Quality, Experience, and Monopoly: Regulating the Soviet Seller's Market for Military Goods

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Abstract

Military market places display obvious inefficiencies under most institutional arrangements; that of the Soviet Union was characterized by monopoly and a seller's market to an unusual degree. Monopoly is a particular problem where experience goods are traded since the consumer cannot respond to bad experience by switching repeat purchases to another supplier. The consumer's likely response is to invest more in evaluation of quality prior to purchase, to be more reluctant to buy, and to exploit the available non-market means to influence the seller. In the case of the Soviet market for military equipment the Russian archives provide evidence of these in the activities of the military procurement agents of the defence ministry. The effectiveness of the military agents was limited by the seller's counteractions and because the buyer was obligated to come to a compromise with the seller. The outcomes, including persistent low-quality output and its rejection up to a point, were in the common interest of both buyer and seller.

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Economists have long been interested in the problem of the consumer who chooses to purchase a good before knowing its qualities. Philip Nelson (1970) introduced the distinction between "search" goods, for example food and clothing, and "experience" goods, for example domestic appliances and mechanical equipment. The basic distinction rests on the cost to the consumer of evaluating the performance attributes of a good before purchase, that is, through search, relative to the costs of doing so afterwards, from experience.

In this paper we investigate the market for weapons and military equipment; these would appear to fit the definition of experience goods quite well. For a wide range of military consumables, for example ammunition and explosives, sampling is destructive and this raises the cost of search. Our idea of the "experience" character of military durables is reinforced by the abundance of anecdotes about equipment on which the government was happy to spend taxpayers' money that broke down afterwards when put to the test of practical use. Reviewing British army exercises in Oman in 2001 the UK National Audit Office recently reported "tank filters clogged; … AS90 gun filters melted; helicopter parts unserviceable; Lynx rotor blades lasted just 27 hours; SA80 rifles jammed; … boots melted or fell apart" (BBC News 2002). In short we think of armaments as experience goods on the basis that prior search has often failed all too evidently to establish their qualities.

The western literature on experience goods typically assumes a buyer's market. Where the consumer is sovereign, experience is valuable and has a payoff above and beyond itself because of the use that can be made of it in deciding on repeat purchases: the consumer's best response to bad experience is to switch brand or supplier. In this paper, however, we consider the case of the Soviet economy, in which the market belonged to the seller so that supply was monopolized and the consumer could not switch suppliers.

From the point of view of the Soviet seller this monopolization was a source of immense advantage. It was associated with the softening of financial constraints on production establishment and a state of permanent shortage in which the consumer had no choice but to accept the goods that the seller offered, regardless of their quality or assortment (Kornai 1980, pp. 101-2). In the absence of free entry and exit there was no automatic punishment for supplying shoddy goods. The initial transition to the monopolistic command system brought a rapid deterioration in product quality (Davies 1989, pp. 88-9, 313-14, 384-5; 1996; pp. 108, 394-5, 404, 484) that was eventually halted and reversed only with great difficulty.

The Soviet economy was generally unlike western market economies. Markets for military equipment have specific features, however, that tend to be similar everywhere and suggest obvious sources of inefficiency. In all countries, the agents on both sides of the market place are powerful and well connected. On one side is a high-ranking politician of the ruling party, the

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defence minister, who controls a government monopsony. The other side is everywhere made up by large-scale producers with insistent claims on budgetary finance that carry additional weight because these concerns are too important to be allowed to fail as either producers or employers. Nonetheless, such markets are not uniformly the same, even among market economies; the comparative evidence shows plenty of historical variation in national arrangements of the military market place with different degrees of competition, public accountability, rent seeking, and "softness" of budget constraints (Eloranta 2002, 2004).

The Soviet economy, with ownership, allocation, and decision making monopolized under a single-party state, lay at one extreme of a spectrum of institutional possibilities (Djankov et al. 2003). Its market for military goods also shows a number of unique and fascinating features, not least the fact that despite being exceptionally monopolized it supplied an army that won World War II and then terrified the West for the next half century. In other words, it is fully worthy of detailed study.

What working arrangements are generally likely to emerge to protect the buyer under conditions of generalized monopoly? We offer three propositions. First, the monopolization of supply reduced the value of experience to the consumer, who could not act upon it in repeat purchases, relative to the value of search; as a result we would expect Soviet consumers to have been more willing to invest in evaluation before purchase, however costly this might be. We would also expect them to have been less willing to buy the goods they were offered in the process of evaluation for the sake of experience.

This is a prediction that we need to qualify carefully since there is much evidence of the opposite kind of behaviour, i.e. of consumers in Soviet-type economies generally being willing to buy whatever they were offered, a phenomenon that Kornai (1980, pp. 36-38) described as "forced substitution." The point Kornai made is that in a seller's market there is a payoff to hoarding that does not exist in a buyer's market. The point we are making does not contradict this but is based on the idea that in a seller's market experience is less valuable since the buyer can only respond to a bad experience by not making a repeat purchase at all. Therefore, we expect to see more care and more reluctance in purchasing decisions concerning goods that would count as experience goods in a normal market than for goods that would be search goods anywhere and everywhere.

Our second proposition is that, since buyers' preferences could not be enforced by competition, we would expect to see the Soviet consumer seeking out other means including legal enforcement, administrative regulation, and enforcement through private or informal relationships. Since the buyer could not punish one supplier by changing to another, we would think it natural to see the buyer seeking to reward the supplier by offering favours and good will in return for higher quality. We would expect to see active consumer lobbies looking to the state for endorsement and promotion of quality standards and for their enforcement through moral pressure, the establishment of regulatory agencies, the funding of incentives for qualitative improvement in the attributes and assortment of goods, the enactment of administrative and legal penalties for substandard work, and so on.

We would also expect counteraction by the producer interest, and we would expect this to go far to frustrate the actions of the consumer given the

weakness of civil society in the Soviet Union and the initial advantage of the seller's market. At the same time the defence ministry was probably the most powerful buyer that existed in the whole Soviet economy. The defence sector was of high priority for the Soviet leadership. The quality of military products bore directly on the country's defensive capability; the cost of a ship that sank or a weapon that misfired would be measured in lives lost. This raised the status of product quality in defence industry above that in civilian industry and gave much force to the attempts to overcome the adverse consequences of the seller's market in the defence sector.

Our third proposition concerns the degree of integration of the defence industry with the military. When experience goods are supplied by one firm as inputs to another a tendency to vertical integration may result if it turns out to be cheaper to exchange information within a firm than across a market (Crocker 1983). The case for integration here extends the argument that firms exist to enforce effort when independent agents cannot commit not to shirk (Alchian and Demsetz 1972; Perry 1989, pp. 210-11); in the case of the defence industry, "shirking" took the form of the supply of substandard goods. Given that weapons are an input to the production of military power, we would expect to see a tendency to vertical integration that could have brought the defence industry under the direct control of the military.

The historical evidence shows that military interests did seek vertical integration with the defence industry, but Stalin opposed it and quickly ruled it out. In 1927 initiatives associated with army commanders Tukhachevskii, chief of the Red Army general staff (Samuelson 2000, pp. 42-7), and Unshlikht, a member of the Revolutionary Military Council (A.K. Sokolov 2004), proposed to secure rights of approval over appointments to the defence industry, plans and reports of defence producers, and plans for capital investment in the industry, for the defence ministry. The proposals were rejected (Harrison and Simonov 2000, p. 230). Tukhachevskii's resignation as chief of staff, which followed in May 1928, was most likely prompted by the failure of his ambition to control the defence industry (Samuelson 2000, pp. 55-9). While Stalin's motivations are not at issue here, divide-and-rule was always there among the mechanisms on which he built his power, and this included keeping soldiers and industrialists at odds (Harrison 2003).

With vertical integration out of reach, the Soviet purchaser in the military market place was confined to the responses that were available in practice. We defined these in our first and second propositions as a greater willingness to evaluate before purchase combined with greater reluctance to buy, and the enforcement of quality by non-market means. We investigate them using the evidence base of the archives of the supplier, the Soviet ministries for military industry; the purchaser, the defence ministry; and the relevant regulatory agencies. This documentation covers the period from the end of the 1920s to the mid-1950s. Our main focus is on the "military agents" of the Soviet defence ministry who were responsible for the day-to-day acquisition of weapons and equipment from industry. The military agents have been described in a number of previous studies based on official publications and the testimony of emigres formerly employed in defence-related branches of industry and science (Agursky 1976; Agursky and Adomeit 1978; Alexander 1978; Holloway 1982; Almquist 1990). Harrison and Simonov (2000) were the first to offer a perspective on these arrangements based on a few central

records of the defence ministry, which gave grounds for much greater scepticism than the recollections of former industrial or scientific workers or anodyne official publications. Ours is the first account based on large-scale primary documentation of the day to day process of military procurement. In terms of the methodology of social science the evidence is qualitative and is of two kinds: for the most part we accumulate examples that illustrate the argument; occasionally we draw conclusions from silences in the data.

The paper is organized as follows. Part 1 outlines the internal mechanisms for quality control that were to be found in the Soviet economy generally, including the defence industry. In Part 2 we describe the special mechanisms for external quality regulation that the defence ministry imposed on its main suppliers, especially through its "military agents." Part 3 analyses the activities and effects of the military agents while Part 4 reviews the counter-actions of industry. Part 5 concludes.

For brevity we use some shorthand conventions. (1) We write "the Army" and "Industry" to stand for the players on either side of the military market place; the *Army* as purchaser, comprised the ministry of defence, including the Red Army's command and supply staff; *Industry* comprised the supply ministry for the defence industry as a whole for most of the 1930s, subdivided in 1939 and subsequently into a number of ministries with specialized responsibilities for the aircraft industry, the armament industry, and so on.

(2) Soviet ministries were called "people's commissariats" until they were renamed ministries in 1946. We refer to them as ministries throughout.

(3) Soviet defence factories were numbered for secrecy, and were subordinated to fundholding ministries. In place of "factory no. 24 of the people's commissariat (ministry) of the aircraft industry" or "research institute no. 13 of the people's commissariat (ministry) of armament" we write "aircraft factory no. 24" and "armament research institute no. 13."

(4) We translate, depending on context, (a) *tekhnika* as "equipment" and *tekhnologiia* as "technology" or "equipment," (b) *priemka* as "acceptance" or "acceptance staff," so *voenpriemka* is "military acceptance" and *tekhpriemka* is "equipment acceptance," (c) *brak* as "substandard goods" or "scrap" and *brakovat´* as either "to reject" or "to scrap," (d) *voennyi predstavitel´* or *voenpred* as "military agent" and *komnab*, probably *komissar-nabliudatel´*, as "naval agent," (e) *tolkach*, literally "pusher" or "trouble-shooter for supply," as "informal purchasing agent," (f) *kontrol´* as "control," "regulation," or "audit," (g) *RKKA*, the Workers' and Peasants' Red Army, as "Red Army," and (h) the *VKhU* (*voenno-khozaistvennoe upravlenie*) of the Red Army, responsible for the purchase of soldiers' consumables other than combat equipment, as its "military-housekeeping administration."

(5) We retain three official acronyms in the text, (a) KPK, the ruling party's "control" or audit commission, (b) NKVD, until 1946 the people's commissariat (ministry) of internal affairs, responsible for internal security and forced labor, and (c) OTK, the department of "technical [i.e. quality] control" that existed within every Soviet factory. Those who pay attention to footnotes will also find VSNKh, the industry ministry from 1918 to 1930.

1. The Problem of Quality

In this section we describe the mechanisms for quality control that were internal to Industry. These evolved at two levels, the factory and the ministry. We find that both were ineffective to a considerable extent. The reason lay in the strong incentives that factory managers faced to provide a quiet life for themselves and their employees by fulfilling the plan for least effort (Granick 1954; Berliner 1957). Plans were given out in rubles of gross output at plan prices and subject to product specifications [*tekhnicheskie usloviia*] that were supposedly fixed, either by higher authority or after negotiation with the purchaser. Quality, however, was costly to the supplier. As we now know, virtually everything in the Soviet command system that appeared fixed was negotiable in practice, including plans and prices. Once these were written down, however, the main scope for the factory to reduce effort lay in finding ways to lower quality that were hard to detect at the point of sale. Hence, quality became the critical issue for the purchaser of "experience" goods.

1.1. OTK: the Factory Departments of Quality Control

The basic regulator of product quality in every Soviet factory was the department for quality control (OTK). The OTK was obligated to regulate quality through comprehensive or sample-based monitoring, depending on the nature of the product. Formally, the buyer could get nothing that the OTK had not previously passed.

The main problem was that the OTK came under the control of the seller, not the buyer, and could not regulate independently. To fulfill the plan factory managers put pressure on the OTK to pass substandard goods or by-passed it altogether: "Often when they want to get substandard goods through without the OTK chief's signature to certify the deviation from the technological process, the chief engineer will sign without OTK approval." [1] OTK staff regarded their dependence on the director as a main reason for their ineffectiveness. At a meeting of OTK chiefs in the ministry of armament held on 21 October 1947, opinion was unanimous: "It would be ideal to take the OTK staff away from the the director's influence. If that's impossible, then the OTK chief should be made deputy [factory] director for quality."[2]

Attempts to remove the OTK from under the director's thumb, for example by subordinating them directly to the ministry, did not alter the basic situation. This is because factory managers had many channels of informal influence over OTK workers to get them to accept poor-quality products. Besides, the ministries themselves were responsible for quantitative outcomes at the enterprise level and giving them control over the OTK did not change the

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[1] Minute of the speech of OTK chief Pavlov from armament factory no. 106 on 21 October 1947 at a meeting of OTK chiefs of the ministry of armament (RGAE, 8157/1/4105, f. 148). Russian archival documents are numbered according to a standard system; the foregoing refers to the Russian State Economic Archive (RGAE), ministerial collection (*fond*) no. 8157, inventory (*opis*) no. 1, file (*delo*) no. 4105, folio (*list'*) 102.

[2] OTK chief Zvonarev from armament factory no. 172 on 21 October 1947 (RGAE, 8157/1/4105, f. 102).

incentives. Finally, subordinating the OTK directly to ministries left it ambiguous who should answer for quality: the ministry or the enterprise (Harrison and Simonov 2000, pp. 238-9). As a result the OTK shifted their subordination more than once during Soviet history: at one point they came under enterprise managers, at another they were taken away. An experienced OTK employee remarked in 1947: "Ten or fifteen years ago I was very happy to be working in quality control. In this context, having listened carefully to the contributions of the OTK workers, I am reminded of a Russian saying: 'The cart is still where it was'."[3]

1.2. OTK in the Defence Industry

In establishments that supplied military orders the factory OTK had the same rights and functions as in the civilian sector; like their civilian counterparts they were strongly influenced by management.

For example, a commission investigating the work of electrical factory no. 698 in 1943 concluded that "the OTK has no influence … there is no account of substandard goods … no one is accountable for substandard goods."[4] The commission chairman described the product acceptance procedure thus: "At the end of the month an instruction went to the workshop chief comrade Val´dman and the OTK chief who signed off the electroplates, or their foremen. At the factory it's not just accountable people [such as] the enterprise leaders but ordinary foremen too who can sign off the electroplates. If one doesn't, another will. It's not laid down whose business is the final acceptance of finished goods at the factory. Any OTK employee can sign; if Val´dman won't, his foreman will sign and that makes it an official document."[5]

The OTK chief of an armament factory tells a similar story: "The chief technician and chief designer generally pass substandard goods for the sake of quantitative plan fulfillment, and also for personal motives, to avoid bad relations with the director. The chief engineer and director generally resolve 99 per cent of disputes on the side of production regardless of quality, based on the recommendations of [the chief technician and designer]. The result is a bit odd: the chief of OTK labels the output as substandard, but the director issues an instruction not to scrap it and not to cut back on acceptance. As the chief of OTK, subordinate to the factory director, I am obligated to carry out the director's instruction."[6]

As in the civilian sector, the efforts of enterprise leadership were frequently directed not at raising the quality of products but at lowering technical standards and simplifying the production process. For example, a

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[3] Deputy chief engineer Gostev of armament research institute no. 13 on 21 October 1947 (RGAE, 8157/1/4105, f. 227). The "Russian saying" is from "The Swan, the Pike, and the Crayfish," a poem by Ivan Krylov (1769-1844) about three creatures who wish to cooperate in a common task but fail because each works in his own way and does not adapt to the others.

[4] Hoover/RGANI, 6/2/55, f. 13ob.

[5] Hoover/RGANI, 6/2/55, f. 24.

[6] OTK chief Pavlov from armament factory no. 106 on 21 October 1947 (RGAE, 8157/1/4105, f. 147).

Commission for Party Control (KPK) report of 1934 on aircraft factory no. 24 remarks that managers had taken an "incorrect line" on "the struggle for engine quality"; "in a number of instances, rather than struggle against defects a tendency has been observed of working to weaken technical standards and the [factory's] experimental section has been spending 18-20 per cent of its time proving that a part will still work in the engine despite one or another defect." In 1933 a resolution of the party bureau at this factory about the failure of the March plan had blamed the shortfall on excessively stringent quality regulation.[7] In 1934 KPK auditors at the Tula artillery factory had met with "widespread conversation about unrealistic plans associated with supposedly increased technical standards that the military acceptance people have been imposing at gunpoint. Neither the management nor the party committee has offered any resistance to this sort of chatter."[8]

Defence enterprise managers were more interested in the gross value of output than in its quality. Thus in 1934 at aircraft factory no. 24 the same managers who had just been reprimanded for poor-quality work by a "comrades' court" and issued with an administrative penalty were rewarded three days later with bonuses for fulfilling the 1933 plan.[9] Managers' neglect of quality issues also led to OTK employees being diverted to other work including production and as informal purchasing agents.[10]

The drive for quantitative plan fulfillment led to instances of what became known as "managed scrap" (*brak po vine administratsii*). This arose when managers chose to resort to inferior materials and components, which sharply increased the probability that the final product would carry defects. Thus "managed scrap" was reported to make up 13 per cent of the overall total of substandard goods from armament factory no. 357 after the war.[11]

Attempts by more responsible or honourable OTK employees to resist management priorities were doomed. Before the war the OTK chief at an armament factory refused to pass defective goods on to the Army without the director's written instruction. The director gave way, but sacked the OTK chief two months later.[12] In another case the OTK chief tried to send a telegram to the ministry complaining about management pressure; the director stopped the telegram on the basis that the OTK chief did not have the right to communicate with the ministry independently, only through the director.[13]

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[7] Hoover/RGANI, 6/1/91, ff. 9-10.

[8] Hoover/RGANI, 6/1/22, f. 34.

[9] Hoover/RGANI, 6/1/91, f. 12.

[10] Production: aircraft factory no. 24 in 1934 (Hoover/RGANI, 6/1/91, f. 10). Procurement agents: electrical industry factory no 698 in 1943 (Hoover/RGANI, 6/2/55, f. 14).

[11] OTK chief Orlov from armament factory no. 357 on 21 October 1947 (RGAE, 8157/1/4105, f. 120).

[12] Planning and technical administration chief Mandich from the armament ministry on 21 October 1947 (RGAE, 8157/1/4105, f. 213).

[13] OTK chief Pavlov from armament factory no. 106 on 21 October 1947 (RGAE, 8157/1/4105, f. 150).

We shall see below that the position of OTK workers was further undermined to the extent that the industrial ministries themselves shared managers' incentives to see the plan fulfilled in quantity.

1.3. Campaigning for Quality

In general we think of the Soviet economy as primarily concerned with quantities, with quality taking second place. This was the "default" case. But the neglect of product quality, if prolonged, eventually stimulated a reaction at higher levels; when the deterioration became intolerable, government and ministerial officials mounted periodic campaigns of "struggle for quality" that had a temporary effect without altering the basic situation. The reason for this was a failure of dynamic commitment: higher officials wanted their industry to produce output of high quality but, after the event, it was too costly for them to enforce the standards that they desired. We illustrate this through the "struggle for quality and observance of technological discipline" that the ministry of armament waged before, during, and after the war.

This campaign began at the end of 1939. A meeting of the ministry collegium on 15 October was entirely devoted to technological discipline in the factories. Minister Vannikov launched an attack on the "criminal favour and good will shown to the facts of breach of technological discipline," and the lack of conscious responsibility for quality in the ministry, "the more so given that our products in particular are not tried out right away but are typically stored so that existing defects are uncovered only when they are tested in action."[14] Vannikov declared he would "ask the government to issue a rule for defence factories that in connection with incidents arising from violations of the technical process and its quality the director will have the right to apply penalties up to dismissal and handing over to the courts, and that the director's decision will not be open to discussion outside the process of judicial investigation."[15]

Vannikov issued the corresponding order no. 373 two months later, in December 1939.[16] Changes to blueprints and specifications were to be permitted only if confirmed by the chief designer, technician, or engineer, following agreement with the purchaser, and these had to be recorded by an office for registration of alterations. The implementation of these provisions was to be checked at least once a month by enterprise directors and twice a year by the chief inspectorate of the armament ministry.

The armament ministry had to return to the problem of quality in the summer of 1940. A decree of the Supreme Soviet presidium of 10 July 1940 set out the accountability of factory directors, chief engineers, and OTK chiefs for substandard or unfinished goods and for breaches of compulsory specifications. In connection with this resolution all the industrial ministries began a campaign for quality. On 15 July the armament ministry issued decree

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[14] RGAE, 8157/1/124, f. 70-112.

[15] RGAE, 8157/1/124, f. 73-74.

[16] Order no. 373 "On the observance of technological discipline" of 29 December 1939 (RGAE, 8157/1/271, f. 54) implemented Vannikov's "Instruction on the procedure for amendment of blueprints and technical documents in factories of the ministry of armament" (Ibid., ff. 55-63ob).

no. 196 "On measures for improving the quality of output of armament ministry enterprises." The new decree required enterprises to inquire into each instance of substandard output and to cut the pay of those responsible; "to establish strict control over the quality of [intermediate] products reaching the factory from elsewhere;" and ministerial department chiefs to give special attention to quality issues while on factory visits. At the same time it was resolved to investigate the work of factory OTKs and in this light to return to the issue in the ministry collegium.[17]

The ministry collegium returned to the matter a month later, on 3 August 1940. "Investigation … has revealed the unsatisfactory state of quality control at a number of factories."[18] The report detailed numerous incidents of poor quality products and irresponsible attitudes to quality. "A check on the quality of individual components showed that only 43.7 per cent were fit for service."[19] It was revealed that previous ministerial directives on quality were not being observed, and unauthorised changes to the production process were widespread. The report ascribed this situation to the unsatisfactory condition of testing-and-calibration, the poor skills of OTK workers, the absence of control equipment, "unsatisfactory work on the analysis of rejected products, book-keeping for rejected products, and the development of measures to eliminate defects," and also the weak enforcement of penalties for producing and passing shoddy goods."[20]

As a result the collegium adopted a new resolution on quality, and the minister issued a corresponding decree.[21] These made the chief tasks of enterprise directors, chief engineers, and chiefs of OTK "to lead work on raising product quality, to establish unambiguous and inviolable technological discipline and procedures for testing and calibration, and high-quality work by the OTK." It was proposed to strengthen the punishment of "violations of the system of technical regulation, the deliberate passing of substandard components for assembly or of substandard final products and of worn-out or otherwise defective testing-and-calibration equipment, and for violations of technological discipline" up to and including handing over to the courts. "All cases where those responsible for substandard output are transferred to the courts to be reported to the ministry and chief administration."[22] Heads of chief administrations were to check on the implementation of this and the previous decree no. 373 in the enterprises at least twice per quarter.

Two months later, on 14 October 1940, a new ministry of armament decree no. 279s appeared.[23] Again it pointed to poor quality in the ministry's

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[17] RGAE, 8157/1/262, f. 20.

[18] Minute no. 30 of the armament ministry collegium on 3 August 1940 (RGAE, 8157/1/262, f. 21).

[19] RGAE, 8157/1/262, f. 12.

[20] RGAE, 8157/1/262, f. 29.

[21] The resolution: RGAE, 8157/1/262, f. 12. The decree: RGAE, 8157/1/262, ff. 18-19.

[22] RGAE, 8157/1/262, f. 15.

[23] RGAE, 8157/1/271, f. 6.

factories and weak enforcement of the minister's previous decrees. The decree issued punishments to some named factory officials for technological violations and for supplying or passing shoddy goods; the penalties ranged from demotion to dismissal and prosecution. Referring to "similar criminal breaches that … are continuing even in the present day," however, the decree also implied that others, equally guilty, had not been punished.

At the collegium minister Vannikov demanded even harsher punishment of the guilty, and no more Mr Nice Guy. "No excuses, no lenience! Anyone who violates the technological process in our factories is a traitor to our Motherland, an enemy of our Motherland! And all who excuse or defend them are also traitors and enemies of our Motherland and traitors and enemies of our Red Army!"[24] The new decree no. 279s captured this spirit. Once again changes to blueprints were prohibited "without careful preliminary testing and the agreement of the purchaser" and without the minister's permission; it was prohibited to change the authorised technology for producing finished goods without permission of the chief engineer, chief technician or chief metallurgist, and, if the changes affected product specifications approved in the blueprints, the chief designer; it was prohibited to use substitute parts without preliminary testing and the special permission of the ministry which should indicate the date and product serial number from which the substitute was to be used, and so on. The decree laid down the personal accountability of the factory director, chief engineer, chief technician or metallurgist, and OTK chief for technological discipline and for imposing penalties promptly on employees who overlooked violations. Those failing to enforce the decree would be brought to account "as if for a criminal offence."

In practice, however, there were huge practical obstacles to imposing the damages arising from scrapped output from those directly responsible for supplying it and accepting it. If penalties could be applied to workers and low-level regulators, it was almost impossible to extend them to the factory technical staff and leadership, as OTK leaders recognized: "Deductions [of pay] from the technical staff, from the technician, the designer, and the foreman for spoiled goods are not carried through and rarely reach the chief accountant who implements the deductions."[25] "When the culprit is highly placed like the shopfloor chief, the factory director and chief engineer announce that *you* can't penalize *my* subordinates."[26]

Moreover, the ministry had its own plan to fulfill; conscientious adherence to quality standards could threaten not only the incomes of workers and managers but also the authority and prestige of the minister. The result was that the ministerial commitment to quality lost credibility and could not be enforced. Before the event the minister was always for *quality*, but after the event, when quality was already known, it was *quantity* that became the important thing. Thus the deputy chief of the ministry for medium engineering

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[24] Minister Vannikov at the armament ministry collegium on 14 October 1940 (RGAE, 8157/1/284, f. 216).

[25] OTK chief Solian from armament factory no. 355 on 21 October 1947 (RGAE, 8157/1/4105, f. 145).

[26] OTK chief Pavlov from armament factory no. 106 on 21 October 1947 (RGAE, 8157/1/4105, f. 152).

explained a plan shortfall for 1940 at the Red Etna factory as follows: "The OTK started rejecting everything just to be on the safe side [*kak perestrakhovshchik*] and letting nothing through … Instead of the breakthrough that the collective could have mobilized there was just whinging and playing safe [*knykan'e i perestrakhovka*]." "I had to comb through the warehouse and label the goods that were serviceable. Now we've replaced the OTK chief and we've taken on someone from the Gor'kii factory, they say he's a sensible, capable worker."[27]

To summarise, the campaign for quality in the ministry of armament, which went on for more than a year, was not productive. The minister's decree appear to have had only a temporary effect; penalties for substandard work were applied selectively, and factory OTKs continued to attract criticism from purchasers. The duration of the 1939/40 campaign is to be explained more by arbitrary decisions at the centre than by its success or failure.

The situation gradually returned to normal; the threatening decrees on quality were forgotten. Once war broke out quality issues received even less attention. The main reasons for this were the deregulation of the supply system, the growing materials shortage, and the requirement to deliver fixed quantities of output to the front. In wartime, moreover, the skills of the typical OTK employee declined. An OTK chief told the 1947 meeting in the ministry of armament: "The establishment of temporary state specifications for a range of materials, the emergence of wartime substitutes, and the limited availability of nonferrous metals, all contributed to deterioration in the quality of products."[28] Another echoed him, remarking that quality requirements for war production had been higher in peacetime than in wartime.[29]

In consequence the postwar state of technological discipline in armament factories differed little from that which had obtained prior to decree no. 373 of 29 December 1939. Factories worked to "temporary" technological parameters that chief technicians and engineers had not approved.[30] Blueprints, like production plans, were issued to factories without having been confirmed, which of course gave the discretion to vary them and depart from them.[31] An OTK chief reported that in the six or seven postwar months during which they had converted to the production of excavators they had introduced up to 2,000

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[27] Hoover/RGANI, 6/2/34, f. 21.

[28] OTK chief Orlov from armament factory no. 357 on 21 October 1947 (RGAE, 8157/1/4105, f. 116).

[29] OTK chief Dovzhenko from armament factory no. 3 on 21 October 1947 (RGAE, 8157/1/4105, f. 129).

[30] OTK chief Zvonarev from armament factory no. 172 on 21 October 1947 (RGAE, 8157/1/4105, f. 101).

[31] The failure to issue final approval of plans and blueprints on a formal basis was common in the armament industry according to deputy OTK chief Koloskov of armament factory no. 74 on 21 October 1947 (RGAE, 8157/1/4105, f. 107). This was a general, if surprising feature of Soviet bureaucracy; in civilian industry it was also normal to operate on the basis of draft plans, and plans that had been formally confirmed were the exception (Markevich 2003).

variations. He recalled the ministerial approval procedure required under the now "forgotten" decree no. 373, and commented that many managers appointed in wartime did not even know that it existed.[32]

As factories of the defence industry were reconverted to civilian goods the problem of quality became sharper. The removal of external military regulation "had the potential to disorient all our workers and we could have quickly lost our skills … and mobilization readiness. To prevent this the ministry's central apparatus had to organise a specialized department … to regulate you [the OTK workers]."[33]

These problems led up to the 1947 meeting of OTK chiefs from the armament factories that we have already cited more than once. It raised substantially the same issues previously debated at the ministry collegium in 1939/40. Those present recognized that the regulators were failing to regulate; they were closer to assembly line workers than controllers of production.[34] The OTK were "mostly an agency for recording substandard products, not an agency of the struggle against it nor an organiser of high-quality goods."[35]

We will leave the final word on this matter to chief designer Morozov of electrical factory no. 193 (cited by Ermolov 2004): "Despite the whole array of instructions and decrees from the ministry, you won't find a single man in the factory today who will take responsibility for the quality of output. Everyone is responsible, but individually I know of no one …"

2. The Army and its Agents

In the previous section we showed that internal quality controls in industry did not solve the problem of the quality of goods that had an "experience" character. The seller was primarily interested in fulfilling the plan for finished output; once the plan was fixed, the seller lost interest in quality and often gained from lowering it. The purchaser was the only agent who was self-interestedly concerned with enforcing quality standards.

In this section we describe the network of agents that the Army created to tackle the problem of quality that Industry presented, and in the following section we analyze its operation. We will begin by showing that the military procurement agent was a special case of a general mechanism whereby the buyer sought to influence the supplier in the Soviet seller's market.

2.1. Purchasing Agents in the Soviet Economy

Legal mechanisms did exist for the Soviet purchaser to bring pressure to bear upon a poor-quality supplier. The purchaser could claim a refund and seek

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[32] OTK chief Zvonarev from armament factory no. 172 on 21 October 1947 (RGAE, 8157/1/4105, f. 98).

[33] Armament ministry official Karasev on 21 October 1947 (RGAE, 8157/1/4105, f. 246).

[34] OTK chief Avesnok from armament factory no. 349 on 21 October 1947 (RGAE, 8157/1/4105, f. 219).

[35] Deputy chief engineer Gostev from armament research institute no. 13 on 21 October 1947 (RGAE, 8157/1/4105, f. 229).

damages through the state arbitration courts. This system was of limited effectiveness, however, for two reasons: the procedure was time-consuming, and, by damaging the supplier's good will, it threatened further adverse consequences for the purchaser in the future.

The solution lay in the purchaser's deployment of permanent representatives in the supplier's factories. There were two variants of this arrangement, legal and extra-legal; which was available depended on the degree of priority that the purchaser commanded within the administrative system. In most cases the purchaser had to rely on informal agents (*tolkachi*) who more or less lived on the supplier's premises (Berliner 1957). Their position was typically vulnerable since their functions were not recognized by law and the central authorities tended to look on them with suspicion. Their existence violated the principles of socialist planning, but the planned economy would have operated without them only with difficulty.

While disliking purchasing agents in general, the authorities legitimized them for the priority branches associated with defence. The Army regulated Industry through specially appointed military procurement agents (*voennye predstaviteli* or *voenpredy* for short). In between the private purchasing agents and the official military agents there also existed an intermediate variant, the "technical inspectors." These were effectively civilian *voenpredy*, although with more circumscribed prerogatives. The defence industry employed them at factories belonging to civilian ministries to which it subcontracted the supply of intermediate goods for defence production; for example, the ministries for the aircraft and tank industries appointed technical inspectors to regulate their own supplies. The resulting complex structure of agency is illustrated in Figure 1. Below we consider the influence and results of the military agents and their derivatives, the technical inspectors.

2.2. Military Agents: Rights and Duties

The Soviet Union inherited the prerevolutionary system of military procurement, including a mechanism established in 1862 for acceptance of the products of the artillery factories. The first attempts to strengthen the Army vis à vis Industry relate to the closing phase of the civil war in 1920. In the 1920s the Red Army set about establishing an alternative network of "military assistants" in industry (Harrison and Simonov 2000, p. 228). To judge from a decree of 1927 on procurement for the artillery, military agents were not yet attached to specific factories; the decree defined the basic mission of procurement as "observance of the fulfillment of orders and the acceptance of manufactured stocks." Technical acceptance was just "the permissive basis for acceptance of equipment into military stores." A lot of detail was given about technical inspection by the defence ministry's artillery administration, to be organized on a regional rather than factory basis: thus the senior official was the regional inspector. The verdict of the procurement agents was not final and could be contested upwards and sideways in the state arbitrage courts.[36]

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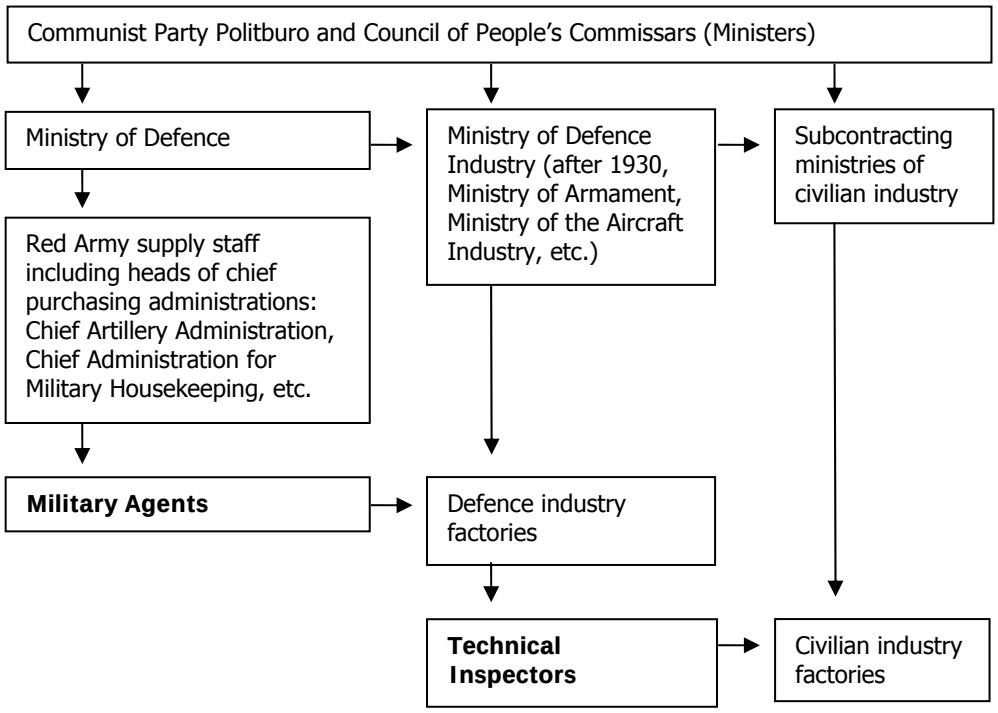
[36] RGVA, 47/5/207, ff. 28-33. The decree was confirmed for the Army by deputy defence minister and president of the Revolutionary Military Council S. Kamenev, and by M. Rukhimovich for VSNKh (i.e. industry), on 28 June 1927

Figure 1. Principals and Agents in the Military Market Place



As the mixed economy of NEP gave way to the command system the Army had to confront the adverse consequences of the seller's market. In 1930 there was a far reaching reform of the military acquisition system; the military agents were created to overcome this situation and "move rapidly to a breakthrough in the work of industrial enterprises in fulfilling military equipment orders."[37] The 1930 statute also defined the rights and obligations of industry and the Army in relation to product quality (Harrison and Simonov 2000, p. 229).

The division of rights and responsibilities among military agents, the Army, and Industry were subsequently reconsidered on several occasions but without any fundamental change. The tasks of the military agents included monitoring the fulfillment of enterprise plans, the acceptance of military products ordered by the Army, regulation of their quality, and observance of the state of mobilisation readiness. Faced with substandard products the military agent had the right to halt acquisition and even the enterprise's entire production operation. The agent had "the right to oversee all [the supplier's] production workshops and divisions and so forth with respect to the production of goods, including components and parts, supplied under agreement [with the purchaser]." The supplier was obliged "to provide the purchaser's military agent with the testing-and-calibration equipment necessary for acceptance of goods, including lighted, heated, and furnished

[37] "Report on fulfillment of the resolution of a meeting held by the Red Army chief of armament on 27 February 1930 on measures to regulation the quality of goods supplied by industry towards the orders of the military department" (RGVA, 33991/1/65, f. 7-8).

working accommodation."[38] The agent was obliged "to report to the Red Army chief of armament through the chief of the appropriate equipment [purchasing] administration" concerning all shortfalls in the fulfillment of military equipment orders: the use of substandard materials, the supply of raw materials and semi-manufactures to the enterprise, departures from approved processes and blueprints, poor work by the factory OTK, missed deadlines for military orders, and so on.[39]

The technical inspectorate that the defence industry ministries deployed among subcontractors in civilian industries had somewhat fewer rights that were limited to quality regulation; excluded, therefore, were mobilization planning and the oversight of plan fulfillment. For example, under a statute dated 11 January 1940 the technical acceptance agents of the ministry of the aircraft industry were defined as "permanent representatives of [the ministry] for acceptance of products" at supplier enterprises.[40] They were responsible for "accepting the factory's products and semi-manufactures prepared to meet [aircraft industry] orders" and "implementing regulation of the quality of output on the basis of concluded agreements and product specifications." In the event of substandard supplies the technical inspector could "halt acceptance." If lapses were systematic the inspector had the right "to require the factory director to convene a special meeting" and to participate in "the development of organizational and technical measures by the supplier factory to eliminate the defects." From another source it appears that the acceptance agent also had the right "to agree the degree of urgency and priority of products and to regulate the despatch of finished goods."[41].

Like the military agent, the technical inspector for the aircraft industry was fully independent of the subcontractor's management. The latter had "no right to issue any kind of instruction or impose any penalty on the acceptance agent." In the course of their duties the agents had the right "to attend production and technical meetings on matters of production for orders of the ministry of the aircraft industry," "to visit production workshops engaged in fulfilling [aircraft industry] orders without hindrance at any time, day or night," and "to obtain information from the factory management on matters of fulfillment of [aircraft industry] orders"; the director of the supply factory was obliged to provide information, invite the acceptance agent to all meetings relating to the fulfillment of orders, respond immediately to all requests of the acceptance agent relating to "issues of fulfillment of orders and the quality of supplies for [aircraft industry] enterprises." The technical inspector had no

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[38] "Model agreement on the sale of principal products to the defence ministry (navy ministry, NKVD) agreed between the defence ministry and armament ministry for 1940" (RGAE, 8157/1/134, f. 44-47).

[39] "Instruction to military agents in industry on reports concerning shortfalls in the fulfillment by industry of military orders" (RGVA, 33991/1/65, f. 11).

[40] Statute no. 69-42, issued by the USSR Council of People's Commissars economic council (GARF, 8300/17/118a, ff. 27-28).

[41] Report of technical inspector for the aircraft industry K.K. Iakimovich (GARF, 8300/17/118a, f. 21).

punitive powers over the subcontractor, however, and could seek to solve problems only via the factory management. Disagreements between factory and agent had to be communicated to the ministry of the aircraft industry and referred upward for resolution at a higher level in the respective ministries."[42]

Those in charge of Industry regarded its technical acceptance staff at subcontracting factories as procurement agents (*tolkachi*) that answered to and reported information to their ministry as the purchaser.[43] The aircraft industry's technical inspectors saw themselves, in the same light, as engaged in "the authorization of payments and the approval of schedules for production and delivery in accordance with requests and signals coming from the aircraft factories, and in particular *securing uninterrupted supply of the aircraft factories with especially scarce materials*."[44]

2.3. Numbers and Qualifications

Within the defence ministry a number of chief administrations dealt with the purchase of weapons to the army: the artillery, air force, chemical-weapons, and military equipment administrations and so forth (see Figure 1). Each had its own military agents at suppliers. Two factors swelled their numbers. First, the agents themselves were serving military officers, but the defence ministry also engaged civilian employees as support staff for them. Second, if a given enterprise supplied more than one purchasing administration of the defence ministry it had to accommodate several agents, and this also added to the overall number. In the town of Iaroslavl´ in 1943, for example, the total number working on military acceptance at 16 factories was 144, including 19 senior command staff, 30 middle ranking officers, and 89 hired employees. Some factories acccommodated up to five agents of the various purchasing administrations of the Red Army and Navy.[45].

The growth of numbers employed as military agents is hard to judge because we do not have global figures for the early period. At the beginning of 1930 the Red Army's purchasing administration for military housekeeping accounted for 263 local procurement agents.[46] By 1940 the overall total of military agents had attained the enormous number of 20,000 (Harrison and Simonov 2000, p. 229). Thus, it seems reasonable to infer rapid growth.

In comparison with the thousands of military agents at defence factories, the technical inspectors at civilian factories were few. As of 1 January 1954 the inspectorate of the ministry of the aircraft industry, responsible for

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[42] Statute no. 69-42 of 11 January 1940 (GARF, 8300/17/118a, ff. 27-28).

[43] Chief of the Sergo Ordzhonikidze factory supply department, Kol´chugino (Vladimir oblast´), to the ministry of state control, letter dated 18 December 1954 (GARF, 8300/17/118a, ff. 30, 59).

[44] Emphasis added. Technical acceptance chief El´shin from the ministry of the aircraft industry at the Ordzhonikidze factory, Kol´chugino, to the ministry of state control, report dated 15 December 1954 (GARF, 8300/17/118a, f. 42-43).

[45] Hoover/RGANI, 6/2/49, f. 8.

[46] "Information on the establishment of the acceptance organization" (RGVA, 47/5/207, f. 1).

purchasing metals, bearings, and so forth, mustered just 227 permanent representatives at 77 subcontractors in the iron, steel, nonferrous metallurgical, heavy, and light industries. Numbers at a single factory varied from one to 12 acceptance agents, depending on the scale of orders for the industry.[47]

The growth in numbers of military agents in the 1930s reflected two factors. One was the expansion of the economy itself, and especially its defence sector (Davies and Harrison 1997). The other stems from the fact that at the beginning of the decade there were not enough skilled engineers to fill vacancies for military agents, to the point that recruiting standards had to be lowered.[48] As Soviet higher education expanded this problem was solved.

The privileged conditions that military agents enjoyed also helped to attract skilled personnel. Military agents' pay was significantly higher than that of civilian employees of factory OTKs, and their workload was less burdensome. This gave rise to discontent among OTK employees, for example at the meeting held in the ministry of armament in October 1947. According to one speaker: "It has been said that military acceptance is better staffed than OTK. They have better conditions … a leading military employee [who accounts] for a single product gets 1,400 to 1,500 rubles [a month]. An OTK deputy [chief] for metallurgy overseeing 17 workshops gets 1,350 rubles and an OTK head of workshop gets 900 rubles. This pay gap ensures they get people with more skills, higher discipline, and better training, since these are all associated with high pay."[49] Another gave the average monthly pay of OTK staff at his factory as 400 rubles including bonuses, while hired employees of the military agents got 600 rubles and the officers up to 2,000 rubles.[50] A third compared wages in the OTK unfavourably not only with the earnings of the military agents but also with production workers' pay. The basic pay for OTK workers was the same as that of production workers, but the latter could count on large piece-rate bonuses whereas OTK staff got nothing for additional effort.[51]

OTK workers gave a similar story about the workload of the military agents. "Our team from the chief artillery administration comprised a lieutenant-colonel, a captain, and three hired staff. They needed 40 minutes to take 'decisions' and the rest of the time they could catch flies, sing songs, and

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[47] From a report on the number of employees and wage fund of the ministry of the aircraft industry chief supply administration (GARF, 8300/17/118a, ff. 5-13).

[48] This was recommended by the heads of the Red Army purchasing administrations meeting on 27 February 1930 (RGVA, 33991/1/65, f. 1).

[49] OTK chief Zvonarev from armament factory no. 172 (RGAE, 8157/1/4105, f. 102).

[50] OTK chief Dovzhenko from armament factory no. 3 (RGAE, 8157/1/4105, f. 140).

[51] Deputy OTK chief Koloskov from armament factory no. 74 (RGAE, 8157/1/4105, f. 110, 112).

undertake staff development."[52] The same was true for technical inspection staff. The OTK workers complained that "in a shift the technical acceptance agent had to work for half an hour or an hour," and this "stimulated discontent among the shop floor workers."[53]

This outcome was deliberate: by giving its agents such favourable conditions the defence ministry tried to buy their loyalty. It was considered normal that "the workload of military product acceptance on military agents and their staff should not exceed 50 per cent."[54] Even in wartime when the Army needed career officers for the combat forces, the defence ministry refused to cut the numbers of military agents by merging its specialized purchasing administrations into one.[55] There were at least three wartime proposals to do this, one in 1941 and two in 1943; the ministry rejected them all, observing that: "each chief administration is fully accountable for the production and quality of armament and munitions, their timely despatch to the front, and their unfailing operation at the front. Creating a unified apparatus for regulation and acceptance of military production, independent of the chief administrations, would lead to a loss of accountability in regulating the production of armament and munitions, and to a reduction in their quality."[56]

2.4. Benefits and Costs of Dual Regulation

The military agents duplicated the work of the OTK; why did they not simply replace it? This was for several reasons. First, all factories engaged in defence production, even the most specialized, also produced commodities for civilian use and someone had to regulate their quality. Second, the defence ministry was short of skilled employees, at least in the early years. Third, without the OTK the military agents' numbers would have had to rise significantly; this would have shifted some regulation costs from the supply ministries to the defence ministry. Finally, the defence ministry preferred the dual regulation of quality: for all its weaknesses the OTK system provided a first level of control, filtering out goods that were obviously substandard, and this freed the military agents to focus on the next level of screening.

It was Industry, apparently, that would have preferred to shift unified responsibility for quality control onto the Army. One of the Red Army's purchasing chiefs spoke out on this in 1928, telling his colleagues: "I consider the main problem is that at the present time industry is hiding behind our

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[52] OTK chief Dul´chevskii from armament factory no. 217 (RGAE, 8157/1/4105, f. 203).

[53] Report on the work of technical acceptance at the Red October factory, sent to the Ministry of State Control on 14 December 1954, by calibration workshop chief Sergeev and OTK chief Chernov (GARF, 8300/17/118a, ff. 194-195).

[54] Hoover/RGANI, 6/2/49, f. 8.

[55] Hoover/RGANI, 6/2/49, f. 8-10.

[56] Chief of the Red Army purchasing administration for military housekeeping [*voenno-khoziaistvennoe upravlenie*] Oshlei (Hoover/RGANI, 6/2/49, f. 9).

acceptance staff. In future we should hold the line that if industry has set up and adopted a standard [*konditsiia*] then industry is responsibility for supplying goods that meet that standard." [57]

In fact, at some enterprises there was regulation in triplicate. In 1940 decree no. 2161 of the USSR Council of People's Commissars introduced permanent regulators from the ministry of state control at major industrial enterprises. Of 194 permanent regulators nominated at the time the decree was issued, 80 were appointed to the defence industry including 23 to the aircraft industry, 17 to the armament industry, 21 to munitions, and 19 to shipbuilding; the remainder were spread among enterprises of the heavy and chemical industries, ferrous and nonferrous metallurgy, and heavy engineering.[58]

The benefit to the Army from its military agents, despite their high cost, is illustrated by the story of the "factory brands" introduced in early 1930. This came simultaneously with the deployment of the military agents instead of the old military acceptance system, and was evidently designed as a stopgap to make up for the initial shortage of skilled staff. It covered the greater part of soldiers' consumables including uniforms and rations, as well as some weapons. Simultaneous decrees of the Army and Industry listed the enterprises supplying products under factory branding.[59] Under this system branded goods were accepted on the basis of the supplier's warranty that contractual specifications had been met. On the side of the Army's purchasing administration for military housekeeping, quality regulation was limited to the inspection of samples and periodic spot-checks.

The purpose of this system, from the standpoint of the Army, was twofold: "to place responsibility for the quality of supplies on industry, and to limit the military acceptance staff."[60] The second aim was achieved in that after the reform the number of acceptance staff employed by the military housekeeping purchasing administration fell from 263 to 161. The first aim failed, however. With the introduction of factory branding, the quality of goods fell noticeably. In the words of the military housekeeping purchasing chief, factory branding led to "a significant deterioration. Not because the principle is wrong, but just because we have been unable to keep a check on things in the warehouses and military units. Industry is counting on this weakness of ours and is sending us items labelled as good that would not have got through before … supplies have become of lower quality, there is no doubt about it … it is regrettable that what fell below the specifications of 1929 and 1928 was undoubtedly of better

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[57] RGVA, 47/9/83, f. 12

[58] GARF, 8300/4/1, f. 1.

[59] The Revolutionary Military Council's decree no. 84 of 12 April 1930, and VSNKh decree no. 1214 of 14 April, implemented a "Statute on technical acceptance of objects and materials of military housekeeping supply [*voenno-khoziaistvennogo snabzheniia*]" (RGVA, 47/5/207, f. 75, 76-82).

[60] Minute of a meeting in the Red Army administration for military housekeeping on 6 June 1930 (RGVA, 47/5/207, f. 118-119).

quality than what we have accepted as good in 1932."[61]. This is confirmed by a great deal of statistical information about the quality of supplies by commodity in 1928/29 and 1929/30.[62] Despite this, a result of the shortage of skilled personnel was that factory branding persisted for some time after the adverse trend in quality of supplies had become clear.

3. The Military Agents at Work

In the introduction we suggested that under Soviet conditions the buyer of experience goods would show a greater willingness to evaluate before purchase combined with greater reluctance to buy, and would also engage in the enforcement of quality by non-market means. In this section we analyze the working of the agents that the Army employed to enforce quality on Industry. We begin by illustrating how the antagonism between the Army and Industry came to focus on the role of the military agent. We will find that the military agents carried the roles that economic theory suggests we should expect: they engaged in systematic evaluation of the product before purchase; they acted as a deliberate brake on the acquisition process and so enacted the Army's reluctance to buy at any price; finally, they enforced quality by non-market means. However, they did not do so with complete success. We will suggest that it was in the interests of both parties to maintain the rejection of substandard products at a level always greater than zero.

3.1. Mutual Enmity

"Without doubt you and we have common interests. We have absolutely no different interests" [63] "We don't forget that [the naval agent] is interested in getting the highest quality goods in the shortest time. These tasks completely coincide with the tasks of any factory director and worker who is concerned for how to consolidate Soviet power and our country's defence."[64] Those who accepted such protestations tended to believe that disputes between Industry and the Army's representatives could only arise through "misunderstanding;" the underlying communication gap could be bridged through joint meetings that would process disagreements and identify how to manage them more harmoniously in the future.[65]

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[61] Chief of the Red Army purchasing administration for military housekeeping Oshlei at a meeting on 25 to 29 May 1933 (RGVA, 47/9/105, f. 18-19).

[62] Chief of the Red Army purchasing administration for military housekeeping Oshlei to deputy defence minister and Revolutionary Military Council chairman Kamenev Report on the quality supply in 1929/30, report dated 30 November 1930 (RGVA, 47/7/184, ff. 197-198, 249-257).

[63] RGVA, 47/9/83, f. 102.

[64] RGAE, 8183/1/146, f. 81.

[65] "Mutual misunderstanding" to be overcome through "joint meetings of the military agents with factory directors (chief engineers)": Red Army artillery administration chief Kulik to defence industry minister Kaganovich on 7 February 1938 (RGAE, 7515/1/403, f. 180). Advocating "joint meetings"

In practice such meetings could not conceal the fact that "mutual relations of the factories with ministry of defence and [navy] representatives are unbearable."[66] The formal status of the military agents, acting for the Army vis à vis Industry, was the basis of endemic conflict with enterprise managers. The attitudes of managers and military agents to each other are well illustrated by the following quotations. From the side of Industry, a defence industry worker spoke out in 1928: "Less regulation. It is our misfortune that they regulate us so much."[67] Nine years later, shipyard worker Serdiuk told a meeting of party activists from Industry: "the handover of vessels must be simplified. We are losing a lot of time doing unnecessary trials." From the side of the Army a military agent spoke to the same meeting: "comrade Serdiuk said that the trials are implemented in too much detail. But I say that detailed trials are essential … We have to eliminate all defects from the key items through exhaustive trials."[68] Another military agent put it bluntly: "Don't argue with us, just do what we say because we're not making it up."[69]

Those who spoke for Industry at a variety of meetings frequently accused military agents of incompetence, lack of realism, and so forth. "There are good acceptance agents but there are also agents who don't understand the things they are supposed to accept. How can someone be a good acceptance agent if they tell him to take soap today, hay tomorrow, and belts the day after?" [70] "If the [naval agency] is staffed with weak employees then they will set requirements wrongly. Often a ship isn't handed over because there is more squabbling going on than work."[71] In a development predicted by Holloway (1982, p. 325n) they considered the agents to be useful only for bringing pressure to bear on the suppliers of intermediate goods who lay outside their own ministry.[72] The agents themselves believed that Industry regarded them

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ten years previously: Dybenko at the 1928 meeting on the supply of military housekeeping (RGVA, 47/9/83, f. 96).

[66] RGAE, 8183/1/146, f. 80.

[67] Defence industry worker Penin at the 1928 meeting on the supply of military housekeeping held in the defence ministry (RGVA, 47/9/83, f. 30).

[68] Shipyard worker Serdiuk versus naval agent Aliakrinskii at a meeting of party activists in the shipbuilding administration of the ministry of defence industry on 13 April 1937 (RGAE, 8183/1/146, ff. 53-53ob).

[69] Naval agent Blagoveshchenskii on 13 April 1937 (RGAE, 8183/1/146, f. 39).

[70] RGVA, 47/9/83, f. 23

[71] RGAE, 8183/1/146, f. 48.

[72] For example, defence industry minister Kaganovich wrote to chief of the Red Army artillery administration Kulik on 20 June 1938 requesting him to tighten up the work of military agents at engineering factories that were supplying defective shell casings to defence factory no. 12 (RGAE, 7515/1/404, f. 247).

with contempt, as "blunderers who … give us nothing useful," or "formalists who … shove spokes in our wheels" and so on.[73]

Civilian managers' attitudes to technical inspectors from defence industry mirrored those of defence industry to the military agents; they clearly wished to be rid of them altogether. This was the position that virtually all adopted in 1954 when the ministry of state control raised the issue in the context of cutting down on administrative staff in industry. Managers alleged that technical acceptance duplicated the work of the factory OTKs without reducing substandard output and led only to delays.[74] It was said that "the selective checks that the technical acceptance staff carry out are for form's sake and inappropriate" while most products only underwent factory checks.[75] Anyway it was the enterprise, not the technical acceptance staff, who had to account for product quality.[76]

3.2. Evaluation Before Purchase and Reluctance to Buy

In general the military representatives acted as loyal agents of the Army by checking the quality of goods at the point of supply. The chief instrument at their disposal for the enforcement of quality, and perhaps the only one that was effective, was their right to refuse to accept goods that were not up to standard. By rejecting the goods that Industry offered they threatened the ability of Industry to show compliance with supply plans and contracts.

This was a powerful threat, although not as potent as might appear at first sight. In theory plan and contract violations could carry administrative and legal penalties. In practice, however, military agents rarely looked to higher authority to impose punishments for low quality, and when they did they were typically unsuccessful. In 1933, for example, the military agent at aircraft factory no. 24 tried to use the factory party committee to bring those responsible to account for "malicious toleration of defective parts," but without success.[77] We have found only one case where a military agent took factory leaders Dotsenko and Muravin of shipbuilding factory no. 347 to court on criminal charges for supplying substandard goods; in this case the court cast doubt on the accusations and the file was returned for further enquiries. A

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[73] "Blunderers": navy official Kudakov on 13 April 1937. "Formalists": naval agent Blagoveshchenskii (RGAE, 8183/1/146, f. 80 and 39). 39).

[74] "On work at the Karbolit factory by the technical acceptance staff of the ministry of aircraft production" (GARF, 8300/17/118a, f. 33), and a similar report about the Red October factory dated 14 December 1954 (GARF, 8300/17/118a, f. 194-195).

[75] Workers of the Elektrosila factory to minister of state control Zhavoronkov, letter dated 14 December 1954 (GARF, 8300/17/118a, f. 30).

[76] Acting chief engineer Luzenberg and deputy technical department chief Pavlotskii of the Sergo Ordzhonikidze factory to the ministry of state control, letter dated 21 December 1954 (GARF, 8300/17/118a, f. 57).

[77] Hoover/RGANI, 6/1/91, f. 10.

KPK review found that the judicial route was inappropriate and substituted dismissal for the criminal charges.[78]

Other consequences of plan and contract violation were more important to Industry. There were financial penalties. When plans failed workers, managers, and ministerial officials lost bonuses; contract failures lost revenue to the enterprise and ministry. Although it did not have the same significance as in a market economy, money did matter. Perhaps of still greater importance, plan and contract violation attracted complaints and was a signal for investigation. Thus, even for those to whom a quiet life mattered more than money, to underfulfill a plan or agreement usually led to unpleasantness and disruption. We see from other classic investigations how important it was for Industry to avoid this by fulfilling the plan (Berliner 1957)

The frequency with which Industry failed to fulfill the Army's contracts is one measure of the effectiveness of the military agents. KPK enquiries into the failure of defence orders found the cause more than once in the military agents' rejection of low-quality goods. For example, in January and February 1934 the Tula gun factory produced 3,000 carbines and 106 ShKAS machine guns, but only 800 rifles were accepted for the defence ministry and no machine guns at all. The 3,000 carbines "were presented for acceptance 23,000 times, i.e. almost 8 times per carbine on average."[79] KPK auditors concluded that "discord between management and representatives of military acceptance on the score of product quality strongly promoted the emergence of a [plan] breakdown in its persistent form."[80] Again in 1934 military agents scrapped two complete runs of aeroengines produced at aircraft factory no. 24 and elsewhere. In 1944 the KPK regional official for the Khabarovsk region, Orlov, reported that a state of "vexatious litigation" had taken root at aircraft factory no. 126 with the managers on one side and the OTK and military agents on the other on the permissability of accepting parts and components that did not conform with the blueprints. "These disputes ('thwarts' as the producers call them) sometimes drag on for weeks … while business stands still." In the first quarter of 1940 rejected goods amounted to 375,000 rubles.[81]

At some plants, for example armament factories nos 74 and 286 in 1946/47, the share of output that the military agents rejected rose above 40 per cent.[82] There were even cases where military agents rejected the entire monthly output of a given factory, for example that for March 1938 at defence industry factory no. 205 "in view of the totally unsatisfactory installation of electric plugs in all articles supplied."[83]

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[78] Hoover/RGANI, 6/6/1616, f. 128.

[79] Hoover/RGANI, 6/1/22, f. 34. Emphasis in the original is omitted.

[80] Hoover/RGANI, 6/1/22, f. 36.

[81] Hoover/RGANI, 6/2/27, f. 108-109.

[82] Representative Mandich of the armament ministry planning and technical administration on 21 October 1947 (RGAE, 8157/1/4105, f. 213).

[83] Red Army artillery administration acting chief Savchenko to defence industry minister Kaganovich (RGAE, 7515/1/404, f. 158).

The difference between the OTK and the military agents can been seen in the following data. Some of the aircraft offered by factory no. 126 to the military agent in 1940, for example, after acceptance by the OTK, had up to 80 defects.[84] In the first nine months of 1940 of the 6,644,000 shell cases of various calibres that were the principal product of munitions factory no. 184, the OTK scrapped 2.74 per cent; after that, the military agent scrapped a further 10.5 per cent, indicating that military control was almost four times stricter than civilian control.[85]

Additionally, military agents tended to require the handover of complete assemblies. The government adopted a special resolution on this subject in 1935. The endless requests from Industry that the Army should vary existing procedures and exceptionally accept incomplete goods, or postpone settlement of accounts until after the supply of parts that were missing because of warehouse congestion or spoilage of production, indicate that in fact the military agents tended not to compromise with managers on this and enforced the line promulgated by the defence ministry.[86] The latter refused such requests from Industry. Thus in 1937 defence minister Voroshilov responded to the latest request from the ministry of defense industry: "I cannot agree with your proposal to accept shell parts without gas seals from the ministry of the defense industry and to settle accounts by 1 August since this conflicts with

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[84] Hoover/RGANI, 6/2/27, f. 108.

[85] Hoover/RGANI, 6/2/34, f. 158-159.

[86] Chief of the Red Army artillery administration Kulik to defence industry minister Kaganovich on 20 October 1937: "In the two years since the government decree on inclusive supply [*o komplektnoi sdachi*] of artillery shells by industry to the orders of the artillery administration, there has been a lack of understanding of issues of inclusive supply at a number fo factories. Factories making particular shell parts, not waiting for the assembly of these parts by the fourth chief administration of the ministry of the defence industry that supplies the artillery administration with finished shells, demand the collection of their goods from the factories while sending dozens of telegrams to the artillery administration … and higher agencies complaining that the artillery administration won't issue warrants [to pay for] finished goods … ignoring the explanations of the artillery administration's military agents that the artillery administration issues warrants only for items made up for firing (RGAE, 7515/1/403, f. 1-2). But on 15 March the following year defence industry minister Kaganovich wrote to defence minister Voroshilov to ask the latter to accept 200 unfinished aircraft since "the onset of spring flooding at the airfield of factory no. 22 is creating a threatening situation" (RGAE, 7515/1/403, f. 166). And on 26 May deputy defence industry minister Bondar´ again wrote to Kulik complaining that the shell factories were congested with "goods accepted by the military agent but not collected because of the lack of specific components of the complete assembly." On the basis that the suppliers had no more storage space, Bondar´ asked Kulik to have the goods collected and stored by the defence ministry, with payment postponed until the missing parts were available for installation (RGAE Ф.7515/1/404, f. 147-148).

government decisions and will disorganize the final assembly of shells in the defence ministry's shell assembly workshops."[87]

Not all military agents took an uncompromising position on quality issues or demanded complete and unqualified compliance with agreed standards; in 1937, for example, naval officers warned against the common practice of accepting vessels without the necessary technical documentation.[88] KPK factory audits of the period report other failures of a similar type. At shipbuilding factory no. 347 the military agent was reported to have accepted substandard mines.[89] At aircraft factory no. 39 in 1939, it was said, "senior military agent … comrade Rodimov and regional military engineer comrade Kaminskii have impermissibly weakened control over the quality of accepted goods, established the practice of accepting unfinished aircraft subject to written factory guarantees, and left aircraft armament unchecked." Aircraft with unserviceable machine guns, and bombers with engines that suffered overcooling when cruising in level flight, were accepted and put into service. Iron replaced chrome-molybdenum for rivets with the silent consent of the military acceptance officers, and so forth.[90] Chief of the air force purchasing administration Efimov was accused of colluding with the malpractices at the factory: "knowing these facts, [Efimov] not only did not take measures to restore order but even suppressed criticism of the defects, describing the communists who raised the criticisms as 'crybabies' and threatening them with dismissal."[91] This attitude of one of the most senior officers of the defence ministry, directly responsible for the army's supply of weapons, suggests that the case of factory no. 39 cannot have been unique.

In the years of rapid prewar expansion it appears that vehicles supplied to military units often turned out to be unfit for service although the military agents had previously passed them as acceptable. In March 1938, for example, the air force complained to defence industry minister Mikhail Kaganovich about numerous defects in I-16 fighters and UTI-4 trainers, and requested that the factories themselves despatch special repair brigades to military units.[92]

Military agents' standards slipped markedly in wartime. Most tanks were accepted in the war years with defects of one sort or another. Table 1 gives an indication of the quality of wartime production at tank factory no. 183; more

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[87] Defence minister Voroshilov to defence industry minister Kaganovich (RGAE, 7515/1/404, f. 161).

[88] Senior naval agent for shipbuilding Blagoveshchenskii to a meeting of party activists in the ministry for defense industry on 11-13 April 1937: "Submarines have been supplied without drawings, instructions, and so forth. Chief of the Navy comrade Orlov has now warned that until there is full provision of all instructions, drawings, specifications, and formulations, vessels will not be accepted and factories will not be paid until everything that is proposed has been carried out" (RGAE, 8183/1/146, f. 38).

[89] Hoover/RGANI, 6/6/1616, f. 127.

[90] Hoover/RGANI, 6/2/17, f. 47.

[91] Hoover/RGANI, 6/2/17, f. 47.

[92] RGAE, 7515/1/404, f. 4-6.

than half of the tanks supplied were accepted by the military agents despite defects, and in 1942 only 7 per cent of them were free of defects.

The situation at other factories was no better. For example of the T-34 tanks that tank factory no. 174 supplied to the military agent in August 1943 only 4.5 per cent were free of defects and more than half had three defects or more. From April to August 1943 roughly a tenth of vehicles were in such a bad state that they were returned to the factory for remedial work before re-testing.[93] The same happened to more than 20 per cent of tanks supplied by the Kirov factory in Cheliabinsk.[94] Subject to repeated testing, however, military agents eventually accepted virtually all tanks produced; across the industry, in July 1943, tanks accepted ran at 99 per cent of tanks supplied.[95]

Table 1. The Quality of Tanks: Factory no. 183, 1942 to 1945

	1942	1943	1944	1945
Number of tanks supplied to the military agent without defects, per cent of total	7	14	29.4	49
Number of defects, average per tank	3.6	2.4	1.7	0.8
Cost of output scrapped, per cent of gross output	…	2.22	2.08	1.49
Number of tanks subject to re-testing by the military agent, per cent of total	36	13.8	4.8	4.5

Source: "History of Tankbuilding at the Stalin Urals factory no. 183" (RGAE, 8798/4/17, ff. 231-232: typewritten MS). The high rate of defects in 1942 was said to be due to the fact that this was basically a new factory, assembled out of plant evacuated from Khar´kov, Bezhitsa, Moscow, Mariupol´, and Stalingrad. The frequency of defects fell as output expanded.

In practice only completely unservicable goods were rejected; most equipment was taken for the army following re-testing, defects and all. The result was a steady flow of complaints by military units. In April and May 1943 the tank industry recorded 77 complaints about cracks in tank bodies.[96] Ermolov (2004) provides further insightful data and citations from the archives that we summarize below. Official figures suggest that during the war generally 12 per cent of all tank losses were due to technical faults. This proportion was higher in 1942 and 1943. According to chief of combat training of the Red Army supply administration for armoured equipment Major-General Krivoshein, "in one particular engagement on the Stalingrad

[93] "On the fulfillment of ministerial decrees on raising the quality of tanks at factory no. 174" (RGAE, 8752a/4/293, ff. 180, 182).

[94] "On the quality of tanks and diesel engines at the Kirov factory" (RGAE, 8752a/4/293, f. 188).

[95] "On the results of work of factories of the ministry of the tank industry for July 1943" (RGAE, 8752/4/293, f. 66).

[96] "On the quality of armoured bodies of T-34s of factory no. 183," report to the collegium of the ministry of the tank industry, 11 August 1943 (RGAE, 8752/4/293, f. 114).

front, when our tank numbers were evenly matched with the Germans, only one quarter of our tanks actually took part − say, 100 out of 400 tanks." Senior military agent at tank factory no. 183 Gorid´ko reported that in the summer of 1942 every tenth new vehicle was reported as needing repair. In his view this understated the true position. He claimed that only one quarter of actual defects were being reported; military units were either tolerating the remainder or fixing them at their own expense. The general tendency is illustrated by the monthly results of tank trials for April and June 1943. For April it was simply reported that "the quality of T-34 tanks … remains low for all factories" (cited by Ermolov 2004). June was better: all the vehicles entered in the trials could make the first 1,000 kilometres more or less without breakdowns. Serious defects began to emerge after the first thousand. The tanks from factories no. 183 and 174 had to be suspended after 1,100 and 1,199 kilometres. The rest were still serviceable after 2,000 kilometres.

In theory the law gave the military agents the right to regulate quality not just after the event but preemptively, by monitoring the organization and process of production itself. How effectively could they exercise this right? The evidence suggests that many obstacles stood in their way. At factory no. 126, the KPK official for the Khabarovsk district reported in 1940, "in many cases defects are observable in assemblies and vehicles that were previously put together."[97] The military agents typically got involved only in checking final output and did not intervene at an earlier stage. When the military agent rejected goods he just returned them for repair or withdrawal. For example, in the first nine months of 1940 ammunition factory no. 184 wasted 576,000 rubles on rectifying goods previously rejected either by the military agent or the factory OTK; this compared with the overall value of losses from substandard output of 2,218,000 rubles.[98] Scrapped aeroengines from aircraft factory no. 24 were repaired and passed on to the navy and the frontier guards where standards were lower.[99]

The standards that military agents applied to armament were probably more stringent than those for personal kit and transport stores. While the gap is inherently difficult to measure, KPK documents give the impression that military agents allowed more defects in soldiers' clothing and footwear and that this was agreed with their superiors in the central supply staff of the defence ministry. A KPK audit of 1937 found that "the army is supplied with footwear made out of leather of completely unsatisfactory quality." "Neither the ministry for light industry and its plant managers, nor the Red Army administration for supply of troops is giving the necessary attention to the quality of military footwear." "[Each] military agent in the localities has to service four to six or more production establishments and cannot systematically check up on the footwear plants." At some factories up to half the footwear that the military agents had previously accepted was substandard. "The [supply administration] has systematically tolerated a lowering of requirements in the footwear supplied, with regard to both soles and materials." The mutual rights and responsibilities of the defence ministry and

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[97] Hoover/RGANI, 6/2/27, f. 108.

[98] Hoover/RGANI, 6/2/34, f. 159.

[99] Hoover/RGANI, 6/1/91, f. 7.

the ministry for light industry, or of the military agents in industry, were unregulated since the draft regulations had been under consideration by the ministry for light industry for two years.[100] This situation persisted for three *more* years. In 1940 a KPK report found that "defence ministry acceptance agents in factories and plants [of the ministries for the light and textile industries] are tolerating substandard items on a massive scale."[101]

Unlike the military agents, the technical inspectors rejected output in modest proportions. At the Red October factory in 1954 technical inspectors from the aircraft industry scrapped between one and three per cent of items, depending on type.[102] Technical inspectors at the Kol'chugin factory performed at similar rates.[103] This is not direct evidence of how well they were working since we lack independent evidence of the true quality of output. A factor that contributed to low rejection rates was that technical inspectors periodically checked the production technology against the purchaser's requirements and, by addressing such problems directly with the supplier, may have succeeded in nipping them in the bud.[104] But they also accepted substandard goods in significant proportions. Thus the chief of purchasing for the aircraft industry wrote to his technical inspectors at the Red October factory on 15 March 1951: "In disregard of [my] repeated instructions [that you should] intensify the regulation of quality of goods accepted for factories of the ministry of the aircraft industry, the aircraft factories continue to report poor quality of materials that [they] receive. The technical acceptance agents are not providing regulation of the technology, accurate testing, and a proper match between materials used and technical specifications." The same letter reprimanded one of the inspectors for accepting substandard items and demanded "strengthening of regulation of the quality of materials accepted and of the factories' adherence to the technology approved."[105]

Still, the technical inspectors were not totally ineffective. For example, when the Red October factory delivered substantial quantities of substandard steel to the aircraft industry in 1947/48 the number of technical inspectors at

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[100] Hoover/RGANI, 6/1/72, f. 77, 82-84.

[101] Report on fulfillment of an Economic Council resolution of 15 January "On the annual and first-quarter supply plan of the Red Army, Red Navy, and NKVD troops with kit and transport equipment for 1940" (Hoover/RGANI, 6/2/250, f. 41-42).

[102] RGAE, 7515/1/404, ff. 239-240.

[103] Report by chief El´shin and engineer-inspector Nadzhar´ian of the aircraft industry technical inspectorate at the Orzhonikidze factory, Kol´chugino, to the ministry of state control (GARF, 8300/17/118a, f. 39-41).

[104] Chief of the aircraft industry technical inspectorate at the Red October metallurgical factory to the ministry of state control, report dated 16 December 1954 (GARF, 8300/17/118a, f. 208-227).

[105] Supply chief of the ministry of the aircraft industry to the chief of technical acceptance at the Red October factory, letter dated 15 March 1951 (GARF, 8300/17/118a, f. 235).

the factory was boosted from one to ten. In consequence the number of claims for compensation from user factories fell to one ninth of the previous level.[106]

3.3. The Quality Stalemate

Military agents were virtually never penalized for accepting shoddy goods for the army, even if it led to loss of life as in the case of aviation accidents. The statute on technical acceptance of artillery goods, for example, did not consider the acceptance of substandard items as a possibility and so did not lay down penalties for it.[107]

However, the main reason that military agents did not always stick rigorously to defence ministry guidelines on substandard equipment was that, being accountable for the supply of the Army, they could not reject everything that Industry offered them. The same reason also led their superiors on the supply staff not to punish them but to collude with them in lowering standards. If they insisted on standards and showed no flexibility, they laid themselves open to criticism for being over-zealous or over-cautious. For example, a KPK factory report of 1940 condemned the OTK and military agent at aircraft factory no. 126 for "a tendency to over-insurance."[108] Surveying the work of military agents in 1943 the KPK demanded that "the military agent should in most cases rule on the acceptability of one or another deviation [from standards] so as not to delay products for the front."[109] Clearly, therefore, while military agents may have tried not to accept goods that were clearly unserviceable, there was pressure on them to tolerate some level of defects.

Industry had a further advantage in disputes over quality when defence goods had alternative uses and a market value to other buyers. If the military agent rejected them the factory could simply sell them off on the market. In 1928, when the Soviet Union still had a mixed economy, the chief of the Red Army administration for military housekeeping complained: "we are in such a state that, if we don't take the goods we need from industry, then industry can put it on the market and get three times more than from us. That's why we have to compromise, one way or another."[110] Despite the suppression of most markets and the transition to a command system this problem still existed ten years later (Harrison and Simonov 2000, p. 236).

Defects that the military supply staff believed they had little choice but to accept were not always tolerable in the eyes of the combat troops. The perennial conflict over quality between the Army and Industry opened up faultlines within the Army itself, between combat officers and supply officers whose interests diverged. The combat staff were those most closely interested in the quality of weapons. In the case of factory no. 39 the air force leadership

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[106] Report on the technical inspectorate at the Red October metallurgical factory, 16 December 1954 (GARF, 8300/17/118a, f. 208-227).

[107] "Statute on technical acceptance of artillery supplies" (RGVA, 5/207, f. 28-33).

[108] Hoover/RGANI, 6/2/27, f. 109.

[109] Hoover/RGANI, 6/2/49, f. 9.

[110] Red Army administration for military housekeeping chief Oshlei to the 1928 meeting on the supply of military housekeeping (RGVA, 47/9/83, f. 11).

appealed to minister of the aircraft industry Kaganovich twice, on 2 August and 3 October 1939, to force changes in aircraft design. The supply officers, on the other hand, shared responsibility for the quantity of weapons procured, and this led them to be more inclined to compromise with managers in defence industry and accept goods with defects. If experience showed that the defects were serious, and it turned out that the military agents had accepted unserviceable goods, the combat officers turned on the supply officers; at this point the military agents had no alternative but to defend themselves and fight to the finish. For example, even after military units began to report aircraft accidents, senior military agent Rodionov of aircraft factory no. 39 insisted that these were "unverified rumours."[111]

It would be wrong to conclude that the military agents were completely ineffective. Certainly they achieved more results than the factory OTK; they turned goods back more frequently and this led to a higher rate of remedial repairs than in the civilian sector. This helps explain why there was sometimes a lower rate of fulfillment of the plan for military orders than for civilian plans in the Soviet economy. Paul Gregory (2003) has noted the relatively low rate of fulfillment of defence industry plans and military contracts despite the high priority attached to the defence sector on the supply side. It may be asked why, through repeated exchanges, Industry and the Army did not learn each others' preferences and resources so as to converge on a mutually beneficial equilibrium in which the Army obtained goods of the quality it required and Industry was able to fulfill its plans without the need for costly rejections and plan failures. In fact, Industry's plan fulfillment remained poor and rates of rejection of Industry's products by the Army remained high. We interpret this as the outcome of a game in which the Army offered mutually advantageous contracts for Industry to supply goods of given price, quantity, and quality; once price and quantity had been fixed, however, Industry was unable to commit its own agents not to shirk on quality. As a result, Industry was continually tempted to fulfill contracts with low quality outcomes at the expense of the Army.

Why was the equilibrium rate of rejection of defence products greater than zero? We think of rejected goods as representing a costly, and therefore valuable investment by both sides. It hurt Industry to see its goods rejected because this made its own position more difficult financially and in terms of plan fulfillment. Industry was willing to take a certain level of rejection, however, to make its difficulties in meeting quality standards credible to the Army. A high rejection rate *forced the Army to lower its expectations and standards*. At the same time it hurt the Army to reject the goods it was offered, because this made it harder for the Army to achieve its strategic goals. The Army was willing to reject goods up to a point, however, to make its own quality standards credible to Industry. Thus a high rejection rate *forced Industry to lift its performance*. In the upshot, quality outcomes and rejection rates were determined simultaneously, and a positive rate of rejection served the interests of both parties (for elaboration see the Appendix).

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[111] Hoover/RGANI, 6/2/17, f. 52.

3.4. Enforcing Deadlines

On quality matters military agents could take a relatively hard line. On other issues they were usually more ready to compromise. This applies particularly to delays in the acquisition process. The KPK archive contains numerous cases of falsified reports for both civilian and defence enterprises. The usual form was to inflate the report of output over the accounting period by including *pripiski*, goods that did not exist as yet but would be produced in the next period. *Pripiski* thus allowed the enterprise to claim fulfillment of the plan and entitlement to a bonus.

It is important to note that a single enterprise could not embark on the practice of *pripiski* in isolation; a criminal violation, it could not be carried off without the awareness and approval of ministerial superiors, and it almost certainly required the collusion of the customer. Despite the risks, however, the power of suppliers in the civilian seller's market was often enough to win the cooperation of both superiors and purchasers (Berliner 1957).

Pripiski appear to have been widespread in the Soviet defence industry.[112] A KPK report of 1946 for example, alleged that the director of tank factory no. 44 "is systematically engaging in the *pripiska* of goods that have not finished production" and that his chief administration, although aware of this, "has not only not prevented, but has even rewarded it."[113] Similarly, the KPK found that in 1944 the relevant administration of the armament ministry "suggested to the director of factory [no. 60 that he] report inflated information to the ministry."[114] In September 1944 the KPK recognized that *pripiski* were widespread: "In 1943 and 1944 director of armament factory no. 8 comrade Fratkin has continually reported falsely inflated information about the fulfillment of the factory's programme, typically using from 5 to 20 days of the following month to complete production … Aircraft factory no. 266 is reporting incorrectly inflated information about plan fulfillment. Factory director comrade Dikarev reported such information in 1943 and also in January, February, and March 1944 … The leaders of tank factory no. 255 (comrade Moroz) and armament factory no. 541 (comrade Aleshin) have also been deceiving the government and ministries by reporting false information

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[112] Devons (1950, pp. 138-42) noted similar practices in the British aircraft industry in wartime, where monthly and weekly output was planned by the number of aircraft both delivered and "AFT" (awaiting flight test); both concepts proved elastic and liable to manipulation. According to the late Sir Austin Robinson, wartime head of the UK ministry of production programmes division, high officials in the ministry of aircraft production were willing to include AFT aircraft in totals "even when they were far from finished. (There were some cases when they lacked wings!)" (letter to Harrison received 21 March 1989). In the Soviet case, while *pripiski* transferred output to one period from the next, they could not accumulate through time and did not, therefore, significantly inflate the accuracy of annual totals as was suggested by B.V. Sokolov (1988).

[113] Hoover/RGANI, 6/2/98, ff. 81, 85.

[114] Hoover/RGANI, 6/2/67, f. 11.

on the fulfillment of the production programme."[115] There were even *pripiski* in the repair factories of the defence ministry itself, for example in central vehicle repair factory no. 72: the ministry's vehicles administration, while "aware of all the factory's shortfalls and lack of management, took no measures to overcome them."[116]

Widespread *pripiski* indicate that Industry was systematically ignoring deadlines for the supply of goods to the Army: goods were being delivered a month or more late. The military agents could not possibly have been unaware of this; they knew what had been ordered, personally accepted the goods, and could perfectly well compare the two. Alexander (1978, p. 59n) suggested that military agents would probably be found to collude with *pripiski* for the sake of maintaining the producer's good will; Agursky and Adomeit (1978, p. 23), on the other hand, thought this unlikely. In fact Alexander was right: military agents virtually never took action to enforce deadlines. Of all the cases of *pripiski* that the KPK uncovered, only two were reported by military agents. In September 1941 military engineer (second rank) Kuntysh reported an unacceptable delay in an order for gas protection equipment placed with the ministry of general engineering.[117] Intervention by the KPK secured a new deadline for the order, but no penalty for the delay. In 1943 military agent captain-engineer Korneev and senior technician lieutenant Romanov reported on "deception and irregularities" at electrical factory no. 698, and this led to a special audit commission which confirmed the various violations.[118]

Other *pripiski* were uncovered by the KPK auditors themselves. When they did so, they found that the military agents had colluded tacitly or openly in the deception. At armament factory no 60 in 1944, for example, the military agent had joined the director in signing a telegram reporting 101.5 per cent fulfillment of the April programme, when both knew this to be false since it took part of the May programme into account.[119] In this case the *pripiska* had been approved by the ministerial superior (Vetoshkin) of the factory manager and the Red Army superior (Dubovitskii) of the military agent; on 30 April these had jointly authorized the factory to devote the first three days of May to fulfillment of the April programme.[120] The justification that Vetoshkin and Dubovitskii gave was that factory no. 60 was not unique; for the defence ministry, Dubovitskii commented that he had given joint approval to similar arrangements in other cases "to avoid a breakdown of the plan and provision for the needs of the troops."[121]

It was the same among tank factories. At the end of 1942 the KPK officer for Sverdlovsk district, Kulefeev, found evidence of *pripiski* at the Uralmash factory. He wrote:

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[115] Hoover/RGANI, 6/6/1583, f. 10-13.

[116] Hoover/RGANI, 6/6/1583, f. 31.

[117] Hoover/RGANI, 6/6/47, f. 18.

[118] Hoover/RGANI, 6/2/55, f. 1-2.

[119] Hoover/RGANI, 6/2/63, f. 159.

[120] Hoover/RGANI, 6/2/63, f. 160.

[121] Hoover/RGANI, 6/2/63, f. 21.

> With the ministry's knowledge the factory has claimed to the government that in September it supplied 15 tanks to the Red Army. Actually the military agent was accepting these vehicles up to 15 October. Moreover these vehicles turned out to have many defects in the outcome of trials and acceptance … The September vehicles were despatched to military units between 15 and 21 October. In their statements Uralmash factory director comrade Muzurkov and the factory's military agent comrade Zukher have reported that the 15 tanks were included in the commodity output [for April] on the instruction of minister comrade Zal´tsman. Moreover, Zukher has stated that while in the factory comrade Zal´tsman suggested that he include 25 tanks in the [commodity] output, but Zukher refused on the grounds that these 25 tanks had not yet been produced at the factory. A similar case took place in November. For November the Uralmash factory was obligated to supply 100 T-34 tanks, but by the morning of 1 December 61 vehicles had been assembled, trialled, and handed over to the military agent under seal; 10 had completed the military agent's trials but awaited their complement of spare parts; the remainder were at the final stage of assembly and some had undergone stationary testing. Regardless of this situation with the vehicles, at the insistence of the ministry (deputy minister comrade Stepanov was then at the factory) the factory reported the handover of 100 tanks to the Red Army. The factory's military agent Zukher reported that on 1 December the [Red Army] chief administration for armoured vehicles suggested to him by telephone to include 100 tanks in the April report in place of the 71 that were finished. As a result of this effort the Uralmash factory did not supply the Red Army with a single tank in October, towards the October programme, before 23 October, and then between 23 October and the end of the month supplied the entire monthly programme: 52 vehicles. In the first 10 days of November it supplied 13 tanks, then 27 in the second 10 days, and 31 in the third 10 days; moreover, in the first six days of the month, not one tank was supplied. Basically up to 5 December the factory had not finished supplying the tanks for November and with no preparatory work yet undertaken had not started to assemble the vehicles for December. Around 80 T-60 tanks with armament have been standing discarded on the Uralmash factory site for a considerable time. These tanks were handed over to the military agent for the former factory no. 37 during April, May, and June 1942. The ministry evidently claimed to the government to have supplied these tanks to the Red Army, but for lack of caterpillar tracks and other spare parts these tanks were never sent to the front. Considering that these goods were already handed over to the military agent for the former factory no. 37, the Uralmash factory is in no hurry to provide tracks and make up the parts complement of the tanks, which meanwhile lie deteriorating under snow cover. Uralmash director comrade Muzurkov told me that these tanks will be provided with parts in the next few days; judging from progress, however, he will not keep his promise.[122]

One of the OTK chiefs at the armament ministry meeting held in October 1947 let the cat out of the bag: "I don't agree that we cannot come to terms

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[122] Report dated 7 December 1942 (RGAE, 8752/4/108, f. 151-151ob).

with the military acceptance staff. This is not the right way to put the issue. It all depends on whether the OTK chief knows how to work with the military acceptance staff. They are state officials the same [as us] and *they are responsible for equipment orders* to the same extent [as us].[123]

To conclude, deadlines for the supply of armament seem to have caused little anxiety to military agents; even their superiors were ready to approve delays to some extent. They just had to look as if they supported firm deadlines. This led them to collude with enterprise managers in falsifying reports of plan fulfillment.

3.5. Contracting for Military Equipment

Military agents were not only regulators; sometimes they also had to act as lobbyists on behalf of their ministry. The Soviet economy was supposedly managed on the lines of a strictly centralized hierarchy in which agents at lower levels strictly executed commands that flowed down from above. In reality, centralized plans were too highly aggregated to indicate precisely who should supply what to whom. Detailed implementation was left to decentralized contracting between ministries (Kroll 1986, 1988; Harrison and Simonov 2000; Gregory and Markevich 2002).

Although supplying the Army was supposed to carry high priority, Industry not infrequently refused to accept military equipment orders; technical difficulties were the reason usually given (Harrison and Simonov 2000, pp. 230-2). Given the vast scale and heterogeneity of defence production the centre could not verify every detail and concentrated its attention only on the most important items; meanwhile, disputes over items of second-rate importance assumed the general character of the conflict between buyer and seller. In such disputes the military agents intervened as the Army's independent source of truthful information about Industry, and as lobbyists for the Army towards Industry.

In 1938, for example, defence industry factory no. 145, the monopoly supplier of a particular kind of lubricator for guns, refused to sign a contract to supply them to the defence ministry; the military agent, however, reported to the artillery administration that "the factory … has requipped its soldering workshop … it is selling off its equipment for making lubricators. The factory is also selling off the lubricators that it has in stock but undeclared."[124] This information enabled the artillery administration to intervene and secure the manufacturing facilities before they were entirely eliminated.

The Army also hoped to use its agents to regulate the prices that Industry set for its goods. For much of the 1930s Industry carried on a bitter struggle for the right to withhold information about the unit costs of military equipment from the purchaser on the curious grounds that this information was too sensitive a military secret to be shared with the Army (Harrison and Simonov 2000, p. 235). In 1938 the defence ministry succeeded in getting the ministry

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[123] Emphasis added. OTK chief Dovichenko from armament factory no. 3 on 21 October 1947 (RGAE, 8157/1/4105, f. 136).

[124] Red Army artillery administration acting chief Savchenko to defence industry minister Kaganovich, letter dated 23 March 1938 (RGAE, 7515/1/404, f. 46-53).

for the defence industry to agree that its factories would disclose pricing calculations to the military agents. Locally, however, this agreement was subject to widespread sabotage on the side of the factories. In a letter of 29 March 1938 to defence industry minister Kaganovich, officials of the Red Army artillery administration reported that "the obstacles to normal calculation and the proper estimation of actual costs of artillery administration orders" had not been overcome. They complained that:

> … despite frequent appeals to the planning and finance administrations of the defence industry ministry nothing has been put into effect up to now. The finance administration of the defence industry has not implemented the direct instruction of your deputy B.L. Vannikov to provide the artillery administration with the calculations. Locally the practice is continuing of the factories' holding back the calculation work of the military agents. Just in the last few days the military agent at factory no. 12 has informed us that the factory is refusing to supply calculations ex post, referring to your decree no. 54 of 9 February this year. Such a refusal is a direct violation of the government decision no. 108ss of 3 September 1937 by which the defence ministry is entitled to receive annual calculations ex post.

It was necessary:

> … to make arrangements to regularize mutual relations with the artillery administration in the sense of providing it with full opportunity to do calculation work and in all cases to obligate factories to provide the artillery administration with calculations ex post for orders covering 1937 in fulfillment of the government's decision. All this is especially necessary taking into account that the defence industry ministry and defence ministry will shortly be working together to set prices for 1938. Correct decisions will only be reached under conditions of the artillery administration's most detailed familiarization with the production costs of the goods to be ordered and joint business preparation.[125]

In other words, to assist the Army the military agents required to be able to supply their principal with information regarding Industry's costs, while Industry was able to deny this information by means of nothing more complicated than simple footdragging.

3.6. Mobilization Preparedness

The military agents encountered similar problems in attempting to carry out their obligation "to oversee the condition of mobilization planning." In 1937 the government Defence Committee issued a special resolution that included a stipulation of military agents' right of access to enterprise mobilization

[125] Red Army artillery administration acting chief Kaiukov and military commissar Savchenko to minister of the defence industry Kaganovich, letter dated 29 March 1938 (RGAE, 7515/1/403, f. 303).

plans.[126] The defence industry ministry, however, "forgot" to include this in the decree that it issued to implement the Defence Committee resolution. The decree limited the prerogatives of military agents to "the right to participate in working out and auditing the provisioning … of enterprises, the right to check the factual correspondence of technological processes with working drawings and technical specifications, and the provision of technology with equipment … and so forth."[127] Enterprises then cited the decree in refusing the military agents' access to mobilization planning.

The Red Army artillery administration appealed to the defence industry ministry more than once on this issue.[128] The defence industry ministry based its refusal on the need to ensure the secrecy of mobilization assignments; in the end, however, it had to agree to open up enterprise mobilization planning to the military agents subject to special procedures and "with the permission of the military-industrial commission of the government Defence Committee."[129]

The underlying situation was that the defence industry ministry was exploiting secrecy to cover up the lamentable state of mobilization planning at the enterprise level. On receiving one of the regular letters from the Red Army artillery administration demanding military agents' access to the mobilization plans, a ministry official, evidently the minister or one of his deputies, wrote on it: "*After* approval of the mobilization plans."[130]

4. Industry's Counteractions

The archives have shown that military agents were typically loyal to the Army in relation to Industry. They screened goods before deciding whether to accept them and displayed reluctance to accept goods that fell below expected standards. As we have seen, this was not to the liking of factory managers in the localities or their ministerial superiors at the centre. The reason is that the military agents' actions reduced their chances of successful plan fulfillment.

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[126] Decree no. 160ss of the Defence Committee of the Council of People's Commissars "On the participation of Red Army artillery administration military agents in developing the mobilization plans of enterprises fulfilling artillery orders and in monitoring their actual provision," dated 19 October 1937 (RGAE, 7515/1/108, f. 1).

[127] Decree no. 00234ss of the defence industry ministry, 25 October 1937 (RGAE, 7515/1/108, f. 2).

[128] On 26 February, 20 March, and 23 April 1938. Red Army artillery administration chief Kulik and military commissar Savchenko to defence industry minister Kaganovich, letter dated 23 April 1938 (RGAE, 7515/1/108, f. 8).

[129] Defence industry minister Mikhail Kaganovich to his brother Lazar Kaganovich, chairman of the military-industry commission of the Defence Committee of the Council of People's Commissars, letter dated 29 August 1938 RGAE, 7515/1/108, f. 10).

[130] Emphasis added. Red Army artillery administration chief Kulik and military commissar Savchenko to defence industry minister Kaganovich, letter dated 23 April 1938 (RGAE, 7515/1/108, f. 8).

Civilians could use various strategies to address problems that they came across in everyday life. Zvi Gitelman (cited by Grossman 1979, p. 841) asked Soviet emigrants to Israel in the 1970s "If you had a problem in the USSR that demanded an administrative solution, what would be the most effective way of dealing with it?" Of 114 respondents who answered, 11 said they would write to the newspaper, 45 said they would turn to the local soviet, party committee, or town council, and 58 reported "other," which turned out on further enquiry to mean the use of "pull, connections, and bribery."

In principle the same strategies were available to Industry in the face of the Army's demands. Below we consider the possible uses of formal protests, the exploitation of informal relationships, and corruption, to influence the behaviour of the military agents.

These were combined with some further stratagems that we have already mentioned above: the covert resistance that Industry carried on by hiding information from the Army, refusing it on grounds of military secrecy, and dragging its feet when required to disclose it nonetheless; and the incessant complaints about generally unjustified regulation that Industry voiced in any and every forum that presented itself.

4.1. Formal Protests

Managers could make official complaints about decisions of the military agents such as a refusal to accept goods on grounds of poor quality. For example, article 5 of the model agreement between the defence ministry and armament ministry for 1940 stated that in the event of "disputes between the purchaser's military agent and the supplier regarding fulfillment of this agreement in relation to the quality of goods supplied" the supplier had five days to lodge a written objection, and the dispute would then be taken to a joint meeting between representatives of both parties.[131]

If resolution was not achieved at this level, the enterprise could pursue its complaint through a wide range of state and party channels up to and including the press; written appeals to higher authority were a general feature of life in a society with underdeveloped legal enforcement, and citizens in all walks of life used them to seek truth and justice (A.K. Sokolov 1998a,b; Livshin and Orlov 1998; Livshin, Orlov, and Khlevniuk 2002). In the case of Industry such complaints typically emphasized that military agents were rejecting perfectly good items so as to play safe, and were hindering the fulfillment of defence orders as a result.

In April 1938, for example, a workshop chief from aircraft factory no. 153 wrote to NKVD minister Ezhov accusing military agent Mikhailov of sabotage by deliberately scrapping serviceable products.

> Some of the technical staff and leaders of factory no. 153, judging on the basis of the military agent's work in their workshops, tend to think that military agent Mikhailov is engaged in covering his own position [*samostrakhovkoi*] in his work at factory no. 153 and by the same token is deliberately putting a brake on the factory's work … he has forbidden a new staff member of the military agents, comrade Vetchinkin, in whose

[131] RGAE, 8157/1/134, f. 44-47.

> view Mikhailov has been scrapping serviceable items, from accepting goods on his own authority.

He went on to claim that factory no. 21 had been supplying similar items, although of lower quality, without objection by the military agent. Mikhailov was alleged to have said: "I'll bring the factory to a halt so as to make it learn to work exactly according to the blueprints and with the new equipment that the factory lacks."[132] By this means the factory succeeded in provoking further investigation into the actions of military agent Mikhailov; first, the defence industry ministry held an internal inquiry which confirmed the charges against him and proposed a special commission to investigate them further; of course, it was in the ministry's interest to displace any blame for the factory's substandard production onto the military agent.[133] Defence industry minister Kaganovich then proposed a further inquiry to air force chief Loktionov.[134]

The archives do not reveal how this story ended. According to respondents cited by Gregory (1990, p. 67n) setting up a "fact finding commission" was a stratagem by which ministerial officials often tried to suppress criticism. In fact, the documents suggest that such inquiries sometimes sided with the military agent. At the 1947 meeting of OTK chiefs the following story was told. In 1946 the director of factory no. 188 had:

> complained to someone at the business administration of the Council of Ministers about the military acceptance staff, to the effect that the military acceptance staff were, with total impunity and total lack of accountability, as he put it, scrapping totally serviceable goods. He came across as so badly treated and so helpless that, as he said, they were scrapping his factory's totally serviceable goods and he was being forced to destroy them and incinerate these items. The issue came before the government. They got a resolution from the Council of Ministers immediately to set up a commission with representatives from state control, the chief artillery administration, and the armament ministry, to sort out how it was that one side was making good products and the other was scrapping these good products with impunity. The commission worked for three and a half to four months. The outcome was that all the scrapped production was

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[132] Workshop no. 7 chief Shevchuk of factory no. 153 to NKVD minister Ezhov, letter dated 20 April 1938, with copies to the chief of the NKVD local administration and defence industry minister Kaganovich (RGAE, 7515/1/404, f. 104-111).

[133] A report on the situation prepared for Kaganovich within the defence industry ministry stated: "From the overall work of military agent Mikhailov at factory no. 153 it is clear that he wants to halt the factory, not to assist a young factory to overcome difficulties and the consequences of wrecking. In the course of his work in the air force administration Mikhailov was closely associated with enemies of the people Bazenkov and Aleksandrov …" (RGAE Ф.7515/1/404, f. 102-103).

[134] Kaganovich to Red Army air force chief Loktionov, letter dated 10 May 1938 (RGAE, 7515/1/404, f. 101).

> substandard and the commission confirmed that it was all to be destroyed and on no account to be used by the Army.[135]

At an earlier meeting held in 1937 a senior military agent told a similar story.

> Yesterday a significant case arose. They decided to go for a military agent on the grounds that he was engaging in formalism, and they went to the newspaper editor: 'Expose this formalist as you should.' The editor came to me and asked me to take steps to put a stop to the rejections by the military acceptance people. I replied: if you want, I'll show you the things that [the military agent] should not only not accept, but shouldn't even have to see; and that's what I showed him. After that he could only spread his hands: how could a builder present a vessel in such a condition? If the editor is fair-minded, he'll probably write something about this.[136]

Managers' complaints against military agents sometimes extended to straightforward fabrication. In 1937 Red Army artillery administration chief Kulik protested to defence industry minister Kaganovich:

> During 1937 factory no. 42 (city of Kuibyshev) has more than once cabled the party central committee (including Stalin personally) about the amount of work for the factory and the artillery administration's delays in issuing warrants, ignoring the explanations given by the artillery administration's military agent at the factory that the artillery administration issues warrants only for goods made up and ready for firing. Most recently, there have been cases where factories have resorted to outright deception of superior agencies in their information, all with the aim of supplying unfinished goods. The most recent cipher telegram from factory no. 42 to the minister of the defence industry, sent by deputy director Konovalov in early October, contained knowingly false information about some T-3 UN tubes (part nos 16-19) which had supposedly been a job of the factory workshop; these tube parts actually left the factory between 11 and 16 August and reached the artillery administration's warehouse no. 67 on 27 August. The factory did not reply to the artillery administration's telegram enquiry about the reasons for delay in the supply of these tubes. On 22 October the military agent at the factory confirmed that the cipher signed by Konovalov was a lie and had been sent "to lay it on thick," and the factory management is presently engaged in trying to get out of a bad situation by getting various justificatory certifications out of the military agent.[137]

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[135] Colonel Gavrikov from the artillery administration on 21 October 1947 (RGAE, 8157/1/4105, f. 239).

[136] Senior naval agent Blagoveshchenskii to a meeting of party activists in the ministry for defence industry on 11-13 April 1937 (RGAE, 8183/1/146, f. 39-39ob).

[137] Kulik to Kaganovich, letter dated 20 October 1937 (RGAE, 7515/1/403, f. 1-2).

4.2. Informal Connections

Another way of influencing the military agent was by means of informal pressure. The institutional basis of this pressure was the goodwill that the buyer needed to build up with the supplier in the seller's market in order to go home with anything at all in the shopping bag, but it was usually exercised through personal contact or *ZiS* (*znakomstvo i sviazi*, "acquaintance and connections"). In the military market place the Army's supply officers each had their own purchasing plans to fulfill, and as a result Industry's officials could and did make demands on them.

The archives preserve many letters from the defence industry ministers to Army officials asking that they accept one item or another as an exception to the rule. For example, writing to defence minister Voroshilov on 15 March 1938, defence industry minister Kaganovich requested that he accept 200 unfinished aircraft.[138] In 1945 the armament ministry asked the artillery administration to instruct the military agent of armament factory no. 8 to accept systems lubricated with an uncertified gun oil as a special case.[139] In a further case the armament ministry asked the artillery administration to accept items fitted with lubricators that diverged from the agreed specification.[140]

Mutual relations between Industry and the Army were such that the former could even ask the latter to write off a loss. In 1943, for example, the chief of the financial accounting department of the ministry for the tank industry wrote to the deputy minister to substantiate the case for appealing to the defence ministry to lift penalties on tank factories for not meeting supply deadlines: "Among the causes of production shortfalls are power cuts and fuel shortages. Moreover, periodic amendments to factory programmes also affect the fufillment of the supply plan for the the Army. On formal grounds the Red Army armoured forces have every right to impose penalties on our enterprises. However, since the fines and forfeits imposed amount to substantial sums and basically show up as enterprise losses, I request you to confer personally with deputy commander of the Red Army armoured forces lieutenant general Korobkov not to claim fines and forfeits from our factories in the first half of 1943 for non-fulfillment of agreements."[141].

When informal pressure was successful in influencing the Army's supply staff in favour of compromise, the result was often to shift the focus of conflict away from the interface between Industry and Army to inside the Army, between its combat and supply staff. In 1930, a few months after the reform of the military acceptance system, deputy defence minister and president of the Revolutionary Military Council Uborevich alleged that the military acceptance staff were covering for the poor work of Industry. He wrote to his heads of administration: "I note that your administrations have recently ceased to

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[138] RGAE, 7515/1/403, f. 166-167.

[139] Letter to major-general of artillery Savchenko, dated 26 November 1945 (RGAE, 8157/1/1010, f. 89).

[140] Letter to major-general of artillery Polikarpov, dated 20 December 1945 (RGAE, 8157/1/1010, f. 217).

[141] Shagalov to Goregliad, memorandum dated 5 August 1943 (RGAE, 8752/1/193, f. 30).

provide reports on the quality of goods … I propose that as a rule [you should] report to me on this once a month …"[142]

When the Army would not concede on quality, there was usually something else on which its agents were willing to trade. The way in which the military agents were sucked into collusion with *pripiski* is evidence of how such informal relationships developed at lower levels. Alternatively, the military agents had to work harder at ensuring supplies, or to give way on mobilization plans. A common factor in managers' complaints against the military acceptance staff was the demand for an improvement in supply. If the state wanted higher-quality goods, it had to give higher priority to supply. "If there are no raw materials, and it doesn't violate the production plan, then we'll take them out of the mobilization stocks so industry will make them up again over a few months."[143]

The Army tried to limit its vulnerability to informal pressure by making declarations that seem unlikely to have had much effect. For example, at a meeting of the armament ministry collegium about technological discipline on 15 January 1939 an artillery officer remarked: "The head of the artillery administration has asked me to tell you not to appeal further to us about lost output that has to be scrapped because of [violations of] the technological process. He will not discuss this further with factory representatives."[144]

4.3. Corruption

The last strategy available to managers was to seek to buy the military agents off. The archival evidence on the spread of such practices is not consistent. On one side we know of secret police chief Genriykh Iagoda's report of August 1933 (cited by Harrison and Simonov 2000, p. 240) that defence suppliers were commonly setting aside special funds for incentive payments to military agents In the second half of the 1930s the defence ministry more than once issued prohibitions on side payments of all kinds by enterprises to military agents, which in itself is a pointer to the existence of the practice (Harrison and Simonov 2000, pp. 240-1). On the other hand our own search of the archives for specific instances of corruption and the punishment of military agents for taking bribes has not yielded anything. We have found no cases in the files of the agencies of state or party control.[145] Although these contain

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[142] Letter dated 22 July 1930 (RGVA, 33991/1/65, f. 27).

[143] Budnevich, from industry, to the 1928 meeting on the supply of military housekeeping (RGVA, 47/9/83, f. 20).

[144] Representative of the Red Army artillery administration Anisimov to the armament ministry collegium on 15 January 1939 (RGAE, 8157/1/124, f. 107).

[145] State control: GARF, *fondy* 7511 (commission of state control) and 8300 (ministry of state control). Party control: Hoover/RGANI, *fond* 6. Perhaps the relevant files have not been declassified. Many files of the ministry of state control relating the defence industry remain secret. The defence ministry has not yet transferred the records of the military prosecutor and courts martial for the 1930s and since to RGVA. Finally, the documents of

many examples of illegal payments to factory managers and local party leaders, they are silent on factory payments to military agents.

This could mean several things. One possibility is that corruption among military agents was tolerated. As the history of military agents' involvement in *pripiski* suggests, the officials of the Red Army central supply administrations tended to cover for the violations of military agents in the localities. Perhaps, while declaring war on corruption in its decrees, the defence ministry did not or could not wage it in practice.

Another possibility is that corruption was not an important factor in inducing military agents accepted substandard goods. Perhaps military agents' high pay and easy conditions were worth more to them than any bribe that Industry could offer. Thus, the reason that we have not found evidence of corruption may be that military agents were typically not corrupt. They sometimes accepted substandard goods not for venal reasons, but because their loyalty to the Army, including their responsibility for its supply, led them to compromise with Industry.

Finally, it is likely that through their informal connections managers could make nonmonetary claims on military agents that, unlike bribes, did not create a criminal liability.

5. Conclusions

Military market places display obvious inefficiencies under most institutional arrangements, but that of the Soviet Union was characterized by monopoly and a seller's market to an unusual degree. Monopoly presents a particular problem where experience goods are traded since the consumer cannot respond to bad experience by switching repeat purchases to another supplier. We suggested that the consumer's likely response would be to invest more in evaluation prior to purchase, to be more reluctant to buy, and to exploit whatever non-market means presented themselves to influence the seller.

In the case of the Soviet market for weapons and military equipment we have found evidence of these in the institution and activities of the military agents, the procurement agents of the defence ministry.

We have explored the historical limitations on their effectiveness. These were of two main kinds. Of some importance were the counteractions of the seller, which included stratagems of covert and overt resistance and informal pressure, but not corruption as far as we have been able to discover. More importantly, the military procurement agents were compelled to compromise with the seller by the logic of their own position.

The military agents' chief weapon was to refuse to buy goods that they evaluated as of poor quality; this imposed certain costs on the seller. In general, however, being responsible for procuring the goods that the armed forces needed to carry out their national mission, agent could not use this weapon without limit; they could not buy nothing for long. Under such circumstances compromise was inevitable. The outcomes, including persistent low-quality output and its rejection up to a point, reflected an equilibrium that was in the common interest of both buyer and seller.

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the NKVD economic administration, the responsibilities of which included the defence industry, are missing from the NKVD archive.

Appendix. Quality Setting and Filter Setting

We think of the Army and Industry as each adopting a boundedly-rational decision rule in pursuit of their objectives. In each period Industry offers the Army one unit of goods of average quality *q*. The Army desires both quality and quantity, but has only one instrument to influence them: it can reject a percentage *r* of the output that is offered. This reduces the quantity available in the present but, taking into account the response of Industry, raises average quality in the next period. Thus, rejecting Industry's goods is costly to the Army but brings a future benefit.

We suppose that the Army rejects the goods that Industry offers in a proportion $0 < \beta < 1$ to the gap between their average quality and the quality level $\hat{q}$ that the Army expects, so its rejection rate in period *t* is $r_t = \beta \cdot (\hat{q}_t - q_t)$. We call $\hat{q}$ the Army's quality filter. This filter is variable, however. In each period the Army re-sets the filter on the basis of the achieved quality level of the previous period plus a constant increment $\gamma > 0$ so that $\hat{q}_t = q_{t-1} + \gamma$; in short, by planning "from the achieved level" (Birman 1978) the Army subjects Industry to a quality ratchet (Weitzman 1980; Keren 1982).

The presence of q_{t-1} in the quality filter and the condition $\beta < 1$ are conditions of a seller's market. That $\beta < 1$ means that the buyer will accept some goods that fall below expectations for the sake of goodwill, to win the seller's loyalty. The influence of q_{t-1} on $\hat{q}$ means that the seller can manage the buyer's expectations.

Substituting the determinants of the Army's quality filter into its rejection decision and defining $\Delta q_t = q_t - q_{t-1}$ yields the filter-settting (FS) curve:

$$r_t = \beta \cdot (\gamma - \Delta q_t) \qquad 1.$$

from which it follows also that when quality is steady so is the rejection rate at $r^* = \beta \cdot \gamma$. This suggests a restriction, however: it is necessary that $\beta \cdot \gamma < 1$ since the Army cannot reject more goods than are offered in the steady state.

Industry would freely set the quality of output at $\overline{q}$, but must incur a cost to achieve the higher quality that the Army wants. A third party, however, the state or a dictator, penalizes Industry when the Army rejects its goods. When sanctioned for low quality in one period, Industry lifts quality above $\overline{q}$ in proportion $\alpha > 0$ to the previous period's rejection rate, so $q_t = \overline{q} + \alpha \cdot r_{t-1}$; subtracting q_{t-1} from both sides gives the quality-setting (QS) curve:

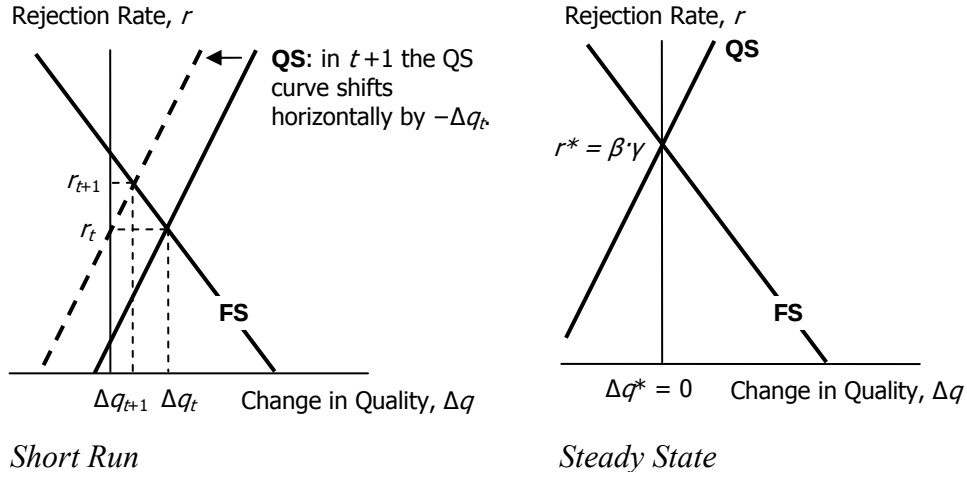
$$\Delta q_t = \alpha \cdot r_{t-1} - (q_{t-1} - \overline{q}) \qquad 2.$$

The interaction between the QS and FS curves is iterative. Given the inverse relationship of Δq_t and q_{t-1} in the QS curve the solution converges on a steady state in which $q^* = \overline{q} + \alpha \cdot \beta \cdot \gamma$ subject to a further restriction on parameter values: for the sake of stability it is necessary that $\alpha \cdot \beta < \frac{1}{2}$.

Figure A1 illustrates how quality outcomes and rejection rates are simultaneously determined and can converge on a steady state. The left hand panel of Figure A1 illustrates the short run. The horizontal axis is defined by the quality increment Δq_t rather than the quality level because Industry sets the quality increment in response to the previous period's rejections; the Army sets its rejection rate in response to the current period's quality increment. As long as the short run equilibrium is away from the vertical axis the quality level is changing, however; each positive quality increment takes Industry further away from $\overline{q}$ and increases its resistance to further quality change. Consequently the QS curve is drawn over time towards the intersection of the FS curve with the vertical axis, where the quality increment is zero and the quality level has achieved a steady state; this is shown in the right hand panel.

Taking into account the history of the Army's rejection decisions, Industry has set the QS curve to intersect the Army's FS curve at $r_t, \Delta q_t$. Since $\Delta q_t > 0$ the rise in quality takes Industry further away from $\overline{q}$. In the next period $t + 1$ the QS curve will shift left by Δq_t, and the equilibrium moves to $r_{t+1}, \Delta q_{t+1}$. Quality will rise further, but at a falling rate, while the rejection rate will climb. With moderate restrictions on parameter values the process will converge on the steady state $\beta \cdot \gamma, 0$ shown in the right hand panel.

Figure A1. Rejection Rates and Quality Outcomes



Short Run *Steady State*

This framework illustrates the possible scope and limits of the Army's influence on quality. The main feature of the model is that in equilibrium both players will accept a positive rejection rate. The Army rejects some of the goods offered in order to maintain Industry's focus on quality. Industry supplies goods of a quality that invites rejection in order to manage the Army's expectations.

Another feature of the model is that the Army can influence quality by altering its behaviour, although not freely. The Army's expectations matter: by ratcheting more stiffly (raising γ) the Army may increase the quality of goods offered. The Army's will to punish low quality also matters, and the Army can raise quality by increasing penalization (raising β). In both cases the cost is a higher rate of rejection in the steady state.

Because of the restrictions on parameter values already mentioned above the Army can raise neither β nor γ without limit. First, $\beta \cdot \gamma$ must not exceed one since the Army cannot reject more goods than are offered. Second, if the Army lets $\alpha \cdot \beta$ exceed one half the interaction of the players will become over-responsive and result in instability.

This model, although extremely simple, may be relevant in other circumstances where two players are locked into an exclusive relationship and quality matters. Consider teachers and students. Students need to produce work of high quality to get good grades. Teachers would also like to be offered high-quality work to read and mark for their own satisfaction, and they can encourage good work by penalizing poor work, marking it down or requiring resubmission. However, teachers need to show some results at the end of the year; in a very clear sense, responsibility for outcomes is shared between teacher and student. Moreover, by marking work as poor teachers usually incur additional costs: time and effort are required to justify a low mark and if the work is resubmitted, to reevaluate it. Low marks can hurt the reputation of the teacher as well as the pupil. Thus, by repeatedly submitting poor work pupils can lower teachers' expectation and raise the average mark given. Grade inflation (Rosovsky and Hartley 2002) is an outcome, limited only by the insistence of some teachers on continuing to fail some work.

An obvious difference from the Soviet seller's market for weapons is that pupils are usually many and compete with each other for good results. To lower the marker's expectations by submitting low quality work requires collusion. Competition among students can provide yardsticks (Shleifer 1985), harden teachers' quality expectations, and enable them to ratchet students' achievements higher than their natural laziness would indicate. However, the strong peer effects that arise in the formation of school and student cultures (Sacerdote 2001) may provide an instrument that enables learners to collude in lowering teachers' expectations and promoting grade inflation.

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RGAE: Russian State Economic Archive (Moscow), *fond* 7515 (People's Commissariat of the Defence Industry); 8157 (Ministry of the Defence Industry); 8183 (Ministry of the Shipbuilding Industry); 8044 and 8328 (People's Commissariat and Ministry of the Aircraft Industry); 8752 (People's Commissariat of the Tank Industry).

RGVA: Russian State Military Archive (Moscow), *fond* 4 (People's Commissariat of Defence, business administration); 47 (People's Commissariat of Defence, military-housekeeping administration); 33991 (Workers and Peasants Red Army, chief administration of armament and equipment supply).

GARF: State Archive of the Russian Federation (Moscow), *fond* 8418 (Defence Committee of the USSR Council of People's Commissars); 7511 (Commission for Soviet Control); 8300 (People's Commissariat and Ministry of State Control).

Hoover/RGANI: Hoover Institution (Stanford, California), "Archives of the Former Soviet State and Communist Party" from the Russian State Archive of Recent History (Moscow), *fond* 6 (Commission for Party Control).

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