THE NATIONAL PRODUCT OF EAST GERMANY

In a recent article[1] data and calculations on industrial production and the labor force in Soviet Germany were given. The present article offers similar calculations for the other major sectors of the economy and attempts to make estimates for the major uses of the Gross National Product.

Because we are dealing with a Soviet economy it becomes necessary to describe the sources on which calculations are based and to explain the methods used in some detail. This has been done in the Appendix (p. 156ff.).

OVER-ALL DEVELOPMENTS

Table 1 gives the result of the calculation of the Gross National Product (GNP) by industrial origin in 1936 and 1950 in West German prices. For comparison's sake the estimates for the GNP of the Federal Republic are also included[2]. The table includes two alternative estimates for trade. The estimate arrived at by the "employment method" seems preferable to the estimates based on deflation, as explained in the Appendix (pp. 160/61). Finally, two summations have been made, one which corresponds to the East German concept of the GNP, the other which corresponds to the Western coverage and which includes the services of those people which in Eastern terminology are employed in "areas outside of material production". An attempt has also been made to adjust the GNP of the Federal Republic to correspond to the East German coverage[3].

1. WOLFGANG F. STOLPER, "Labor Force and Industrial Development in Soviet Germany", *Quarterly Journal of Economics*, Vol. 71, November 1957, pp. 518–545.

2. Only the estimates in 1936 prices, available for the years 1950–1955 are shown.

3. The precise adjustments are described in footnote 4 to Table 1, c. The calculations made differ from the normal statistics in that neither actually paid nor imputed rents are included.

First a brief comment on the relative size of the GNP 1936 in the Federal Republic without West Berlin and in the German Democratic Republic (GDR) including East Berlin. In that year the West German GNP was about $2\frac{1}{2}$ times the East German, with the West German population being roughly twice the East German population. By 1955 the West German population was about three times that in Soviet Germany but the gap in the aggregate GNP had widened. The West German GNP was more than four times the East German GNP.

Secondly, if 1955 or 1957 is compared with 1936, the increase in the aggregate GNP was substantially greater in the West than in the East, the Eastern showing being even worse when measured in 1950 than when measured in 1936 prices. There can be no doubt that the per capita product in the GDR was by 1956 barely above 1936 while it was in the Federal Republic substantially above it[4].

Thirdly, in both the Federal Republic and in the GDR, the increases in the GNP between 1955 and 1936 are larger if the East German coverage of the GNP is taken, than when the West German coverage is taken, but the differences are not significant.

Fourth, since 1950, the year of the First Five Year Plan, the rates of change are not too different. The GNP of the Federal Republic has increased in 1955 by about $63\frac{1}{2}\%$ above 1950. The East German

4. The per capita figures are found on Table 6 (p. 152). During the summer of 1958 I had occasion to discuss my estimates with various gentlemen of the Deutsches Institut für Wirtschaftsforschung. The over-all results of the estimates made in West Berlin for the post-war years were substantially similar to the estimates presented here. Dr. Abeken and Dr. Kupky pointed out, however, that there was evidence that industrial production in 1936 was substantially underestimated by the census. Thus the growth compared to 1936 of aggregate or per capita GNP would be smaller than the calculations presented indicate. At the time that this is written it is not known to me what the order of magnitude of the required adjustment might be. The reader is, however, advised that West German sources have adjusted the prewar figures for major crops upward by 10% (see Appendix p. 158). This adjustment has already been made in the estimate of agriculture and a similar increase of the estimate for industry would raise the estimated GNP of the GDR (Western coverage) in 1936 from 18.0 billion RM to about 20 billion RM, measured in 1936 prices, which would reduce the aggregate growth between 1956 and 1936 to about 10% as against 15% shown by the calculations in Table 1.

Table 1

The Gross National Product of the German Democratic Republic by Major Sectors, 1936 and 1950–1957
(In Million RM/DM at 1936 and 1950 Prices)

A. *1936 Prices*

Year	Agriculture (Including Forestry)	Industry	Construction	Transport and Communications	Trade (Employment Method)	Total GNP (Eastern Coverage)
1936	2,911.322	7,786.399	1,020.854	1,372.780	2,208.000	15,299.355
1950	2,043.655	5,863.832	445.092	1,344.217	1,750.944	11,447.740
1951	2,362.229	6,838.070	539.011	1,479.407	1,702.368	12,921.085
1952	2,647.247	7,417.964	572.699	1,612.232	1,987.200	14,237.342
1953	2,214.997	8,577.292	672.742	1,687.135	2,055.648	15,207.814
1954	2,231.980	9,323.925	745.223	1,836.721	2,115.264	16,253.113
1955	2,267.747	9,996.399	863.642	1,947.377	2,148.384	17,223.549
1956	1,991.162	10,536.985	1,063.730	2,041.938	2,210.208	17,844.023
1957	2,121.724	11,203.013	1,317.973	2,180.642	2,214.624	19,037.966

Year	Index 1936 = 100	Index 1950 = 100	Services (Rough Estimate)	GNP (Western Coverage)[1]	Index 1936 = 100	Index 1950 = 100	Trade (Deflation Method)
1936	100.0	133.7	2,721	18,020	100.0	127.4	2,208
1950	74.8	100.0	2,701	14,149	78.5	100.0	2,043
1951	84.5	113.0	2,660	15,581	86.5	110.2	2,356
1952	93.1	124.5	2,533	16,772	93.1	118.6	2,475
1953	99.4	132.9	2,574	17,782	98.7	125.7	2,613
1954	106.2	142.0	2,835	19,088	105.9	134.9	2,730
1955	112.6	150.5	2,769	19,993	110.9	141.3	2,875
1956	116.6	155.9	2,868	20,712	114.9	146.4	3,053
1957	124.4	166.3	2,894	21,932	121.7	155.0	3,457

1. Trade included as estimated by employment method.

Table 1 (continued)

B. *1950 Prices*

Year	Agriculture (Including Forestry)	Industry	Construction	Transport and Communications	Trade (Employment Method)	Total GNP (Eastern Coverage)
1936	5,575.457	15,668.999	1,995.770	1,838.507	3,859.584	28,938.317
1950	4,163.995	10,472.226	832.236	1,837.472	3,060.650	20,368.579
1951	4,847.190	12,242.140	1,015.846	2,019.697	2,975.739	23,100.612
1952	5,525.591	13,406.815	1,079.711	2,203.241	3,473.626	25,688.984
1953	4,635.552	15,573.300	1,247.356	2,306.594	3,593.273	27,356.075
1954	4,697.143	16,944.316	1,347.145	2,512.705	3,697.481	29,198.790
1955	4,872.536	18,025.652	1,536.743	2,674.618	3,755.375	30,864.924
1956	4,368.380	18,924.496	2,233.267	2,804.151	3,863.444	32,193.738
1957	4,926.688	20,186.913	2,253.224	3,003.684	3,871.163	34,241.672

Year	Index 1936 = 100	Index 1950 = 100	Services (Rough Estimate)	GNP[2] (Western Coverage)	Index 1936 = 100	Index 1950 = 100	Trade (Deflation Method)
1936	100.0	142.0	3,374	32,312	100.0	136.2	3,860
1950	70.4	100.0	3,349	23,716	73.4	100.0	3,571
1951	79.8	113.4	3,298	26,399	81.7	111.3	4,118
1952	88.8	126.1	3,141	28,830	89.2	121.5	4,326
1953	94.5	134.2	3,191	30,547	94.5	128.7	4,568
1954	100.9	143.3	3,515	32.714	101.2	137.9	4,772
1955	106.7	151.6	3,433	34,298	106.1	144.6	5,026
1956	111.2	158.0	3,556	35,750	110.6	150.7	5,336
1957	118.3	167.6	3,589	37,831	117.1	159.5	5,359

2. Trade included as estimated by employment method.

Table 1 (continued)
(In Billion RM/DM at 1936 Prices)

C. *Federal Republic*[3]						
Year	GNP (Total)	Index 1936 = 100	Index 1950 = 100	GNP[4] (Adjusted)	Index 1936 = 100	Index 1950 = 100
1936	47.928	100.0	87.4	41.188	100.0	90.7
1950	54.845	114.4	100.0	45.445	110.3	100.0
1951	62.734	130.9	114.4	53.058	128.8	116.8
1952	66.664	139.1	121.6	56.573	137.4	124.6
1953	71.556	149.3	130.5	60.996	148.1	134.3
1954	77.520	161.7	141.3	66.536	161.5	146.4
1955	85.805	179.0	156.4	74.271	180.3	163.5

3. *Statistisches Jahrbuch FR.*, 1956 ed., p. 520.
4. Total Gross National Product as given in *Statistisches Jahrbuch* less *net* social product at factor cost of banking, private insurance, house rents, public administration (including social security but without public enterprises) and defense, professional and households and other services. No adjustment has been made for the balance of trade. All indirect taxes and all depreciation allowances have therefore been imputed to the other sectors.

increase was 40 to 45%. This means that the increase in the per capita GNP was about the same in the two Germanies.

These facts hold considerable interest. In the one case in which a Communist and a free economy are historically, culturally, and economically comparable there is no evidence whatsoever that the Communist economy has grown faster, even on a per capita basis. Furthermore, the per capita product in 1950 was in the East only about two thirds of the West. Hence the same rate in increase of per capita product has meant that the Communist regime has not only not been able to catch up but that the gap in per capita product has actually widened from 1950 to 1955. The aggregate GNP in 1950 was in the East less than 80% of 1936 but in the Federal Republic about 10% above it.

Now, there are some perfectly obvious reasons to explain the differences in the development in East and West Germany. There has been a heavy loss of population from the East to the West which has consisted increasingly of people of working age and frequently of highly trained men and women. There has been a very substantial exploitation by the occupying power in the East which did not cease until 1954 and which was not reversed until 1958 if indeed it was reversed. Data on the population movements were presented in the already mentioned article in the *Quarterly Journal of Economics*, and the estimates on investments given below will give an idea of the extent of exploitation by the occupying power.

Finally there is a startling inefficiency in the intra-bloc economic relations in which an exploitation by Soviet Russia has gone for many years hand in hand with a strong autarkic tendency in individual areas and indeed with the notion that even individual small areas should, if at all possible, have a full complement of all industries. Only very recently has the notion of international specialization been permitted to enter the operational planning phase and, as far as we know, the international integration of the bloc is still very crude. By contrast, the Federal Republic was never exploited and received large-scale aid from its former enemies; it not only organized its economy domestically more efficiently, but deliberately planned on an intimate international integration of her economy with the world.

THE SECTORAL ORIGIN OF THE GROSS NATIONAL PRODUCT

All of these explanations for the differentials in the GNP in East and West Germany are correct and they are probably basic. Yet, there is more to the differences in development of the two Germanies. Some of the factors associated with specific planning difficulties, will become apparent when the aggregate figures are broken down into their major components either by origin or by use.

I therefore turn to the more interesting figures of the results of the sectoral origin of the East German Gross National Product.

(1) *Agriculture.* There is no question possible that by 1955 or 1957 the GNP attributable to agriculture was substantially below prewar, though the extent of the decline is open to question[5]. The outstanding finding is that there is no discernable development since 1950, but there are only ups and downs. If anything, there has been a stabilization of agricultural output since 1953. The bad result of 1956 must in part be blamed on catastrophic crops rather than the workings of the economy proper.

Within the agricultural sector there have been changes back and forth in the relative importance of crops and of animals and animal product. By 1950 about half of the total value was due to crops, but by 1957 the value of animals and animal product was again about 70% of the total value of agricultural output as it had been before the war. Within the crop sector the total acreage has not changed very much but grains take now a much smaller acreage which in turn is reflected in the very substantial increases in the imports, particularly of bread grains. Large increases in acreage have taken place in oil seeds and fiber plants, but also in the acreages attributable to vegetable and fodder plants. The major crops of potatoes and sugar beets commanded roughly the same acreages before and after the war[6].

5. See Appendix p.157, the discussion of the new East German figures on net yields of major crops.

6. I have made calculations on the sales value of agricultural marketable output in the Federal Republic along the identical lines of the East German calcula-

The question arises naturally why agricultural output should in East Germany as elsewhere in the Communist world have proved to be the Achilles heel of the planned economy. The answer certainly cannot be found in either reduction of acreage or in the reduction of labor inputs. In fact, until 1955, employment in agriculture, forestry, and the water economy was probably greater than in 1939[7]. As is shown in Table 2, the labor force in agriculture has fallen

Table 2

Employment in Agriculture
and GNP Attributable to Agriculture, 1950–1956

Year	GNP Attributable to Agriculture (Billion RM)	Employment in Agriculture (Million)
1950	2.04	1.983
1951	2.36	1.802
1952	2.65	1.702
1953	2.21	1.673
1954	2.23	1.697
1955	2.27	1.775
1956	1.99	1.678
1957	2.12	1.624

substantially from 1950 to 1953. It has then increased to 1955 and has since fallen again. In 1956 it was still slightly larger than in 1953. This implies that between 1950 and 1952 productivity in agriculture must have risen very much, but that since that date there has been no visible improvement. The year 1956 should probably be disregarded as a year of plain bad luck rather than unusual inefficiency. Undoubtedly land reform and inefficient planning contributed to this failure. Insufficient tractorization of the machine tractor stations, much too detailed planning as to how many animals should be kept,

tions. These calculations indicate that the value of agricultural marketable output was by 1955 at least 30% above prewar in the Federal Republic while it was 10 to 20% below in the German Democratic Republic. I have not calculated the inputs for the Federal Republic. There is no doubt, however, that in physical terms they have increased substantially more than in the East.

7. See my "Labor Force and Industrial Development", *op. cit.*, p. 525.

what had to be planted when and where, etc., inadequate prices which held no incentive to farmers, insufficient and uncoordinated fertilizer supply, contributed to the poor showing.

All of these assertions can be documented from official statements and/or actions. In 1956, for example, the prices for forced deliveries were raised substantially in the course of introducing "the principle of material interestedness of the working population" or, to put it into Western language, as well as better English, in order to provide better incentives for more efficient production. The detailed animal plans (Viehhaltepläne) were abolished. Mechanization made progress after 1953, particularly as far as machinery other than tractors is concerned. Still, even in 1956 the machine tractor stations had only 33,866 tractors, only 3,244 combines and all of 3,069 trucks, and 15,940 truck trailers of all kinds. In agriculture, machinery outside of the Machine Tractor Stations, exists, but it is not numerous as far as it is known and it is certainly antiquated. The best estimate that could be made indicates that tractorization rose in the GDR from 3.4 HP/hectare in the prewar period to 12.7 in 1955. In the Federal Republic on the other hand, the horsepower per hectare rose from the same 3.4 HP/hectare before the war to 23.1 HP/hectare in 1950 and to 52.1 HP/hectare in 1955. The differences become even more pronounced when it is considered that the proportion of crop land to total acreage is higher in the GDR than in the Federal Republic. As an interesting side light it appears that the average horsepower per tractor has increased substantially in the East while it seems to have fallen in the West.

The insufficient mechanization is accompanied by a lack of commercial fertilizer. Except for the important phosphates, more of all fertilizers is now used than before the war, but these increases fall substantially short of the increases in the Federal Republic and they are insufficient to fulfill the agricultural plans. Thus the Federal Republic used in the crop year 1954/55 45.8 kilogram per hectare of nitrogen fertilizer, compared to only 36.8 kilogram per hectare in the GDR. It used 52.3 kilogram per hectare phosphates (P_2O_5) compared to only 20.9 kilogram per hectare in the GDR. Only with potash fertilizer did the GDR better than the Federal Republic: 58.5 kilogram per hectare compared to 50.8 kilogram per hectare. But yields are not only limited by the availability of the limiting

fertilizer, they are also dependent on timing of the application of the fertilizer, which frequently was faulty[8].

The irregular availability of fertilizer provides also evidence of the shortcomings of planning. The allotted supplies were not only not available at the right moment, they were also too small to do the job, primarily because of export needs and this in turn involved the whole over-all planning and the international integration of the GDR into the Soviet bloc. Something more will have to be said on this point below. The insufficiencies of planning are most obvious in the case of nitrogen and potash fertilizers[9]. Thus the official sources state that "the need of mineral fertilizer to fertilize the soil and raise yields was in the fertilizer year 1955/56 571,000 tons of P_2O_5 and 837,000 tons of K_2O... They would have to be delivered during the next 5 years over and above the plan in order to give our soil a normal composition of nutrients"[10]. The actual amounts supplied during the fertilizer year 1955/56 were 457,000 tons of K_2O, 152,400 tons of P_2O_5 and 199,900 tons of N (compared to a need of 364,000 tons)[11]. Actual production of nitrogen fertilizer in 1955 was 293,408 tons, and of potash salts over 1.5 million tons K_2O, but export requirements took in 1955 1.0 million tons of K_2O.[12] It would be tiresome to give details for the other fertilizers.

Other reasons also play a role, such as the fact that in the early post-war years special seed farms were treated like ordinary farms[13],

8. Figures from *Statistische Praxis*, Staatliche Zentralverwaltung für Statistik beim Ministerrat der Deutschen Demokratischen Republik, Berlin (East), October 1956, p. 150. The same issue also states that the fertilizers were not delivered on time and that this, together with the general insufficiency, means that crops are more subject to the influence of the weather than in the West where fertilizer supplies are sufficient. The insufficiency of fertilizer is also blamed for the excessive amounts of weeds. American experts who were questioned on the plausibility of these statements agreed that the timing of the application of fertilizer was important but that an excess of weeds could probably not be blamed on the absence of the correct fertilizer at the right time.

9. Phosphates must be imported, but other fertilizers are abundantly produced at home.

10. *Ibid.*, p. 151.

11. *Statistisches Jahrbuch der Deutschen Demokratischen Republik*, 1956 ed., p. 366.

12. Production figures from *Ibid.*, pp. 277/278. Export figures from *Ibid.*, pp. 519/520. Imports of phosphates in 1955 were only 50,422 tons, *Ibid.*, p. 523.

13. The area of the GDR was famous for sugar beet seeds.

seed qualities deteriorated and had to be brought up to standard anew.

In general it is true to say, therefore, that agriculture has performed poorly because of insufficient incentives, insufficient investments, and export requirements of the economy which had to be fulfilled. Improvements in the future can be expected as incentives are improved and investments in agriculture increased, but the international integration of the East German economy into the Soviet bloc is still inefficient.

(2) *Industry.* Since the recalculation of the figures previously published in the *Quarterly Journal* have resulted in no essential changes of the results, I can be brief in the discussion of this most important industrial sector.

Measured in 1936 prices, industrial output in the GDR was in 1957 about 44% above 1936, and in 1950 prices only 29% above it. The output of the Federal Republic was more than twice the prewar level. Even on a per capita basis, the output of the Federal Republic was about 50% above prewar, while there was but little change in East Germany to 1955.

The basic difference in the developments of the two Germanies is that the output of the Federal Republic had already in 1950 surpassed the prewar level by about 10% while the industrial output of the GDR was at most two thirds or three quarters of the prewar output, depending on the prices used to measure it. Since 1950, however, when the First Five Year Plan was started, the performance of the GDR improved greatly, and the rate of growth of the per capita indices in the two Germanies since 1950 was essentially the same—which means, of course, that the GDR has had a difficult time closing the gap between East and West.

Without going into an industry by industry comparison, the developments can be summarized as follows: East German mining output increased much more than West German output compared to prewar, and slightly more compared to 1950. This is, of course, an achievement, but it reflects in part the fact that the planners favor basic and heavy industries, in part it is the consequence of the fact that West Germany has many more sources for its energy than solid fuels, e.g. imported oil, water power. In the highly important electric

power generation East German output doubled over 1936, but West German output quadrupled.

Even in the important categories of production goods and of investment goods West Germany did better compared to 1936, though about the same as East Germany since 1950, at least in investment goods. This is rather surprising, since the categories are specially favored by planners. Surely the lack of electricity and of basic materials (the latter reflecting the inefficient international integration of the GDR into the Soviet Bloc) must be blamed for this. On the other hand, it is hardly surprising to find that the output of manufactured consumers goods was in 1957 in East Germany only about three fourths of 1936, while in West Germany it was already in 1950 about 13% above prewar, and in 1955 was almost twice that level. This reflects not only the usual Soviet pattern, in which the consumer takes the hindmost. But there is actually some sense in letting the textile and clothing industries shrink from their prewar level, when they virtually supplied all of Germany and exported abroad, both markets now lost. A similar pattern of development can be observed also for the food industries whose level in 1950 was only two thirds that of 1936 but which have since reached a level of about 20% above prewar.

The figures in Table 3 summarize most quickly the structural changes that have occurred, using East German classification. The basic industries—mining, chemicals, metal making, cement, etc.—are obviously emphasized, and are likely to keep their predominance since ideology demand that "Abteilung 1" must grow faster than

Table 3

Percentage Share of Major Industry Groups in Industrial Output, Selected Years (Calculation in 1950 Prices)

	1936	1950	1955	1957
Basic Industries	27.2	40.2	36.3	35.3
Metal Working Industries	27.0	27.4	33.1	36.6
Light Industries	34.4	22.2	19.9	18.1
Food Industries	11.4	10.2	10.7	10.0
	100.0	100.0	100.0	100.0

"Abteilung II"; and the existing shortages of basic materials in the GDR are likely to support ideology[14]. Even so, their relative importance has diminished since 1950. Metalworking industries—essentially the engineering trades, including electrical machinery and fine mechanics and optics—have increased in importance. This is a world wide phenomenon, and the only astonishing fact is that in 1950 the increase had not yet started. Light industries—woodworking, textiles, leather and shoes, clothing, cellulose and paper, printing —are the chief sufferers as is to be expected.

The future planned pattern is likely to shift the emphasis somewhat from basic to metal working industries, but how much must remain uncertain. It is unlikely, however, that the relative importance of the two consumer goods sectors will be allowed to increase[15].

(3) *Construction.* The development in the construction sector indicates that its output surpassed its 1936 level only by 1956. The GNP attributable to construction in the Federal Republic was, on the other hand, already in 1955 twice as high as in 1936. This is, of course, understandable in terms of the preferences of the planner and the general availability of building material and labor, and it is confirmed by the looks of East Berlin and of the other German cities which travellers have described. The development of construction becomes completely understandable when housing construction is split off.

In terms of dwelling units constructed (regardless of size) the area of the GDR erected in 1936 about 45% of the number built in the area of the Federal Republic. By 1955 the total number of dwelling units newly constructed *and* rehabilitated was only 32,830 according to official East German sources[16]. This is only 6% of the number of *new* dwelling units alone constructed in the Federal Republic. Considering the bomb damage and the increase in the population

14. "Abteilung I" is, of course, essentially investment, and not identical with basic industries.

15. For further details, see my *Quarterly Journal* article, *op. cit.*, p. 537f., and my forthcoming book. The figures given here differ from the previously published estimates for reasons discussed in the Appendix.

16. *Statistisches Jahrbuch DDR, op. cit.*, 1957 ed., p. 334. The number was in 1956 virtually the same, but in 1957 61,125 dwelling units were constructed.

of roughly 10% compared to 1936, this is extremely little, particularly as new dwelling units are rather small. The calculations made indicate that by 1950 housing was less than a fourth of the level of 1936 (when it probably was rather high) and by 1956 it was still only about 44% of prewar.

The implications of the low level of housing are not only that the population lived miserably but also that other construction recovered rather quickly and reached substantial levels. By 1950 other construction, i.e. investment in plant, government and cultural buildings, etc., was at least at half the 1936 level. By 1955 the prewar level was reached and by 1956 it was surpassed by 15 to 30% depending on the prices used for measurement. Thus the poor performance of the construction sector as a whole is quite consistent with a much better performance in industrial and commercial construction and the result fits the pattern made familiar by Soviet experience.

Unlike in agriculture, employment in construction increased substantially from 1950 to 1953 but has since then been stabilized at a level of around 480,000 to 490,000 a year. The early increases in construction reflect therefore mainly increased labor inputs while since 1953 there must have been a substantial improvement in productivity.

(4) *Transport, Communication, and Trade.* The GNP attributable to transport and communications has increased almost parallel to that of the industrial sector. By 1950 it was about at its prewar level and by 1956 it surpassed its prewar level by about 55 to 60%. Here too the West German developments were in the aggregate more vigorous; the GNP attributable to transport in the Federal Republic was in 1950 already 1/3 above prewar and by 1955 about 90% above it. (All calculations in 1936 prices.)

The structure of the change is, as usual, of greater interest than the aggregate. The area of the GDR had important inland water ways but virtually no overseas or coastal shipping. It always was overwhelmingly a railroad economy. The division of Germany hit the area probably with unusual severity and the wounds inflicted by partition were probably more difficult to heal in this than in the industrial sector. Berlin, which had been the rail hub of the Reich, remained the rail hub of a truncated area and indeed the East

German Reichsbahn (which has not changed its prewar name) is in charge of all rail traffic in both East and West Berlin. The extensive canal system has been cut by the Western sectors of Berlin and required some rebuilding. The Oder river became a border river and its terminal port, Stettin, Polish. This reduced its usefulness to the economy and induced the East German authorities to build up new port facilities and ship building facilities in such places as Wismar, which had been insignificant before the war. The Elbe river also lost much of its significance. Its terminal port Hamburg always was the major gateway for imports into and exports from the central areas of Germany or Czechoslovakia (while Rotterdam played a major role as a gateway to Germany). The political division and particularly the very drastic reorientation of international trade toward the Soviet Union and the satellites reduced the other major natural waterway to minor significance.

Truck transport increased even in the GDR, but it picked up only what is essentially short distance and local traffic and it still is not very important. This is almost a foregone conclusion in view of the antiquated stock and the extremely limited production of trucks which even according to the official East German sources amounted in 1956 to only 17,201 units, about 1800 less than in 1936, when trucks played still a relatively subordinate role in the transport picture of Germany. All of this adds up to the fact that the rail system has to bear the brunt of the increase in transportation. All Western observers agree that the Soviet German rail system is highly efficient, considering its overage rolling stock and the general shortages it has to work with.

In 1936 the rails can be estimated to have shipped 98.7 million tons of goods over 15.1 billion ton/kilometer, 48.9% of them heavy goods, shipped at lower rates. By 1956 they shipped 210.2 million tons, 60% of them heavy goods at special rates, reflecting, of course, the expansion of mining and heavy industries. They were responsible for 27.3 billion ton/kilometer in that year.

By contrast, inland shipping decreased from 2.5 billion ton/kilometer in 1936 to 2.3 billion ton/kilometer in 1956, and ocean shipping increased from a negligible 382 million ton/kilometer in 1936 to a still negligible 412 million ton/kilometer by 1956. Thus rail shipments in 1936 accounted for three fourths of the ton/kilometers of

freight shipped and 20 years later for almost 85%. The implication of this development is, of course, that if the expansion had taken place mainly in the cheaper water transport the GNP attributable to transport would have been smaller. This in turn implies that the enforced or deliberately planned increase in the rail system has required additional resources which might have been used in other sectors and that the increase in the GNP attributable to transport is not an unmitigated blessing. Certainly the bulk goods, such as coal, iron ore, potatoes, sugar beets or cement, which now form 60% of total shipments could be much more cheaply and efficiently transported on barges. Nevertheless, the fact that the expansion of the sector is not an unmitigated blessing should not blind one to the fact that it did take place.

Passenger traffic expanded as vigorously on the railroads from an estimated 9.2 billion passenger/kilometer in 1936 to about 16.5 billion in 1956. The important city railroad of Berlin increased its passenger traffic, however, only from 5.8 billion passenger/kilometers to 6.1 billion passenger/kilometers[17].

Other street railways and busses increased as vigorously as rail transport from 4.7 billion passenger/kilometers to 7.7 billion. The increase in passenger traffic is somewhat more difficult to interpret than the increase in freight traffic. The relatively greater increase in traffic outside of East Berlin reflects undoubtedly the small decline in the population of East Berlin since 1952 and the increasing importance of other industrial centers. It may be that the increasing passenger traffic also reflects a vigorous social development of paid vacations on a large and organized scale. It would be extremely surprising if it did not also form a part of the price which the economy has to pay for the housing shortage, forcing workers to commute over relatively long distances. All of these statements, however, are only suggestions, and not proven assertions.

17. The Berlin transport system consists of busses, trolleys, the subway, and the so called S-Bahn. The trolleys and busses did not cross sectoral lines until recently. Busses virtually did not exist in the Eastern sector and they are still unimportant. The underground railway goes through both sectors of the city and is run by the West Berlin authorities. The S-Bahn runs through both sectors of Berlin and into the Zone proper. It is part of the Reichsbahn and is administered by the authorities in East Berlin.

It is likely that the GNP attributable to communication and the postal services has also increased: employment increased from an estimated 90,800 in 1936 to 125,527 in 1956. It is possible (though unlikely to be quantitatively important) that the increase is due in part to a statistical reclassification or to a reorganization of the industry; for example, there may now be less messengers in plants and more use of the postal services and less private and more public communication between plants. Even if the productivity has fallen in this sector it is still likely that there has been a substantial increase in its output. As indicated in the Appendix, not much more can be said about this sector.

Employment in trade was in 1956 just about at the estimated 1936 level. It seems very unlikely that the GNP of trade is therefore any bigger in 1956 than it was 20 years earlier. There is no particular reason to suppose that the productivity of this sector was any different from 1936 in 1956 and it was almost certainly less before 1956 when the number of retail outlets was much smaller and the reorganized and socialized wholesale trade had to learn its business. Numerous examples of inefficiency in the trade sector could be given from the East German press and it was certainly a favorable sport of the East German papers to blame any shortages of consumer goods on the inefficiencies of trade rather than on inefficiencies in planning. In fact, shortages invariably were not attributed to lack of production but always to a breakdown in distribution. It is, however, impossible to say just what all these complaints add up to.

Considering the fact that the value added of wholesale trade is relatively minor and that the output of manufactured consumer goods or the output of food, drink and tobacco was even in 1956 either still below prewar or only little above it, it seems extremely unlikely that the GNP attributable to trade could have been in 1956 above the prewar level.

Employment in "unproductive" sectors is probably higher than it was before the war and in the absence of any knowledge whatsoever, I have assumed that the value added per employee is unchanged. It is unfortunate that not more can be said about this sector[18].

18. The treatment of the nonproductive sector in East German methodology presents the curious case of the dead hand of Adam Smith keeping a much more

(5) *Summary.* The picture which emerges from this discussion indicates therefore that compared to 1936 the output of industry and transport sectors have increased, that of agriculture has decreased and that of the other sectors has more or less remained unchanged by the time the economy embarked upon the second five year plan. The most vigorously expanding sectors were mining and heavy industries, investment goods and rail transports, while housing in particular and crop production for human consumption lagged.

This contrasts sharply with the development in the Federal Republic where all sectors of the economy expanded vigorously though even there the industrial sector grew more rapidly than the other sectors. It is, of course, a pattern which is not unfamiliar in other Communist countries. It throws some light on the claims of the planned economy of the Soviet type to promote the proportionate development of the economy. I will turn to the possible explanation of these developments below.

THE USES OF THE GROSS NATIONAL PRODUCT

The estimating procedures described in the Appendix indicate that the figures on the uses of the GNP are not as reliable as the estimates for the GNP attributable to those sectors for which data in physical units are available. Nevertheless, the order of magnitude must be roughly correct and some of the findings, particularly those relating to the unexpectedly low investment ratios particularly in fixed in-

powerful grip on Communism than on market economies while his live ideas are only grudgingly permitted to exercise an influence. While trade is defined as the "continuation of production in the sphere of circulation", and passenger traffic and postal services have been included with productive employment in 1956 without bothering to give ideological excuses at all, research and teaching continue to be treated as nonproductive though useful. Perhaps the day will come when the obvious needs of a highly technological economy will induce East German economists to define research and teaching as "production in the preparatory phase".

Unfortunately, published East German data are quite insufficient to give a picture as to what happened to the numbers of doctors, health services, etc., though the number of teachers at various levels could be somewhat laboriously arrived at.

vestment in the early years, go a long way to explain the lagging development in the East compared to the West. Aggregate consumption was in 1956 a little above prewar which implies, of course, that per capita consumption was still below it. Since rationing was not abolished[19] until 1958 and the consumption estimates refer only to individual private consumption of products which are sold against money or are consumed at the farms and do exclude consumption by society or of commodities for which payment is made indirectly through taxation, the estimate seems plausible. The best estimates I have been able to make is that consumption (as defined) took in 1950 only about 1/3 of the GNP, compared to about 53% ever since 1954. It is, of course, a startlingly low share but again hardly implausible: reparations were abolished in 1953 which accounts for a sudden jump in consumption. In 1950, on the other hand, rationing was severe and the production of manufactured consumer goods also had not recovered to more than about 40% of the 1936 level.

The really startling result is, however, the rate of investment. Consumption in a Communist economy is after all just a stepchild, while it is a dogma that "Abteilung I" must grow faster than "Abteilung II". Nevertheless, the gross investment (including inventory accumulation) passed the prewar level in the GDR only in 1951, and on a per capita basis temporarily in 1953 and finally in 1955. In the Federal Republic it was already in 1950 well above the 1936 level in the aggregate and by 1951 also on the per capita basis. By 1955 60% more was invested per man, woman and child in the Federal Republic than in Soviet Germany.

The share of GNP going to gross investment has been about the same in East and West Germany throughout the post-war years. But not until 1953 did fixed investment take about as great a share of the GNP in Soviet Germany as in West Germany. On the other hand, inventory accumulation was startlingly bigger in East than in West Germany until 1954[20]. In fact the chief effect of the June

19. Even now fluid milk and apparently potatoes are not completely derationed.

20. R. W. CAMPBELL, "Soviet and American Inventory-Output Ratios", *American Economic Review*, Vol. XLVIII, No. 4, September 1958, published after my calculations were finished comes to parallel results for the Soviet Union.

Table 4

The Uses of the Gross National Product in East Germany and the Federal Republic, 1936 and 1950–1957
(In Billion RM/DM at 1936 Prices)

	1936	1950	1951	1952	1953	1954	1955	1956[1]	1957[1]
I. German Democratic Republic									
1. Individual Consumption . .	10.898	4.621	6.008	7.440	8.490	10.089	10.934	10.930	11.156
2. Gross Investments	3.368	2.648	3.438	3.622	4.219	3.439	4.166	5.255	6.313
of which Fixed (including Housing)	[2]	1.645	2.023	2.177	2.848	3.172	3.794	4.795	5.614
of which Housing	[2]	0,140	0.149	0.139	0.258	0.277	0.262	0.262	0.488
of which Inventories	[2]	1.003	1.415	1.445	1.372	0.267	0.372	0.460	0.699
3. Other (Residual)	3.754	6.880	6.135	5.710	5.073	5.560	4.993	4.527	4.463
4. Aggregate GNP	18.020	14.149	15.581	16.772	17.782	19.088	19.993	20.712	21.932
II. Federal Republic									
1. Private Consumption	28.986	33.250	35.870	38.751	42.475	45.861	50.998		
2. Gross Investments	8.972	10.680	13.554	13.156	14.610	16.327	18.918		
of which Gross Fixed Investments.	6.900	9.992	10.739	10.942	12.566	14.078	16.791		
of which Inventory Accumulation.	2.072	0.688	2.815	2.214	2.044	2.209	2.127		
3. Other (Government and Export Balance)	9.970	10.915	13.310	14.757	14.471	15.332	15.889		
of which Export Balance . .	0.000	0.460	1.979	1.916	1.756	1.836	1.988		
of which Defense Expenditures (current)	[2]	2.335	2.446	2.780	2.333	2.334	2.286		
of which Defense Expenditures (investments)	[2]	0.251	0.535	0.921	0.692	0.737	0.651		
4. Aggregate GNP	47.928	54.845	62.734	66.664	71.556	77.520	85.805		

1. 1956 and 1957 data for the Federal Republic not available.
2. Not available.

Table 5

Percentage Distribution of the Uses of Gross National Product in East Germany and the Federal Republic, 1936 and 1950–1957
(In 1936 Prices)

	1936	1950	1951	1952	1953	1954	1955	1956[1]	1957[1]
I. German Democratic Republic									
1. Individual Consumption . .	60.5	32.7	38.6	44.4	47.7	52.9	54.2	52.8	50.9
2. Gross Investments	18.7	18.7	22.1	21.6	23.7	18.0	20.8	25.4	28.8
of which Gross Fixed Investments	[2]	11.6	13.0	13.0	16.0	16.6	19.0	23.2	25.6
of which Inventory Accumulation	[2]	7.1	9.1	8.6	7.7	1.4	1.9	2.2	3.2
3. Other	20.8	48.6	39.4	34.0	28.5	29.1	25.0	21.9	20.3
II. Federal Republic									
1. Private Consumption	60.5	60.6	57.1	58.1	59.3	59.2	59.4		
2. Gross Investments	18.7	19.5	21.6	19.7	20.4	21.1	22.0		
of which Fixed	[2]	18.2	17.1	16.4	17.6	18.2	19.6		
of which Inventory Accumulation	[2]	1.3	4.5	3.3	2.9	2.8	2.5		
3. Other	20.8	19.9	21.2	22.1	20.2	19.8	18.5		
of which Export Balance . .	[2]	0.8	3.2	2.9	2.5	2.4	2.3		

1. 1956 and 1957 data for the Federal Republic not available.
2. Not available.

Table 6

Per Capita Expenditures of Gross National Product on Consumption, Investment, and Other Uses, in East Germany and the Federal Republic, 1936 and 1950–1957 (In RM/DM at 1936 Prices)

	1936	1950	1951	1952	1953	1954	1955	1956[1]	1957[1]
I. German Democratic Republic[2]									
1. Individual Consumption . .	674	251	327	406	467	559	604	617	637
2. Gross Investment.	208	144	193	203	240	192	233	297	364
of which Fixed		89	110	119	157	176	211	271	320
of which Inventory Accumulation.		55	83	84	83	16	22	27	44
3. Other (Residual)	232	374	334	312	279	308	278	256	255
4. Gross National Product . . .	1115	769	849	915	978	1057	1114	1169	1252
II. Federal Republic[2]									
1. Private Consumption	759	700	746	799	867	926	1020		
2. Gross Domestic Investment .	235	225	282	271	298	330	378		
of which Fixed	181	210	223	226	256	284	336		
of which inventory accumulation.	54	14	59	46	42	45	43		
3. Other	261	230	277	304	295	310	318		
of which export surplus . . .	0	10	41	40	36	37	40		
4. Gross National Product . . .	1255	1155	1304	1375	1460	1566	1716		
III. German Democratic Republic as Percentage of the Federal Republic									
1. Individual Consumption . .	89	36	44	51	54	60	59		
2. Gross Investment.	89	64	68	75	81	58	62		
of which Fixed		42	49	53	61	62	63		
of which Inventory Accumulation.		393	141	183	198	36	51		
3. Other	89	163	121	103	95	99	87		
4. Gross National Product . . .	89	67	65	67	67	67	65		

1. 1956 and 1957 data for the Federal Republic not available.
2. Detail may not add up because of rounding.

1953 uprising was to increase consumption at the expense of inventory accumulation, leaving fixed investment plans and "other" commitments essentially unchanged.

Again, the particular figures can be questioned but it is certain beyond any reasonable doubt that East German investment in plant and equipment lagged behind West German performance as much as did consumption. The usual pattern of Communist economies of very high investment ratios does not hold in Soviet Germany.

Furthermore, even when the investment ratios are of the same order of magnitude, the actual per capita investment remains substantially lower in East than in West Germany. Only "other" uses and inventory accumulation (until 1953) are bigger in East than in West Germany. (See Table 6.)

The reasons for the lagging may be peculiar to the GDR. They are clearly connected with the fact that the area was called upon to make very high reparations payments until 1953 estimated by some observers at about 25% of current industrial production. Aside from reparations payments there is once more the inadequate international integration of the area. As with the export of fertilizers which had to be made at the expense of domestic agricultural needs, to pay for import of goods which might have been better produced at home, so it is quite clear that a large proportion of investment goods, the production of which was favored in the GDR, had to be exported to pay for raw materials and foodstuffs as well as reparations. A confirmation of this statement can be found in the export figures of important investment goods (see Table 7). Other, equally startling figures could be given which suggest that perhaps half of the production of investment goods is exported. The figures could be multiplied sufficiently to present overwhelming evidence that a relatively forced production of investment goods is quite consistent with actually low investments. Figures on imports which are not given to save space, confirm the estimates. Raw materials and food stuffs naturally dominate the figures[21].

21. In addition to the exports of many individual machines and other investment goods, whole installations were exported. Machinery installed in such a complete installation is not included among the figures quoted but it is included in the production figures. I have not found it possible thus far to evaluate the relative importance of exports of complete plants.

Table 7

East German Production and Exports of Important Commodities, 1957[1]

Commodity	Unit	Production	Exports	Export as Percentage of Production
Sulphur	Tons	94,236	17,347	18.4
Synthetic Rubber	Tons	73,435	39,723	54.1
Rubber Tires	Thousand Pieces	4,455	1,185	26.6
Gasoline	Thousand Tons	883	152	17.2
Diesel Oil	Thousand Tons	830	206	24.1
Cement	Million Tons	3.269	570	17.4
Ship motors, diesel and gas	Pieces	2,720	896	32.9
Stationary diesel and gas motors	Pieces	6,847	1,277	18.7
Lathes	Pieces	5,794	1,539	26.6
of which Automatic	Pieces	276	152	55.1
Hydraulic Presses	Pieces	1,048	571	54.5
Rolling Mill Equipment	Thousand Tons	27,800	26,700	96.0
Steam Locomotives	Pieces	136	43	31.6
Electric Locomotives	Pieces	234	119	50.9
Freight Cars	Pieces	4,123	1,649	40.0
Trucks	Pieces	17,201	3,721	21.6
Fishing "Seiner"	Pieces	25	25	100.0
Fishing "Logger"	Pieces	104	104	100.0
Transformers	Pieces	10,474	6,422	61.3
Standard Typewriters	Pieces	31,052	23,592	76.0
Calculating and Similar Businessmachines	Pieces	74,231	55,087	74.2
Bookkeeping Machines	Pieces	5,202	3,552	68.3

1. Figures from *Statistisches Jahrbuch DDR*, 1957 ed., p. 515ff., except for the statement of the production of gasoline and diesel oil which are West German estimates (see Deutsches Institut für Wirtschaftsforschung, Berlin [West], *Wochenbericht*, No. 24, 1957, p. 96).

The "other uses" are, as indicated in the Appendix (p. 164), a miscellaneous lot. The startlingly high proportion in total GNP by 1950–1954 is undoubtedly due to the extent of reparations but by 1956 the percentage was probably about 1/4 of the GNP, a quite normal ratio. It is entirely possible that there were real export surplusses on commercial account after reparations were abolished, when the export shipments shown by statistics suddenly increased.

Official data claim such surplusses for the years 1954 through 1956. Before that date the GDR had officially import surplusses, but reparations paid were not included in these figures[22].

The relatively low investment ratios and the high proportion of GNP required for "other" uses, explain sufficiently why developments in the GDR have lagged behind the Federal Republic.

CONCLUDING REMARKS

As the figures indicate—and I am quite sure that their order of magnitude is correct—the GDR has by 1956 arrived roughly where the Federal Republic was in 1950. In this period changes have occurred in planning methods, prices have been revised, rationing has been abolished, the major exploitation of the area by the occupation power has been abolished. As developments have proceded, the international weaknesses of the system also have become apparent. Probably for historic reasons, planning has proceded essentially on a national basis. The First Five Year Plan in the GDR and apparently also in the other satellites were formulated with none but the crudest regards of the plans of other countries. Officially the international coordination of Five Year Plans did not start until the Second Five Year Plan was ready to be discussed, which means not until 1956. Yet it is interesting to note that the Second Five Year Plan of the GDR for the years 1956 through 1960 did not become law until January, 1958[23]. The annual economic plan for 1958 was stated to have been the first to be passed before the beginning of the planning period. Present discussions in the press and the East German journals make it plain that the international coordination consisted almost exclusively of discussions about foreign trade which themselves took the national productions as planned by the national plans as data. The problems now discussed refer to a "true" coordination of the

22. *Statistisches Jahrbuch DDR, op. cit.*, 1956 ed., p. 518. The export surplus in 1954 was DM-Ost 409 million. In 1955 DM-Ost 234 million, and in 1956 DM-Ost 163 million. Very little is known about the prices used to calculate the import and export values, but they seem to be world market prices of sorts.

23. Published as special supplement to *Neues Deutschland*, Berlin (East), the official newspaper of the Party, on January 18, 1958.

national plans on the production level. Thus it has become known that the GDR is destined to become a major center of chemical production while it will reduce or abolish its output of many types of heavy machinery the location of which is to be shifted to Czechoslovakia or the Soviet Union itself. It will be interesting to see how the planned economy is able to handle the problem of multi-lateral trade, and international specialization which in the free world does not cause the same kind of trouble.

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APPENDIX

Available Data and Estimating Procedures

AVAILABLE DATA AND THEIR RELIABILITY

When the calculations were started a few years back, the first task consisted in collating a statistical abstract of Soviet Germany on the basis of newspaper clippings, articles in statistical journals, announcements of ministers, or promulgations of the five year plan and the annual economic plans. The data were all equally official but nevertheless frequently contradictory and suffered in all cases from a dearth of explanatory material. Since 1956 three statistical yearbooks have appeared, each of which presents an increasing amount of information which in turn is more carefully described in each successive volume.

As in all other countries, data are either given in value terms or in physical units; there are, as of 1957 or 1958, 379 series on the output of industrial commodities, a great number of them in physical units. There are furthermore data in physical units on the output of all major crops and animal products. All of these data can be directly used for the calculations of measures meaningful to a Western economist.

On the other hand, numerous series and calculations presented in value terms are all but useless to the Western observer. The reasons are only partly that Soviet concepts differ from those customarily employed by Western economists. In my article in the *Quarterly Journal*[1] it was pointed out that in fact the differences in

1. "Labor Force and Industrial Development in Soviet Germany", *Quarterly Journal of Economics*, Vol. 71, November 1957, pp. 518–545.

the National Income concept, for example, have narrowed with the differences being increasingly resolved in favor of the Western concepts. Thus the concept of National Income includes since 1955 passenger traffic previously excluded. While the dubious concept of Gross Industrial Production continues to be used, new figures on net output are given by the Statistical Yearbook for the year 1957.

The major reason why these figures can be used for analysis only with difficulty is that the prices used for the evaluation of these value figures are unknown and would probably be useless if they were known. The least informative sections of the Statistical Yearbook deal with the money supply, the budget, and prices. The reasons for this omission are not hard to guess but one reason which seems to be peculiar to East Germany is that the price system makes no sense in terms of the planned economy itself and is at present in process of revision, a process which started already in 1953[2].

On principle, and with only few exceptions, I have used only data given in natural units. The exceptions will be specifically explained in the proper place. It has been assumed that the data presented in physical units are not deliberately falsified. On the other hand it is incumbent on the investigator to find out in detail just what is being measured. Thus it is known that the statistics of industrial output included for a while also rejects; and crop statistics were until 1957 specifically stated to refer to biological yields. Since 1958, series on "net" yield are published, the "net" yield being defined as "actual yield after threshing but before loss during storage and other losses". The series were published too late to be used in the calculations to be presented.

There are several reasons besides lack of time why the calculations have not made use of the new net yield figures. In the first place they cover at most the years 1953–1957, and in a few cases even only the years 1956 and 1957. In the second place, the losses assumed for the important grains and even more for potatoes are improbably small, so that the "net" yield is a less reliable estimate of what in the West is understood by barn yield than my own calculations. Moreover, losses for potatoes after the harvest are rather big, and vary from 8–12%.

It should be stated that for most crops the new "net" series are slightly above the estimated barn yield used in the calculations and in some cases, particularly for potatoes and sugar beets, they are substantially above them. In the case of pulses for human consumption on the other hand, or of important oil seeds, they are substantially below the estimates which have entered our calculations. On the whole, therefore, the results of the agriculture calculations may possibly be on the low side, though the difference between the calculations made and the results which would have been obtained had the new figures been used, cannot be very big.

2. It would go too far in this context to enter into the details of the questions just raised. The reader is referred to my preceding article and also to two articles by R. JANAKIEF, published in *Statistische Praxis*, "Kritische Bemerkungen zur Anwendung der Kennziffer der Bruttoproduktion für die Einschätzung der Produktionsarbeit des Industriebetriebes", May 1957 and June 1957, an English translation of which is available in *International Economic Papers, No. 8.* See also "Price Policy and Price Formation in the German Democratic Republic", (in German) *Wirtschaftswissenschaft*, Vol. 6, Special Issue No. 5, 1958, Verlag Die Wirtschaft, Berlin (East), 159 pp.

ESTIMATING PROCEDURES

Gross National Product by Origin

(1) The estimating procedures used to calculate the Gross National Product (GNP) attributable to *industry* need not be described in detail. The basic calculations of the coal mining sector and the iron and steel sector were made by evaluating final output and deducting all known inputs. When this method was not possible, the estimating procedure consisted essentially in constructing an index industry by industry from the major outputs, weighted alternatively with 1936 German and 1950 West German prices, and multiplying the 1936 base with this index. This method is essentially used also by the Statistisches Bundesamt. An exception to this procedure was the calculation of machinery output. It was assumed to move more or less parallel to the available input of iron and steel in a manner too complicated to describe briefly here. The electrical machinery output and the output of fine mechanics and optics was assumed to move in the same ratio to the output of engineering calculated by the just mentioned method, as the East German figures in "Messwerte" of electrical machinery and fine mechanics and optics had to the East German figures in "Messwerte" of output of engineering[3].

The figures presented in this article differ from the previously published results not because of any changes in estimating procedures but, first, because the official series of the Statistical Yearbook of the GDR have been substituted for previously unofficial or semi-official estimates, and, secondly, because a great number of new series which became available in 1957 have been included. The new series refer first to imports of important inputs, particularly the vital steel imports, and, secondly, to a substantially increased coverage of the consumer goods sector and the food, drink, and tobacco group of industries.

(2) The estimating procedures used to value *agricultural output* were as follows: The starting point were the biological yield series for all major and many minor crops. These figures were adjusted to arrive at barn yields. After consultation with West German experts it was decided that the barn yield of grains was about 87% of the claimed biological yield of grains and of oil seeds, that the barn yield of pulses for human consumption and of sugar beets was 80% of the claimed biological yield and that of potatoes 75%. In addition, another 3 to 5% of the output was deducted to allow for spoilage in the barn, a percentage which is comparable to, though slightly higher than, West German experience. The output for 1934–1938 which is the comparison period was raised by 10% for some major crops to allow for an underestimation in accordance with the practice of the Federal Republic for such comparisons[4].

3. For further detail, see my *Quarterly Journal* article (pp. 536/537) already referred to, and my forthcoming book.

4. *Handbuch für Landwirtschaft und Ernährung*, issued by the Federal Ministry of Agriculture and Food (Bundesministerium für Landwirtschaft und Ernährung), Hamburg and Berlin, 1956, p. 53, Table 91, Footnote 3.

On principle, only output for human consumption and industrial use was valued. This involved an estimate of consumption on the farms. The basis for the estimates were official data on per capita consumption of important food stuffs and the now published data on forced deliveries and government purchases which were presumably the equivalent of market production and which were adjusted for consumption on the farms by the assumption that farmers ate by and large as well as the non-farm population. The fodder crops and those part of grain crops which remained within agriculture were treated as intermediate products and not evaluated. All crops were valued in West German prices.

The animal sector was broken down into three parts: the live weight of slaughtered animals, the live weight of the change in the stock of animals; and finally the output of milk, eggs and wool. With milk and eggs only the amounts leaving the agricultural sector were evaluated.

The evaluations of milk and eggs are two major exceptions from the rule that official statistics as given are accepted without question. In both cases, however, my procedure has in fact official blessing. In the case of milk the official East German procedure to determine the milk yield was changed in 1956 and the milk yield as determined by both the old and the new method was given. This enabled me to correct the preceding years and to make them comparable with the latest figures, a procedure neglected by the East German Statistical Office[5].

As far as eggs are concerned, only the forced deliveries and government purchases of eggs plus an allowance for consumption by farmers have been evaluated at West German prices.

The coverage of the major crops and animal products is virtually complete. Any questions of the results of my calculations can relate only to the magnitude of the deduction to get from biological to barn yield. Only such minor items as the number of beehives or the production of honey were omitted.

Before discussing the input side, two further problems have to be mentioned. The one relates to the estimates for vegetables and fruits, the other to the estimates for the value of the forest sector. It was possible to make a rough allowance for vegetables, fruit and cut wood (both timber and fire wood) but it proved completely impossible to make even a rough estimate of the change in the value of standing timber.

The services of machine tractor stations as such, like the fodder grown on the farms, were treated as intermediate products and neither added as an output nor deducted as an input. On the other hand, separate estimates for the amount of gasoline and diesel oil used were made, and such fodder which farmers had to purchase from outside the agricultural sector, either imports or industrial products, were deducted. The amounts of commercial fertilizer, and the electricity used on the farms could be directly ascertained, while manure was treated as an intermediate product.

5. In the 1957 edition of the *Statistisches Jahrbuch der Deutschen Demokratischen Republik* it is stated that the procedure for calculating the milk yield was changed in 1956 and that there was therefore a break in the comparability of the data. The 1956 edition does not contain such a footnote, but *Statistische Praxis*, the journal of the Statistisches Zentralamt, did explain this fact.

(3) The estimation of the Gross Value Added of *construction* was considerably more difficult. As the major official East German data are given in value terms which had to be rejected for the reasons outlined above, it was assumed that construction moved parallel to the availability of building materials, hence an index of *available* (rather than produced) building materials was constructed from the amounts of bricks, tiles, cement and cement products, glass, etc., available[6]. The index was weighted by 1936 or 1950 prices which not only gives different results from assigning to the various building materials a fixed weight[7], but also allows for the substitution of cement and cement products for bricks which has occurred in the post-war period.

The East German Statistical Yearbook gives also figures for the number of dwelling units produced and East German sources give data on the required inputs per dwelling. This has made a separate estimate for housing and other construction possible which was later used in estimates of gross investment. This will be explained presently.

(4) The important *transport* sector was broken down by major carriers: railroads, inland waterways and ocean shipping, the last of extremely small importance due to the fact that the GDR inherited none of the major Baltic ports and had to develop both port facilities and ship building from scratch. No attempt was made to calculate the performance of air transport, but it is certain that both in 1936 and during the period under investigation it was insignificant. Freight transport was broken down into those heavy goods transported at specially low rates and all other goods shipped at high rates. This follows the practice of the old Reichsbahn. Suburban passenger traffic which is of major importance for Berlin was estimated separately.

(5) The procedures thus far discussed have all in common that, with minor exceptions, they are based on data provided in physical units: tons, ton/miles, kWh, etc. For the other sectors: *trade*, *communication*, or *services*, calculations cannot possibly be based on physical units. It would have hardly made sense to measure the output of communications by the number of telegrams sent or letters delivered, nor would it have been reasonable to accept the official figures for trade turn-over as a basis for estimating the Value Added attributable to trade.

Instead, trade and communications as well as other services were estimated by assuming that their Gross Value Added moved parallel to employment. This involved making an estimate both for employment in 1936 and the Value Added

6. Mr. Fred Sanderson in *Trends in Economic Growth* constructed a similar index to estimate the Gross Value Added contributable to construction, using, however, the production rather than the available amounts of building materials for his index. This overstates substantially the expansion of construction since it appears that building materials were imported into the area of the GDR before the war in substantial amounts while in the post-war period a very large percentage of the cement production was exported. Thus in 1956 about 570,000 tons of cement were exported out of a production of 3.3 million tons, i.e. about 1/6. In 1955 exports of cement were 685,000 tons out of a production of about 3.0 million tons. Even bricks and tiles are exported in large quantities and apparently not imported. See, *Trends in Economic Growth; a Comparison of Western Powers and the Soviet Bloc*, a Study Prepared for the Joint Committee on the Economic Report, Joint Committee Print, 83rd Congress, Second Session. Washington, D.C., 1955, p. 292.

7. This is the procedure of Mr. Sanderson.

per employee in these sectors. The procedure is very likely to overstate the performance of the Soviet German economy in these sectors during the first years of the First Five Year Plan, but for 1955 or 1957 it is likely to give reasonable results. There is little question that the many people employed in trade in 1950 could hardly have had the productivity of 1936 when they had so much less to sell, but by 1956 this shortcoming of our method has probably been largely eliminated by the generally improved performance of the Soviet German economy. In other words, comparisons between 1956 or 1957 and 1936 are likely to be correct, but the rate of growth of the trade sector between 1950 and 1957 is likely to be understated.

In general the estimates based on data given in physical units are likely to be reliable. I am convinced that any reasonable alternative procedure actually used would not change the end-result very much.

On the other hand, estimates based on the "employment method" are not as good and even less reliable are estimates arrived at by deflation. Table 1 (p. 133), which gives the results of our calculation of GNP by origin presents one such alternative estimate derived by a process of deflation. The turn-over figures for trade have been deflated by an officially given retail price index which is based on 1936 but uses the commodity basket of 1955. It is an understatement to say that the results are improbable, but anyone wishing to use these figures instead of the figures arrived at by the employment method has the possibility of doing so. For communications it was not possible to make such an estimate by the deflation method, but it is a relatively minor sector in any case.

Gross National Product by Use

Attempts have been made to estimate the uses to which the GNP is put, which though the best I have been able to make, have to be taken with a great deal of salt.

The first officially supplied East German figures on national product by use were reported in the *Quarterly Journal* article. In the meantime more details have been published in the third volume of the Statistical Yearbook. This gives gross and net product in current prices by origin[8]. Data are also available on depreciation and materials used up by industrial origin in current East German prices, and a percentage distribution of the domestically available national income is given by investment and consumption. Unfortunately, these figures are difficult to use because, first, we don't know enough about the price structure, secondly, we don't know enough about the balance of payments, and, thirdly, the actual value of "the national income available at home" is not given.

The East German claims on investment are quite modest, but the distorted price structure makes it certain that actual investments were a bigger percentage of national product than officially claimed. Furthermore it is known that at least through 1953 reparation payments were huge and it is virtually certain that the government sector as this term might be understood in the West, is relatively

8. The reader is reminded that the East German concept of net product corresponds quite closely to the Western concept of net product, but that the East German concept of gross product is essentially a turn-over concept with no similarity to what is understood by that term in the West.

large in a planned economy. Since rationing even of elementary food stuffs was not abolished till 1958, it is also certain that consumption was relatively low. It is therefore of considerable interest to develop some sort of estimates of the uses of GNP, of investment and consumption and "other" uses, but it must be stressed that these estimates are extremely rough and that all estimates, but particularly the estimates for consumption and for "other" uses are subject to a large margin or error.

(1) The most reliable estimate refers probably to *investment*. This estimate depends essentially on the assumption that investment in equipment bears a reasonably fixed ratio to investment in plant. The estimates for investment in plant and equipment proceded essentially in the following manner. First, housing and other non-industrial or non-commercial construction was split off on the basis of East German data. This led to a series of "other" construction which is basically investment in plant, in commercial buildings and some road building[9]. Equipment is assumed to be twice the size of investment in plant. Although this figure is rather low by West German standards, it corresponds fairly well to American experience. This ratio has been suggested by Helmut Kupky[10] of the (West) Berlin Deutsches Institut für Wirtschaftsforschung, who derived this ratio of 2 equipment to 1 plant in turn from East German sources. The great need for plant, due to destruction and dismantling as well as the peculiar nature of industrial expansion involving essentially mining and heavy industries make the low ratio plausible[11]. The final estimate of gross fixed investment includes, of course, housing, etc., to be consistent with Western usage.

Inventory accumulations have been estimated in yet another roundabout manner. Official data give inventories and fixed investments as a percentage of the domestically available income. It is assumed that inventories bear the same relation to investments in plant and equipment, as the percentage of inventory accumulation in domestically available national income bears to the same percentage for "accumulation"[12]. The procedure seemed justifiable because the distortion of the price system (chiefly but not solely due to the importance of turnover taxes) is certainly much less serious within the investment sector than between the investment and the consumption sectors.

9. Road building was very small. The statistics include also a very small expenditure on "Enttrümmerung", i.e. the removal of rubber and the possible salvage of re-usable bricks and other materials which in East German practice is considered part of the output of the construction industry.

10. HELMUT KUPKY, "Die langfristige Entwicklung der Brutto-Anlageinvestitionen der mitteldeutschen Industrie von 1924–1955", *Vierteljahreshefte zur Wirtschaftsforschung*, 1957, No. 4, pp. 391–407. Mr. Kupky's estimates for investment are in fact quite close to my own estimates in spite of the fact that they were derived by the entirely different and independent method of deflation.

11. In West Germany, however, the ratio of plant to equipment is much closer to 4 to 1 and this fact does make one slightly uneasy about the East German estimates. On the other hand, in Poland and in 1955 58% of investments were in building, 30% in machinery, and 12% in "other" investment, such as geological exploration (see *Rocznik Statystyczny* [Statistical Yearbook], 1957, p. 181). Thus my ratio is perhaps not too far off the mark.

12. The *Statistisches Jahrbuch DDR*, 1957 ed., foreshadows a change in methodology to bring Soviet German usage into line with Russian usage. In the past, "accumulation" has been defined in the GDR as "productive" accumulation only while housing, etc., was included with individual consumption, and school construction or "cultural" buildings were included with "societal consumption". A footnote gives an alternative percentage distribution to include both "productive" and "unproductive" accumulation.

(2) Data to estimate consumption directly from official East German data on important supplies to the public were insufficient. Hence the estimating procedure used starts with figures for the wage bill, given in current East Marks. These figures were adjusted for the changing proportion of dependent income earners in the labor force on the assumption that self-employed and other non-wage earners, earn on the average as much as wage and salary earners. It is difficult to say whether this procedure involves an over- or an under-estimate. The self-employed include on the one hand doctors and highly paid writers who are not in the employ of somebody else, but they also include many farmers and their working family members who may or may not be as well off as industrial workers and they include large numbers of persons working in retail trade who are almost certainly less well paid than industrial workers.

Individuals may save, and indeed the personal savings in all thrift institutions have grown from about 1.3 billion East Mark in 1950 to 6.1 billion East Mark in 1956, hence the total income payments as calculated above have been adjusted by the annual change in saving deposits. A similar allowance is also made for the difference between the payments to and by the social security system and other insurances.

The figures thus arrived at are essentially the total expenditures by the population for consumption goods. Further adjustments which would have been desirable but could not be made include an allowance for wage taxes on the expenditure side, and on the other hand for the many indirect payments to consumers made directly by plants and by the government, such as food supplied in factory canteens.

The total wage payments adjusted in the manner described are then deflated by an official retail price index, given on the basis of 1936. This index is based on a commodity basket of 1955 and consists of 550 goods[13]. An alternative deflation could be made by an equally official index of the cost of living.

The cost of living index has risen from 100 in 1936 to "only" 307 per cent in 1950 compared to 419 per cent for the retail price index; from 1936 to 1957 it has risen to "only" 188 per cent compared to 270 per cent for the retail price index. Deflation by the cost of living index would have therefore raised the estimate for consumption substantially. Nevertheless, it has seemed more reasonable to take the retail price index for purposes of deflation. In the first place the cost of living index contains rent payments which have not changed at all since 1936 and expenditures on heat and light which have supposedly even fallen, even though it is known that housing is not only rationed and seriously short but exceedingly poor, and that the same is true for lightning. Some of the other categories, such as expenditures on food, drink and tobacco or clothing, which are included both in the retail price index and the cost of living index, show in the retail price index a much greater increase which probably reflects the fact that it includes non-rationed expenditures in a more reasonable proportion. If the difference between the retail price and the cost of living index had been due only to such differences as the inclusion of rent, a case could be made for the

13. *Statistisches Jahrbuch DDR*, 1956 ed., p. 201. Though the weight of the industrial commodity group remains constant at the relative importance they had in 1955, the actual commodities entering the index changed corresponding to the average quality of the particular year.

cost of living index. The mere fact, however, that the retail price index contains several identical items with the cost of living index and in addition such important categories as shoes, suggests that for purposes of estimating the GNP available for consumption, the retail price index is more suitable.

Nevertheless, the estimates arrived at by assuming, on the one hand, that adjusted wage and salary payments are essentially equivalent to disposable income[14], I may possibly underestimate the GNP used for consumption, first, because of the contributions of entrepreneurs to social security payments, secondly, of other indirect contributions by the industrial plants, and thirdly, because of what in Communist jargon is called societal consumption. On the other hand it is very unlikely that the price index provided by the Central Statistical Office errs in a direction unfavorable to the German Democratic Republic.

When all the pros and cons of the suggested estimating procedure are weighted, it seems possible that consumption has been somewhat underestimated, but I am convinced that this underestimation is not very great. Because the results presented in Table 4 are rather startling, it has seemed essential to dwell at length on the considerations which have gone into the selection of the particular index used for deflation.

(3) The "other" uses are found as a residual. They include the export surplus, including reparations, the government sector proper, and they include also such "societal consumption" as has not been possible to estimate separately. No estimates were possible to state reliably the relative importance of these various items.

SUMMARY

The article has two purposes: to give the results and to explain the methods of calculating the East German Gross National Product by industrial origin and domestic use. Wherever possible, comparisons with the developments in the Federal Republic were made. The original data come from official East German publications but the methodology is Western. All calculations were made in West German prices of 1950 and in 1936 German prices.

The East German Gross National Product (GNP) was in 1957 about 122% of 1936, and 155% of 1950. Industrial output passed the prewar level in 1953, the output of transport already in 1951, but trade and construction passed it only in 1956. On the other hand, agriculture even in 1957 was still substantially below the prewar level. Unlike all other sectors, which developed vigorously since 1950, agriculture remained stagnant.

Consumption in 1950 accounted for only about a third of GNP, undoubtedly largely because of reparations demands. After the June 1953 uprising it reached a level of 53%, while in West Germany it always was close to 60%. Gross investment

14. Income taxes are unimportant and indirect taxes are allowed for in the price index. On the other hand, neither wage taxes nor the workers' contribution to social security have been deducted.

as a per cent of GNP in the German Democratic Republic was of about the same order of magnitude as in the Federal Republic, but gross fixed investment reached West German rates only in 1956, while inventory accumulation was very high until the 1953 uprising led to a precipitous drop. On a per capita basis, consumption and investment appear to be in East Germany only about 60% of West German levels, though they are slowly rising.

The reasons for the differential developments are: (a) heavy reparations payments at least through 1953; (b) constant loss of population to West Germany; (c) planning errors; and (d) insufficient international integration. The first has been stopped, and some planning errors have been eliminated. The loss of population may diminish as living conditions improve and there are attempts at improving the international organization of the Soviet bloc.

ZUSAMMENFASSUNG

Das Sozialprodukt Ostdeutschlands. Der Artikel gibt die Ergebnisse und Schätzungsmethoden einer Berechnung des Bruttosozialprodukts der Deutschen Demokratischen Republik (DDR) nach Wirtschaftssektoren und Endbestimmung. Wo möglich werden Vergleiche mit der Bundesrepublik gemacht. Die Grunddaten stammen aus offiziellen Veröffentlichungen der DDR, aber die Methodologie ist westlich. Alle Berechnungen wurden in westdeutschen Preisen von 1950 und in deutschen Preisen von 1936 gemacht.

Das Bruttosozialprodukt der DDR betrug 1957 etwa 122% von 1936 und 155% von 1950. Die Industrieproduktion überstieg das Vorkriegsniveau im Jahre 1953, der Verkehr bereits 1951, aber Handel und Bauwirtschaft erst 1956. Andererseits lag die Landwirtschaftsproduktion selbst 1957 noch wesentlich unter dem Vorkriegsstand. Im Unterschied zu allen andern Wirtschaftssektoren, die sich seit 1950 kräftig entwickelten, stagnierte die Landwirtschaft.

Im Jahre 1950 ging nur ein Drittel des Bruttosozialprodukts der DDR in den Verbrauch, ohne Zweifel hauptsächlich wegen der grossen Reparationsforderungen. Nach dem Aufstand vom 17. Juni 1953 stieg der Anteil des Verbrauchs auf 53%. In der Bundesrepublik war er immer nahe bei 60%. Die Bruttoinvestitionen hatten in Ost- und Westdeutschland etwa den gleichen Anteil am Bruttosozialprodukt; aber der Prozentsatz der Bruttoinvestitionen in Anlagen und Maschinen erreichte den westdeutschen Prozentsatz erst 1956, während Lagerbestände bis zum Aufstand von 1953 einen sehr hohen Anteil des Bruttosozialprodukts verbrauchten, um nachher scharf abzufallen. Per capita Verbrauch und Investition betragen in der DDR etwa 60% des westdeutschen Niveaus, aber sie steigen allmählich.

Die Gründe für diese unterschiedliche Entwicklung sind: a) grosse Reparationsleistungen bis mindestens Ende 1953; b) dauernder Bevölkerungsverlust an Westdeutschland; c) Planungsfehler und d) ungenügende internationale Verflechtung. Die Reparationen sind abgeschafft, und einige Planungsfehler sind

korrigiert worden. Der Bevölkerungsverlust wird wahrscheinlich abnehmen, wenn die Lebensbedingungen sich verbessern, und die ersten Versuche werden jetzt gemacht, die internationale Organisation des Sowjetblocks zu verbessern.

RÉSUMÉ

Le produit social de l'Allemagne de l'Est. Le présent article a pour objet de donner les résultats et d'expliquer les méthodes de calcul du produit social brut de la République Démocratique Allemande par secteurs économiques et destination finale. Partout où cela a été possible, des comparaisons ont été faites avec la République Fédérale d'Allemagne. Les données fondamentales proviennent des publications officielles de l'Allemagne orientale, mais la méthodologie est celle de l'Ouest. Tous les calculs ont été faits en prix de 1950 de l'Allemagne occidentale et en prix allemands de 1936.

Le produit social brut de l'Allemagne orientale a représenté en 1957 quelque 122% de celui de 1936 et 155% de celui de 1950. La production industrielle a dépassé le niveau d'avant guerre en 1953, les transports en 1951 déjà, tandis que pour le commerce et la construction, ce fut le cas en 1956 seulement. En revanche, la production agricole, même en 1957, était notablement inférieure à son niveau d'avant guerre. Contrairement à tous les autres secteurs économiques, qui se sont vigoureusement développés depuis 1950, l'agriculture est demeurée stagnante.

En 1950, la consommation n'a compté que pour un tiers seulement du produit social brut, ce qui est indubitablement dû dans une large mesure aux exigences des réparations. Après l'essor de juin 1953, elle a atteint un niveau de 53%, tandis qu'en Allemagne occidentale, elle a toujours été proche de 60%. Le pourcentage des investissements bruts en République Démocratique Allemande a été approximativement du même ordre de grandeur que dans la République Fédérale, mais le pourcentage des investissements bruts en installations et machines n'a atteint le niveau de l'Allemagne de l'Ouest qu'en 1956, tandis que les stocks furent très élevés jusqu'à ce que l'avance de 1953 eut conduit à une rapide diminution. Par tête d'habitant, la consommation et les investissements ne représentent en Allemagne orientale que 60% environ du niveau de l'Allemagne occidentale, bien qu'ils aillent progressivement croissant.

Les raisons de cette évolution divergente sont: *a)* les lourdes prestations au titre des réparations jusqu'à fin 1953 au moins; *b)* la diminution constante de la population (mouvement vers l'Allemagne occidentale); *c)* les erreurs de planification et *d)* une intégration internationale insuffisante. Les réparations sont abolies et quelques erreurs de planification ont été éliminées. La diminution de la population se ralentira probablement, au fur et à mesure que les conditions de vie s'amélioreront, et des efforts sont accomplis en vue d'améliorer l'organisation internationale du bloc soviétique.