for something 'much more than the first prototype and something less than the second'.

The post-Soviet Russian scholar Irina Bystrova would appear to agree with Aspaturian when she stresses that, 'despite its traditional prioritisation, the [military-industrial complex] was hardly the "alpha and omega" of Soviet society'. In correspondence with his stronger prototype, however, she refers to the Soviet military-industrial complex as '*a powerful corporation which represented the common interests of social and political groups connected with the provision of national security of the USSR: the professional soldiers, the defence industry sector, the party and state officials, and the representatives of the security agencies and scientific and technical circles*'.²¹ Her idea of the military-industrial complex as a corporate entity matches Aspaturian's hypothesis that it 'acted as a single input into the political system'. However, she limits the application of this concept to the post-Stalin period because Stalin's policy of 'divide and rule' prevented the emergence of a military-industrial complex before that time.²²

We ourselves would reject Aspaturian's stronger version, and might accept his weaker one only with some qualifications. Some of these qualifications were suggested by Peter Almquist. He concurred with Aspaturian in the idea that shared interest must underlie the idea of a military-industrial complex:

For a military-industrial complex to exist in a meaningful way, the military and its supporting industries must have, first, complementary interests. By this it is meant that one of the 'partners' generally benefits from the self-interested actions of the other ...

As distinct from shared *interest*, however, Almquist suggested that shared *purpose* must be capable of independent and separate expression:

Second, and equally important, both the military and the industry must have a means of influencing the political decision makers. In a

²¹ Bystrova (1997), 32, 35 (emphasis added).

²² Bystrova (1996), 4-5.

military-industrial complex, a 'silent partner' is an irrelevant partner ...²³

Our research shows that, in the period which we have covered, the conditions for existence of a Soviet military-industrial complex proposed by both Aspaturian and Almquist were met only to some extent. First, the armed forces and defence industry certainly shared a common interest in increasing resources for military as opposed to civilian uses. However, when it came to practical decision making about resource allocation, there were different levels and stages to consider. At a very general, strategic level, a decision to allocate more resources to the armed forces carried the implication of more resources for defence industry, and conversely. Once decisions at this level had been taken, however (for example, over budgetary allocations), there was a large potential for conflict between soldiers and industrialists at the next level, since higher costs and less exacting standards implied more resources and an easier life for defence producers at the expense of resources for the military, while cheaper, better weapons could only be bought by means of direct pressure on the producers. The day-to-day correspondence between the supply and service departments within the defence-industry complex which we have seen speaks eloquently of the mutual tensions, frustrations, suspicions, and antagonisms generated by this relationship. Thus the interests of the two sides were complementary in part, but there was also an irreducible element of conflict.

Secondly, there is evidence of independent voice of the armed forces and of defence industry in the process of resource allocation; thus, neither was 'silent'. But were they partners? When they pressed for higher production and mobilisation targets, soldiers knew that more resources would be required for defence industry production and construction. But is there evidence of military-industrial collusion in pressing for more joint resources? This step in the argument remains unsupported by evidence. The voice of the armed forces was conspicuous only by its absence. Thus when M.G. Pervukhin, minister for the chemical industry, fought the planning chief N.A. Voznesenskii for more resources for the uranium industry after World War II, it was within a bureaucratic framework which excluded the military (the Special Committee appointed by Stalin to take charge of atomic weapons development had no armed forces representatives). When in the same period D.M. Ustinov, minister for armament, fought G.M. Popov, chief of Mossovet (the Moscow city administration) for factory space for jet and rocket armament, the dispute was settled by Stalin, not pressure from the armed forces.²⁴

To the extent that it was possible, each interest group, military and industrial, fought its own corner. Moreover, the extent of pressure which each could bring to bear was strictly constrained by the political

²³ Almquist (1990), 12-13.

²⁴ Bystrova (1996), 5, 6, 10.

system in which they operated. The interests of Soviet society were already strongly identified with military and defence-industry interests, but the concentration of decision making in the central party organs and the ubiquitous role of the party-state apparatus meant that military and defence-industry interests had little or no freedom of independent action. Civilian leaders from Stalin onwards retained complete authority through prewar rearmament, World War II, and postwar military confrontation and standoff. The political influence of outstanding soldiers was always tenuous, from Marshal M.N. Tukhachevskii (the Red Army chief of armament, executed by Stalin in 1937) to air force Marshal A.A. Novikov (imprisoned by Stalin in 1946) and Marshal G.K. Zhukov (sacked first by Stalin in 1946, then by Khrushchev in 1957). If any other branch of the state apparatus developed an organic relationship with the defence industry at this time, it was the security organs under the leadership of the civilian minister for internal affairs and deputy prime minister L.P. Beriia. Beriia, like Stalin's postwar commander of ground forces N.A. Bulganin, also possessed the military rank of Marshal, but neither was a professional military man. Beriia shared Stalin's distrust of the professional soldiers, even to the point where in the early 1950s he stood in the way of the armed forces' acquisition of the nuclear weapons developed under his own leadership at such cost in industrial resources (see chapter 13).

These considerations do not conclusively refute the arguments for the emergence of a Soviet military-industrial complex, particularly in the last three decades of the Soviet state which are not covered by our research. But they do justify our decision to focus our historical investigations on the Soviet defence industry as such (see further chapters 8, 9, and 10).

At the end of the day it makes sense to look back on the Soviet defence-industry complex as a distinct part of the economy, and not the whole, but not entirely separate from the other parts either. This complex comprised of the specialised defence producers, combined with the regulatory bodies to which they were subordinate, formed a distinct element in the Soviet political economy, weighty and influential to be sure -- but not all-encompassing or all-determining, not really autonomous, and characterised by inner fault-lines as well as by unifying themes. The study of this defence-industry complex is therefore a particularly fascinating route to enlightenment as to the nature of the Soviet economy and society more generally. We hope that the reader will find the Soviet defence-industry complex further illuminated, if not fully, then at least in many aspects for the first time, in the chapters which follow.

Table 1.1. 'Cadre' defence factories and their ministerial subordination, 1929-1956 (selected years)

	Ministry or other agency	Number of factories
1929	6 trusts: Orudiino-Arsenel'nyi (Gun and Arsenal), Oruzheino-Pulemetnyi (Rifle and Machine-Gun), Patronno-Trubochnyi (Cartridge and Barrel), Aviatsionnyi (Aviation), Voenno-Khimicheskii (Military-Chemical)	43
1936	Narkomoboronprom (People's Commissariat of the Defence Industry)	183
1939	4 people's commissariats: Narkomaviaprom (aircraft industry), Narkomsudprom (shipbuilding), Narkomvooruzheniia (armament), Narkomboepripasov (ammunition)	218
1956	4 ministries: Minaviaprom (aircraft industry), Minoboronprom (defence industry), Minsudprom (shipbuilding), Minradioprom (radio industry)	781

Sources: 1929: calculated from RGAE, 2097/1/1051, 64 (figures exclude the Voenno-Kislotnyi Trest, military optics, military shipbuilding, and radio products). Other years: Simonov (1996), 38-42.