# Online Appendix to "Was Stalin Necessary for Russia's Economic Development?"[*]

Anton Cheremukhin, Mikhail Golosov, Sergei Guriev, Aleh Tsyvinski

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Table 1: Calibrated Parameters

| Parameter | Description | Baseline | Sensi-ty |
|---|---|---|---|
| $\alpha_{A,K}$ | Elasticity | 0.14 | 0.20 |
| $\alpha_{A,N}$ | of the | 0.55 | 0.61 |
| $\alpha_{M,K}$ | production | 0.30 | 0.36 |
| $\alpha_{M,N}$ | function | 0.70 | 0.64 |
| $\gamma_A$ | subsistence level | 28 | 25 |
| $\eta$ | assymptotic share | 0.15 | 0.20 |
| $\beta$ | discount factor | 0.96 | 0.93 |
| $\rho$ | elasticity of substitution | 1.0 | 0.8 |

# 1 Main Tables

In this section the main Tables from the paper are repeated. Table 1 shows the calibrated parameters and their alternative values used in the sensitivity analysis described in Section 3. Table 2 shows a variety of values which the wedges take for different periods and in different scenarios. The first three columns of Table 2 show the average values of the wedges measured for three subperiods: 1885-1913, 1928-1936 and 1937-1940. The next two columns show projected values for the wedges used in the two baseline counterfactual simulations: for Stalin and for Tsar. The next column shows alternative values for projected wedges with only incremental changes to each wedge, which are used in the sensitivity analysis in Section 4. Columns "Japan" and "50-53" show the average values for the wedges inferred from Japanese data for the period 1914-1940 and for the USSR after World War II for the period 1950-1953. We use these to evaluate alternative scenarios in Section 2.

First, to assess the sensitivity of our estimates of the wedges to measurement error in the data we conduct a Monte-Carlo exercise. We create artificial data series by adding 1% log-normal random disturbances to all of the original data series. We use this artificial data to compute pseudo-series for the wedges. Using 1000 such pseudo-series for the wedges we compute percent standard deviations of the pseudo-wedges for the whole period and for sub-periods. The elasticities of the wedges with respect to measurement error are computed as the ratios of the percentage standard deviations of the pseudo-wedges to the percentage measurement errors. Table 3 reports the results. It shows that 1% measurement error artificially introduced into the data leads on average to 1-5% changes in the values of the wedges.

Table 4 reports the effects of various wedges on welfare (measured in units of the con-

Table 2: Average and Projected Wedges

| Wedge | Period Average | | | Projection | | | | |
|---|---|---|---|---|---|---|---|---|
| | [85-13] | [28-36] | [37-40] | Stalin | Tsar | Sensi-ty | Japan | [50-53] |
| $N_t$ | 1.0 | 0.78 | 0.78 | 0.78 | 1.0 | — | — | — |
| $\tau_K$ | 0.085 | 0.066 | 0.038 | 0.038 | 0.085 | 0.048 | 0.059 | 0.045 |
| $\tau_C$ | 0.24 | 3.19 | 0.52 | 0.52 | 0.24 | 0.54 | 0.66 | 0.89 |
| $\tau_W$ | 5.66 | 13.11 | 4.71 | 4.71 | 5.66 | 4.77 | 4.35 | 4.61 |
| $\tau_R$ | 1.75 | 6.18 | 1.76 | 1.76 | 1.75 | 1.79 | 2.75 | 1.29 |
| $(1+\tau_W)/(1+\tau_C)$ | 5.89 | 4.76 | 3.80 | 3.80 | 5.89 | — | 3.29 | 3.02 |
| $(1+\tau_R)/(1+\tau_C)$ | 2.41 | 2.34 | 1.83 | 1.83 | 2.41 | — | 2.39 | 1.22 |
| $G_M$ | 0.067 | 0.024 | 0.085 | 0.085 | 0.067 | 0.095 | 0.11 | 0.090 |
| $A_M$ | 1.0 | 0.97 | 0.91 | 0.90 | 1.0 | 0.91 | 1.07 | 0.94 |
| $A_A$ | 1.0 | 0.79 | 0.95 | 0.995 | 1.0 | 1.005 | 1.05 | 1.01 |
| $A_M$ growth | 0.66% | -2.95% | -1.12% | 0.61% | 0.61% | 0.68% | 0.70% | 1.23% |
| $A_A$ growth | 1.45% | 0.35% | 3.05% | 0.97% | 0.97% | 1.06% | 1.21% | 0.70% |
| $ex$ | 0.096 | 0.058 | 0.027 | 0.027 | 0.096 | 0.037 | — | 0.033 |
| $q$ | 0.66 | 1.07 | 1.58 | 1.58 | 0.66 | 1.60 | — | 1.65 |

Table 3: Percent Standard Deviations in Wedges Due to 1% Artificial
Measurement Error introduced in All Data Series

| Wedge | 1885-1940 | 1885-1913 | 1928-1936 | 1937-1940 |
|---|---|---|---|---|
| $1-\tau_K$ | 2.53 | 2.52 | 2.31 | 3.02 |
| $1+\tau_C$ | 3.67 | 3.95 | 3.17 | 2.72 |
| $1+\tau_W$ | 1.93 | 1.88 | 2.00 | 2.18 |
| $G_M$ | 1.42 | 1.42 | 1.41 | 1.42 |
| $A_M$ | 1.26 | 1.26 | 1.26 | 1.27 |
| $A_A$ | 1.08 | 1.05 | 1.10 | 1.19 |
| $ex$ | 1.42 | 1.42 | 1.42 | 1.41 |
| $q$ | 1.42 | 1.43 | 1.42 | 1.41 |
| $1+\tau_R$ | 3.34 | 3.05 | 3.58 | 4.88 |

Table 4: Welfare Decomposition

| Policy | Gain from policy for | | | |
|---|---|---|---|---|
| | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | -2.2% | 4.7% | 9.9% | 7.6% |
| $\tau_C$ | 11.4% | 13.0% | 9.9% | 7.3% |
| $\tau_W$ | -10.1% | -4.6% | 3.6% | 5.4% |
| $G_M$ and $\tau_R$ | 2.6% | 0.9% | -0.3% | -1.0% |
| $A_M$ | -1.9% | -6.6% | -10.2% | -9.2% |
| $A_A$ | -15.4% | -7.4% | -1.3% | -0.1% |
| $ex$ and $q$ | 5.5% | 5.4% | 5.3% | 5.0% |
| Total | -24.1% | -1.0% | 16.5% | 14.9% |
| Total net of $K_{1928}$ | -10.1% | 5.3% | 16.9% | 14.9% |

Table 5: Standard Errors of Welfare Decomposition

| Policy | Gain from policy for | | | |
|---|---|---|---|---|
| | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | 0.7% | 0.9% | 2.0% | 2.0% |
| $\tau_C$ | 4.4% | 0.3% | 0.4% | 0.3% |
| $\tau_W$ | 4.9% | 0.7% | 1.4% | 1.4% |
| $G_M$ and $\tau_R$ | 0.5% | 0.3% | 0.2% | 0.2% |
| $A_M$ | 0.8% | 0.3% | 0.4% | 0.4% |
| $A_A$ | 1.4% | 1.3% | 1.0% | 1.0% |
| $ex$ and $q$ | 0.13% | 0.02% | 0.11% | 0.13% |
| Total | 2.5% | 1.2% | 0.4% | 0.4% |
| Total net of $K_{1928}$ | 2.6% | 1.2% | 0.4% | 0.4% |

sumption basket) achieved by Stalin's policies compared to the potential path coming from a continuation of Tsarist policies. Table 4 simply repeats Table 1 from the main text.

Using the Monte-Carlo simulation which adds a 1% measurement error to the data, we can compute standard errors for these contributions. Table 5 shows standard errors which are relatively low, as even two standard deviations, in most cases, do not significantly alter our main conclusions.

Table 6 reports the changes in the paths of the manufacturing labor share, total capital and total GDP in 1913 prices achieved by Stalin's policies compared to the potential path coming from a continuation of Tsarist policies. Table 6 repeats Table 5 in the main text.

Table 6: Effects on Labor Share, Capital and real GDP

| Policy | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | 1.2% | 4.2% | 2.7% | 3.7% | 26.6% | 37.0% | 2.3% | 11.6% | 13.7% |
| $\tau_C$ % | 16.1% | 1.7% | 3.1% | 24.0% | 38.8% | 14.0% | 32.2% | 12.3% | 8.3% |
| $\tau_W$ | -14.2% | 5.1% | 4.0% | -46.9% | -29.1% | -0.0% | -36.0% | -0.9% | 4.8% |
| $G_M$ and $\tau_R$ | 2.2% | 0.2% | 0.3% | 14.5% | 10.0% | 3.1% | 5.2% | 3.2% | 1.3% |
| $A_M$ | 0.3% | -0.4% | -0.4% | 3.0% | -14.2% | -15.8% | -3.3% | -11.2% | -12.2% |
| $A_A$ | -5.9% | -0.8% | 0.2% | -11.4% | -14.1% | -4.6% | -20.7% | -6.4% | -1.2% |
| $ex$ and $q$ | 1.5% | 2.8% | 2.6% | 3.2% | 2.6% | 3.5% | 3.7% | 4.1% | 4.2% |
| Total | 2.8% | 13.2% | 12.6% | -49.3% | 15.3% | 36.2% | -23.9% | 11.5% | 18.7% |

# 2    Alternative Scenarios

In this section we report the results of various alternative scenarios on the welfare decomposition and the speed of growth and structural transformation.

## 2.1    Japanese Wedges

Our counterfactual exercise envisions the path of the Russian economy under the assumption that after 1913 the speed of changes in the Tsarist economy would be similar to those in Japan. In particular, for all wedges and TFP we constract new series for Russia using the law of motion $\tau_t^{Russia} = \tau_{1913}^{Russia} \frac{\tau_t^{Japan}}{\tau_{1913}^{Japan}}$ for $t = 1914, ..., 1940$ where $\tau_t \in \{\tau_{C,t}, \tau_{K,t}, \tau_{W,t}, \tau_{R,t}, A_{M,t}, A_{A,t}, G_{M,t}\}$. To control for Russia's population and comparative advantage we keep the actual realizations of population growth and trade as occured in the data. After 1940 we extrapolated the average growth rates of all wedges between 1928 and 1940.[1]

Figure 1 compares implied real GDP per capita (red line) with actual real GDP per capita in Japan and U.S.S.R, as well as with our projection of real GDP in Soviet Russia and in Tsarist Russia under the assumption of no changes in wedges. Before 1940 the constructed path of Russia's GDP per capita is very similar to that of Japan. The gap between projected GDP per capita in Russia and USSR increases after 1940, mainly due to higher productivity growth. Even though by construction these series do not take into account the drop in GDP during the WWII these projections understate the eventual level of GDP achieved by Japan after 1960.

Table 7 shows welfare decomposition for this economy. It is evident that imposing the

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[1]Since $G_{M,t}$ significantly increased in Japan before WWII, we set $G_{M,t} = \Sigma G_{M,1928-40}/13$ for $t > 1940$.

Table 7: Welfare Decomposition: Stalin vs. Japan

| Policy | Gain from policy for | | | |
|---|---|---|---|---|
| | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | -4.5% | 1.6% | 6.4% | 4.3% |
| $\tau_C$ | 3.2% | 9.7% | 9.4% | 7.4% |
| $\tau_W$ | 3.5% | 4.5% | 12.4% | 13.7% |
| $G_M$ and $\tau_R$ | 4.6% | 3.6% | 2.9% | 2.4% |
| $A_M$ | -17.4% | -36.6% | -53.1% | -52.6% |
| $A_A$ | -12.9% | -5.7% | -0.1% | 1.1% |
| $ex$ and $q$ | - | - | - | - |
| Total | -41.3% | -31.0% | -22.7% | -24.2% |
| Total net of $K_{1928}$ | -23.4% | -22.7% | -22.2% | -24.0% |

Table 8: Effects of Japanese Wedges on Labor Share, Capital and real GDP

| Policy | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | -1.1% | 2.4% | 1.4% | -26.1% | 5.2% | 19.8% | -9.7% | 5.2% | 9.3% |
| $\tau_C$ | 11.0% | -0.5% | 1.7% | 18.9% | 31.7% | 7.1% | 27.2% | 9.8% | 6.8% |
| $\tau_W$ | -4.5% | 12.4% | 11.5% | -22.5% | 2.5% | 35.9% | -16.2% | 24.8% | 37.1% |
| $G_M$ and $\tau_R$ | 3.8% | 0.9% | 1.8% | 22.0% | 30.4% | 31.7% | 10.2% | 6.5% | 9.8% |
| $A_M$ | -0.3% | -1.3% | -1.9% | -9.2% | -51.4% | -78.2% | -23.2% | -55.3% | -77.1% |
| $A_A$ | -5.0% | -0.9% | 0.5% | -9.7% | -12.3% | -4.1% | -17.8% | -6.1% | -0.1% |
| $ex$ and $q$ | — | — | — | — | — | — | — | — | — |
| Total | 5.5% | 13.5% | 15.1% | -94.5% | -3.6% | 10.3% | -42.3% | -17.6% | -14.7% |

Japanese wedges substantially improves the Tsarist counterfactual simulation. The big welfare gain comes from the improvements in productivity. While distortions in Stalin's policies decrease and are generally lower than those in Japan, lower productivity wipes out those gains and leads to significant welfare losses.

Figure 2 plots the paths of the wedges that Tsarist Russia would have followed in the first counterfactual exercise. Table 8 the effect of the Japanese path of wedges on the path of real GDP, capital and labor share.

Another, alternative way to do the counterfactual exercise using Japanese wedges is to envision the path of the Russian economy under the assumption that after 1913 the Tsar would (in absence of World War I, the Revolution and the Civil War) continue implementing policies similar (apart from trade) to those adopted by the Japanese government. Here, unlike in the previous exercise, we measure the trends in all Japanese wedges except population and trade
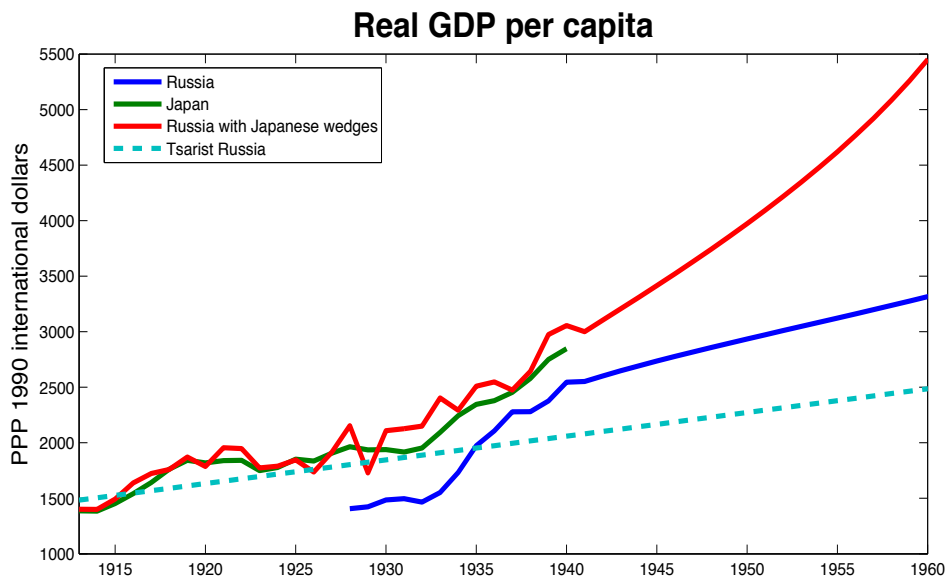
Figure 1: Real GDP per capita in Russia, Japan and Russia with Japanese wedges
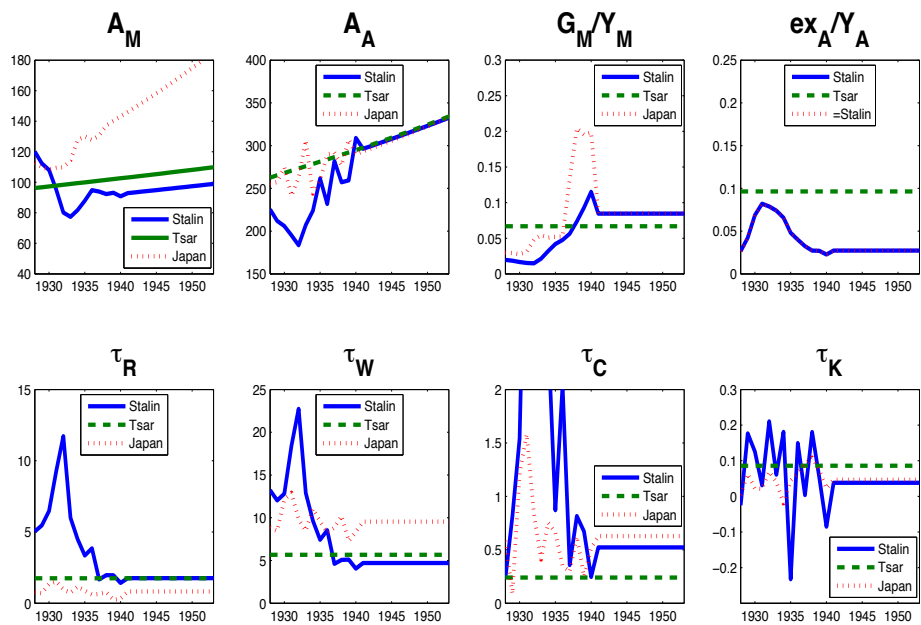


Figure 2: Tsarist wedges following the Japanese path post 1913

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Table 9: Welfare Decomposition with Tsarist wedges replaced by Japanese wedges

| | Gain from policy for | | | |
|---|---|---|---|---|
| Policy | 28-40 | gen 28 | gen 40 | gen 40, $K_{1940}$ |
| $\tau_K$ | -2.6% | 0.6% | 3.1% | 0.4% |
| $\tau_C$ | -8.1% | 1.0% | -0.9% | -3.7% |
| $\tau_W$ | -4.9% | -9.5% | -4.0% | -2.2% |
| $G_M$ and $\tau_R$ | 5.3% | 3.0% | 1.2% | 0.6% |
| $A_M$ | -6.0% | -12.2% | -16.9% | -16.0% |
| $A_A$ | -20.1% | -10.8% | -3.6% | -2.5% |
| $ex$ and $q$ | 5.5% | 5.4% | 5.3% | 5.0% |
| Total | -43.2% | -28.4% | -16.4% | -18.4% |
| Total net of $K_{1928}$ | -30.8% | -22.6% | -15.9% | -18.3% |

and input these average wedges into the Tsarist simulation from 1913 onwards. The values of the wedges for this simulation are reported in Table 2. Some of the Japanese distortions are higher than under the Tsar $(\tau_C, \tau_R, G_M)$, others are lower $(\tau_K, \tau_W)$, and TFP growth is higher in Japan than under the baseline projection for the Tsarist economy.

We consider two more exercises: one where Tsarist wedges are replaced by Japanese wedges and compared to Stalin, and a second one where in addition Japanese TFP growth is used to project Stalin's TFP growth after 1940. We then recompute Tables 4 and 6. The results of the first exercise presented in Tables 9 and 11 show that most of the Japanese wedges substantially improve the Tsarist counterfactual simulation. TFP grows even faster in the Japanese economy, while net distortions are mostly lower. Thus, Japanese policies have such a profound total positive effect on the Tsarist economy, that Stalin's policies are inferior in all dimensions both in the short and long run. The incremental impact of the exercise on Table 4 is reported in Table 10. This way of presenting the results as the difference between two Tables makes the difference more transparent. In the remainder of this appendix we shall use this as the preferred method of reporting results. The results of the second exercise shown in Tables 9 and 11 are essentially the same as the first exercise.

## 2.2 New Economic Policy

First, we compare the outcome of Stalin's policies to an outcome of a counterfactual excercise where the New Economic Policy (NEP), which was in place in the U.S.S.R between 1921 and 1928, remains in place after 1928. The lack of high quality data for 1921-1927 limits what we

Table 10: Impact of Japanese wedges on Welfare Decomposition

| | Gain from alternative policy for | | | |
|---|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | -0.33% | -4.10% | -6.76% | -7.22% |
| $\tau_C$ | -19.55% | -12.00% | -10.89% | -10.93% |
| $\tau_W$ | 5.22% | -4.85% | -7.61% | -7.60% |
| $G_M$ and $\tau_R$ | 2.72% | 2.06% | 1.52% | 1.60% |
| $A_M$ | -4.07% | -5.61% | -6.73% | -6.77% |
| $A_A$ | -4.76% | -3.37% | -2.34% | -2.35% |
| $ex$ and $q$ | 0 | 0 | 0 | 0 |
| Total | -19.11% | -27.38% | -32.92% | -33.29% |
| Total net of $K_{1928}$ | -20.76% | -27.85% | -32.81% | -33.27% |

Table 11: Effects of Japanese Wedges on Labor Share, Capital and real GDP

| | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| Policy | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | -0.5% | 2.9% | 1.7% | -16.4% | 8.7% | 26.1% | -5.4% | 5.4% | 8.9% |
| $\tau_C$ | 10.9% | -3.2% | -2.1% | 17.7% | 33.4% | 7.6% | 22.9% | 2.9% | -1.5% |
| $\tau_W$ | -18.9% | 0.2% | -0.9% | -63.0% | -47.5% | -17.2% | -47.6% | -10.7% | -5.3% |
| $G_M$ and $\tau_R$ | -0.6% | -2.5% | -2.1% | 3.9% | -6.9% | -13.8% | -1.7% | -3.3% | -4.6% |
| $A_M$ | -0.0% | -0.6% | -0.7% | -2.0% | -23.2% | -25.5% | -9.2% | -18.6% | -20.3% |
| $A_A$ | -7.1% | -1.9% | -0.6% | -13.6% | -16.7% | -6.7% | -26.6% | -10.5% | -4.6% |
| $ex$ and $q$ | 1.5% | 2.8% | 2.6% | 3.2% | 2.6% | 3.5% | 3.7% | 4.1% | 4.2% |
| Total | -13.5% | -1.8% | -1.9% | -121.4% | -59.8% | -28.3% | -76.4% | -32.7% | -23.8% |

Table 12: Welfare Decomposition with Tsarist wedges replaced by
Japanese wedges and Stalin's TFPs adjusted

| | Gain from policy for | | | |
|---|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | -2.5% | 0.6% | 3.1% | 0.4% |
| $\tau_C$ | -8.1% | 0.9% | -1.0% | -3.7% |
| $\tau_W$ | -4.9% | -9.4% | -4.0% | -2.2% |
| $G_M$ and $\tau_R$ | 5.3% | 3.0% | 1.2% | 0.6% |
| $A_M$ | -6.0% | -11.8% | -16.2% | -15.3% |
| $A_A$ | -20.1% | -10.2% | -2.7% | -1.5% |
| $ex$ and $q$ | 5.5% | 5.4% | 5.3% | 5.0% |
| Total | -43.2% | -27.5% | -14.8% | -16.7% |
| Total net of $K_{1928}$ | -30.8% | -21.6% | -14.3% | -16.7% |

Table 13: Effects of Japanese Wedges on Labor Share, Capital and real GDP with Stalin's TFPs adjusted

| | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| Policy | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | -0.5% | 2.9% | 1.7% | -16.4% | 8.7% | 26.3% | -5.4% | 5.5% | 8.8% |
| $\tau_C$ | 10.9% | -3.2% | -2.1% | 17.7% | 33.5% | 7.6% | 22.9% | 2.9% | -1.5% |
| $\tau_W$ | -18.9% | 0.2% | -0.9% | -63.0% | -47.7% | -17.2% | -47.6% | -10.8% | -5.3% |
| $G_M$ and $\tau_R$ | -0.6% | -2.5% | -2.1% | 3.9% | -6.9% | -13.8% | -1.7% | -3.3% | -4.5% |
| $A_M$ | -0.0% | -0.6% | -0.7% | -2.0% | -23.5% | -25.7% | -9.2% | -18.7% | -19.9% |
| $A_A$ | -7.1% | -1.9% | -0.6% | -13.7% | -17.1% | -7.2% | -26.6% | -10.7% | -4.2% |
| $ex$ and $q$ | 1.5% | 2.8% | 2.6% | 3.2% | 2.6% | 3.5% | 3.7% | 4.1% | 4.1% |
| Total | -13.5% | -1.8% | -1.8% | -121.5% | -60.4% | -29.0% | -76.4% | -32.9% | -23.0% |

can say about this period, and our discussion here is more tentative.

The Soviet economy experienced rapid growth in GDP per capita during the NEP years. However, economic growth did not coincide with structural change. A larger fraction of the labor force was employed in agriculture in 1928 compared with 1913, and the share of investment in GDP remained at 12%. This implies that distortions, measured as wedges in our accounting excercise, must have remained large in 1928. Therefore, TFP in both sectors must have been growing fast during 1921-1928 to reconcile high distortions and rapid growth of GDP. If we assume that wedges measured in 1928 remained in place through the whole 1921-1928 period and impute the implied capital stock and TFP, we obtain that manufacturing TFP grew on average 10% annually during this period. Such rapid TFP growth is clearly not sustainable in the long run and would have to slow down.

The lack of available data makes it impossible to determine with certainty how much of that growth would have continued in the medium run in the absence of Stalin's "Great Turn". For this reason, we explore what we view as the lower bound on the potential outcome of the NEP. In our simulations, we assume that the average wedges from 1928-1929 remain in place indefinitely, and that the growth rate of TFP in manufacturing is reduced to the average Tsarist rate of 0.5% after 1928. We view this number as a lower bound since the actual reduction in the growth rate of TFP is unlikely to be as sharp, and the level of distortions is likely to reduce over time.

Figures 3 - 7 and Tables 14 - 17 present our findings. The key observation is that the welfare outcome of this counterfactual is almost the same as the one achieved under Stalin's
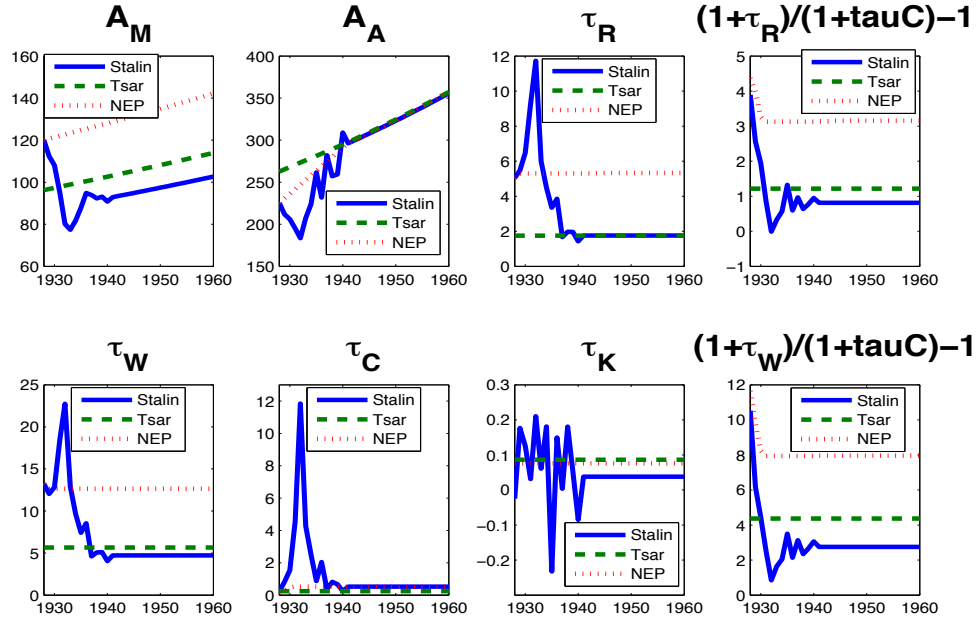
Figure 3: Wedges under NEP (0.5%)

policies. The big welfare gains from Stalin's reduction in wedges after 1928 are nearly fully offset by productivity losses during that period, so that the net welfare gain for an infinitely lived representative consumer from industrialization and collectivization is just 0.2 percent.

Even small departures from our baseline assumptions for this counterfactual produce net welfare gains for NEP, very substaintial in some cases. For example, if we assume that some of the high growth rate of TFP could be maintained after 1928, and assume that it reduces to 2% (the average TFP growth in Japan in the interwar period) rather than 0.5%, the welfare gains of the representative consumer exceed 20 percent.

The second counterfactual exercise envisions the path of the Russian economy under the assumption that after 1928 the New Economic Policy (NEP) continues partially: collectivization does not take place. This exercise is a stylized version of Allen's NEP counterfactual. Allen simulates the Soviet economy from 1928 to 1940 making five changes compared to the actual trajectory of Stalin's economy: a) there are no production and livestock losses which accompanied collectivization; b) there is no mass migration from rural to urban areas; c) the turnover tax aimed at peasants is replaced by a tax on all cash incomes; d) farm supply is
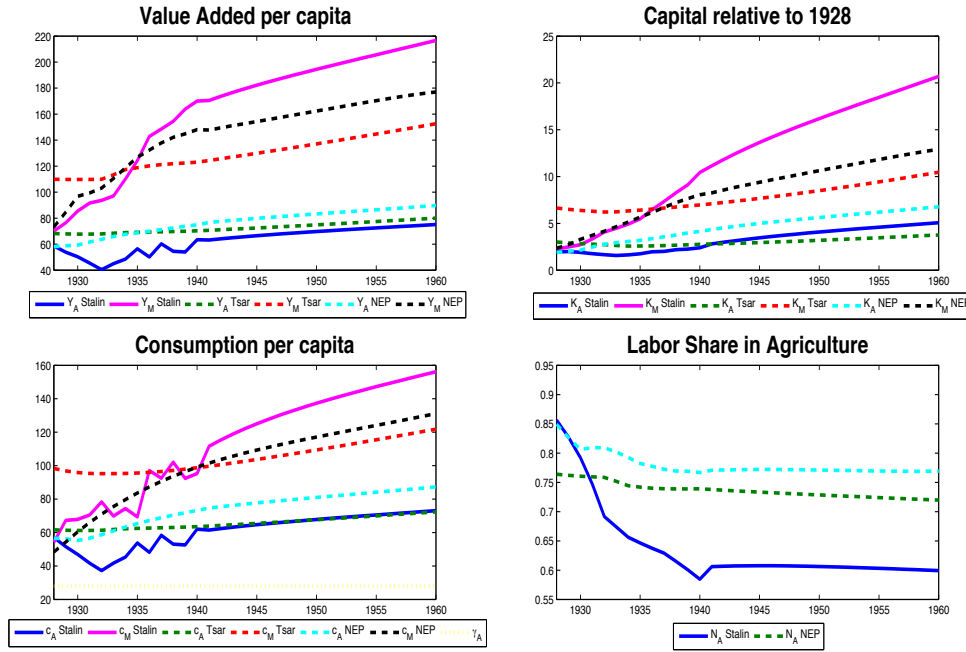
Figure 4: Paths of the economy: NEP (0.5%) vs Stalin

Table 14: Welfare Decomposition: Stalin vs. NEP (0.5%)

| | Gain from policy for | | |
|---|---|---|---|
| Policy | [28-40] | [28-∞] | [40-∞] |
| $\tau_K$ | -2.6% | 3.0% | 7.3% |
| $\tau_C$ | 6.5% | 6.0% | 1.6% |
| $\tau_W$ | 20.7% | 26.5% | 34.8% |
| $G_M$ and $\tau_R$ | 4.0% | -0.5% | -3.9% |
| $A_M$ | -23.6% | -29.9% | -34.6% |
| $A_A$ | -8.4% | -4.1% | -0.8% |
| $ex$ and $q$ | -0.3% | -0.8% | -1.2% |
| Total | -3.7% | 0.2% | 3.2% |

Table 15: Welfare Decomposition: NEP vs Tsar

| | Gain from policy for | | |
|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] |
| $\tau_K$ | 0.4% | 1.7% | 2.6% |
| $\tau_C$ | 5.0% | 6.9% | 8.4% |
| $\tau_W$ | -30.8% | -31.1% | -31.2% |
| $G_M$ and $\tau_R$ | -1.5% | 1.4% | 3.5% |
| $A_M$ | 21.6% | 23.2% | 24.4% |
| $A_A$ | -7.0% | -3.3% | -0.5% |
| $ex$ and $q$ | 5.9% | 6.2% | 6.4% |
| Total | -20.4% | -1.2% | 13.3% |
| Total net of $K_{1928}$ | -6.3% | 5.1% | 13.6% |

Table 16: Welfare Decomposition: Stalin vs. NEP (2%)

| | Gain from policy for | | |
|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] |
| $\tau_K$ | -2.7% | 3.0% | 7.2% |
| $\tau_C$ | 6.3% | 5.7% | 1.2% |
| $\tau_W$ | 21.1% | 27.3% | 35.6% |
| $G_M$ and $\tau_R$ | 4.1% | -0.4% | -3.8% |
| $A_M$ | -30.1% | -50.8% | -66.0% |
| $A_A$ | -8.4% | -4.2% | -0.9% |
| $ex$ and $q$ | -0.4% | -0.8% | -1.1% |
| Total | -9.8% | -20.1% | -27.7% |

Table 17: Welfare Decomposition: NEP (2%) vs Tsar

| | Gain from policy for | | |
|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] |
| $\tau_K$ | 0.4% | 1.7% | 2.7% |
| $\tau_C$ | 5.1% | 7.3% | 8.7% |
| $\tau_W$ | -31.2% | -32.0% | -32.0% |
| $G_M$ and $\tau_R$ | -1.5% | 1.3% | 3.4% |
| $A_M$ | 28.2% | 44.2% | 55.8% |
| $A_A$ | -7.0% | -3.2% | -0.5% |
| $ex$ and $q$ | 5.9% | 6.2% | 6.4% |
| Total | -14.3% | 19.1% | 44.2% |
| Total net of $K_{1928}$ | -0.1% | 25.5% | 44.5% |
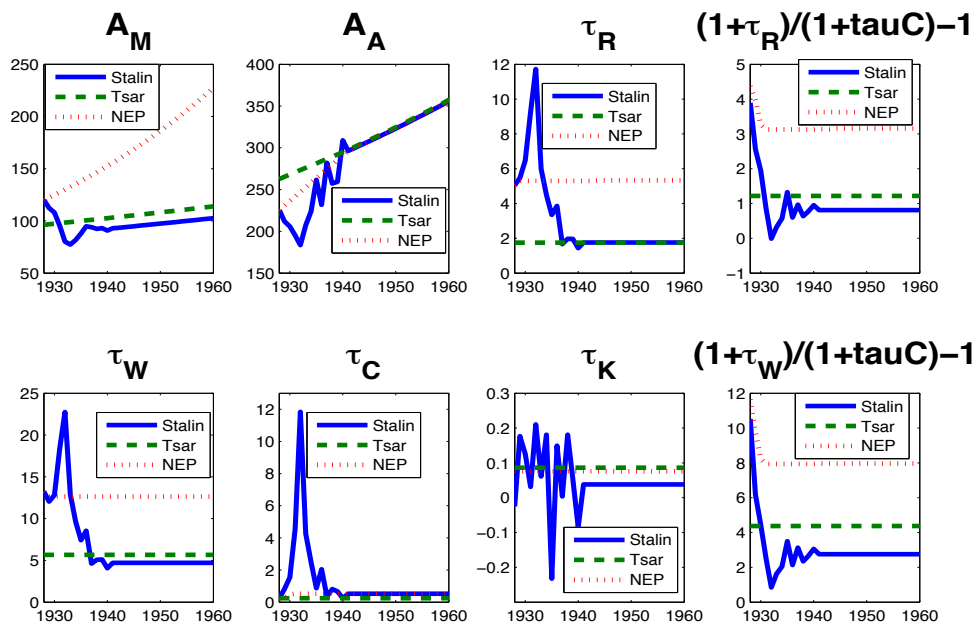
Figure 5: Wedges under NEP (2%)
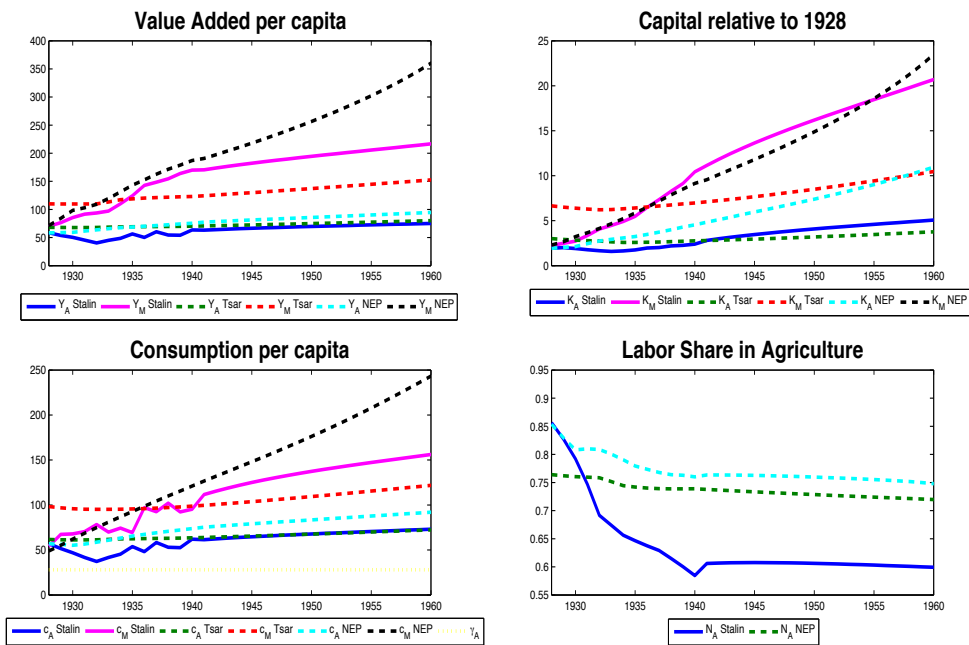


Figure 6: Paths of the economy: NEP (2%) vs Stalin

18
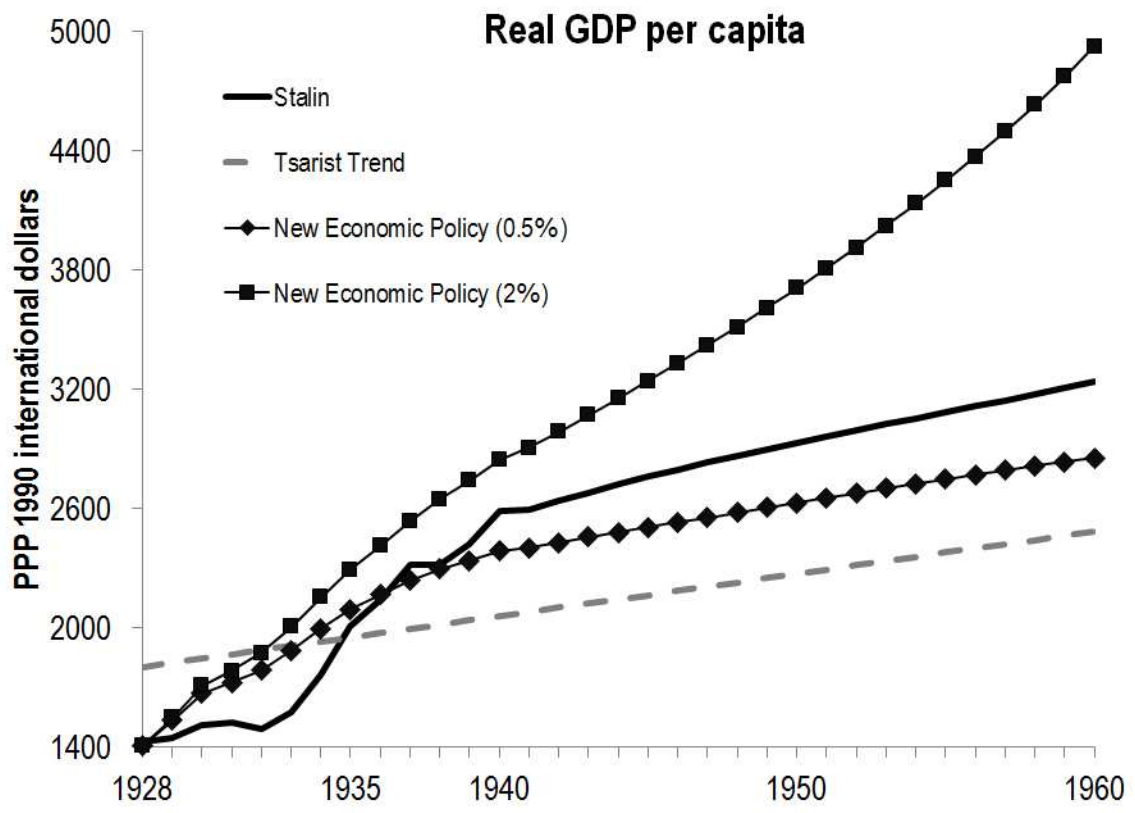
Figure 7: Real GDP per capita: Tsar vs NEP vs Stalin

determined by market mechanisms; e) no excess mortality due to famine.

We try to make our no-collectivization counterfactual exercise as close as possible to Allen's. We start the simulation from observed 1928 levels for all variables. To mimic no losses in production we assume that TFP grows at a constant rate - its average rate between 1928 and 1940 - in both sectors. To mimic the assumption that there is little migration from rural to urban areas we fix the barrier to labor reallocation, $(1 + \tau_L) / (1 + \tau_C)$, at its average 1928-29 level. To mimic the assumption of a uniform turnover tax we shut down the sharp increases in the price scissors observed in the collectivization period. We assume that the price scissors, $\tau_C$, remain constant at their average 1928-29 level.

Following Allen's counterfactual, we preserve wedges that describe the industrialization effort. To preserve the allocation of capital between the two sectors, we assume that the net barrier to capital reallocation, $(1 + \tau_R) / (1 + \tau_C)$, follows its actual path observed in Stalin's economy. In addition, to make the choice of investment and accumulation of capital consistent with their actual paths under industrialization policies, we assume that the investment wedge (distortion to the Euler equation) follows its actual path between 1928 and 1940 and has no effect after 1940. Consistent with the logic of our benchmark exercises, we do not alter the paths of population and labor force.

Figure 8 shows wedges under the NEP (red dotted line) compared to actual wedges under Stalin (blue line) and compared to the Tsarist trend (green dashed line). We assume no shortfall in TFP due to the collectivization effort in either sector, but we assume that the Soviet trend in TFP remains unaltered. In particular, we assume that the long-run level of manufacturing TFP remains below the Tsarist trend due to rapid industrialization.

The net barrier to labor reallocation remains high under NEP, even higher than under the Tsar. This is consistent with the facts discussed in Allen that land was distributed more equally among peasants and more land remained in commune ownership under NEP, compared to the pre-1913 period. We shut down the sharp increase in price scissors introduced during collectivization.

We assume that the net barrier to capital reallocation falls as much under NEP as it did under Stalin. This is consistent with the idea that under the NEP the Soviet economy would still implement the industrialization effort by investing heavily in capital accumulation and by reallocating capital towards the manufacturing sector. Given that the price scissors remain
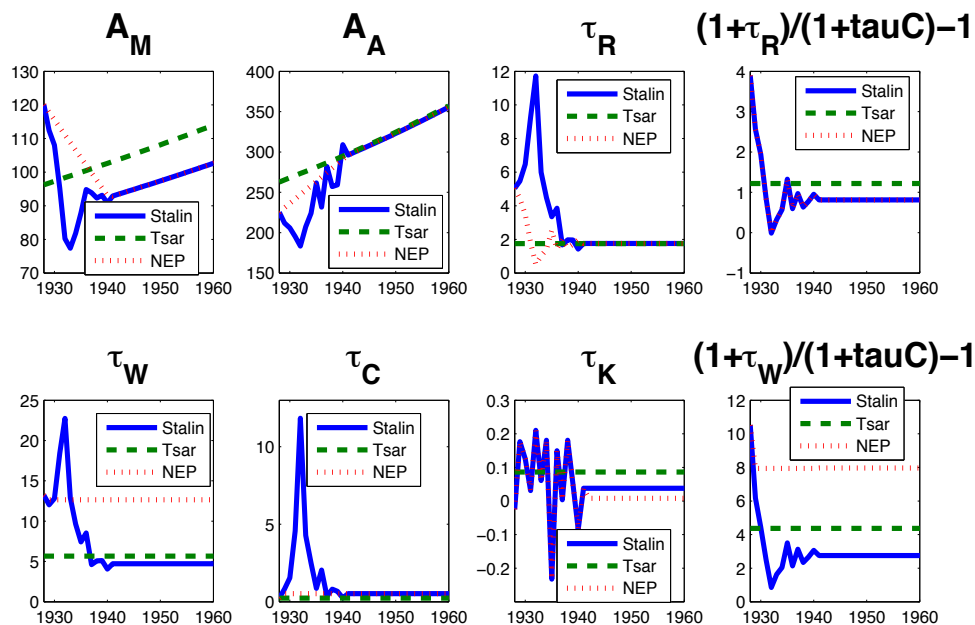
Figure 8: Wedges under Allen's NEP
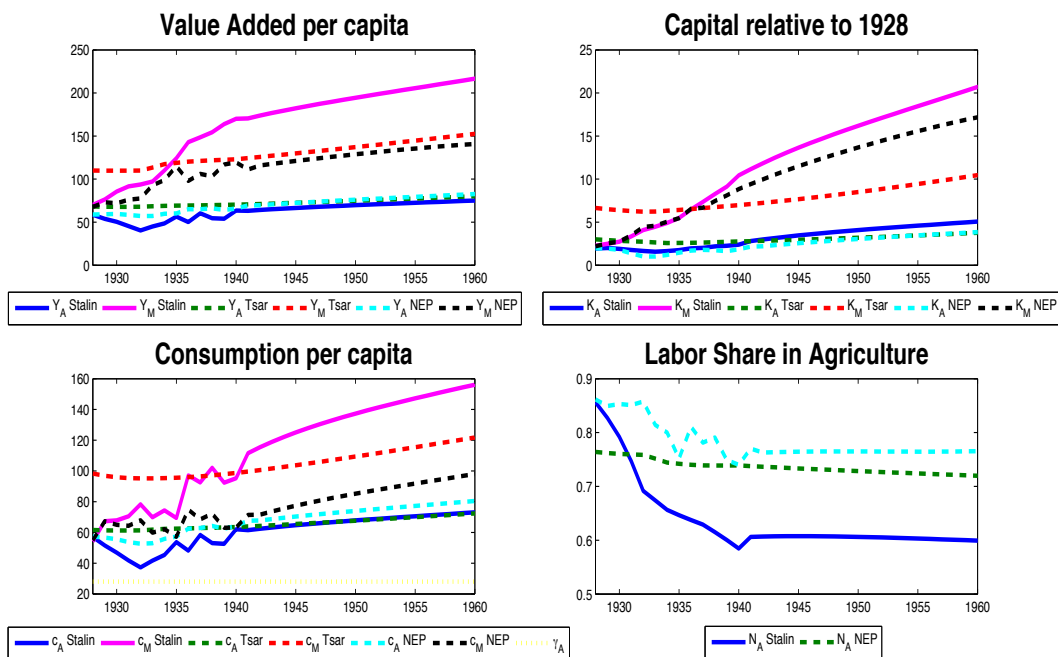


Figure 9: Paths of the economy: Allen's NEP vs Stalin
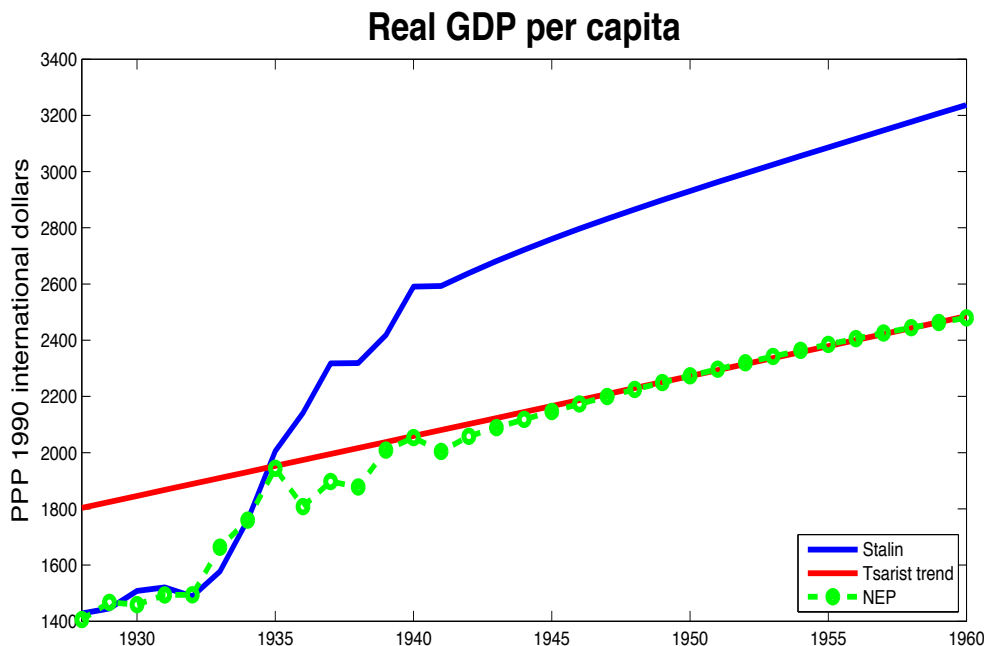
**Real GDP per capita**

Figure 10: Real GDP per capita: Tsar vs Allen's NEP vs Stalin

fixed throughout the period, we assume that the capital rate distortion, $\tau_R$, falls. We preserve all the changes in the investment wedge, $\tau_K$, between 1928 and 1940. As shown in the Figure, we assume that the investment wedge is shut down to 0 after 1940. This assumption helps mimic the path of rapid capital accumulation observed under Stalin. [2]

Figure 9 shows the counterfactual path of the Soviet economy under NEP policies in the absence of collectivization. Even though a very similar path of capital accumulation is achieved in our NEP counterfactual, without collectivization there would be much less rural-urban migration, and much lower growth of output and consumption would be achieved in the long run. Figure 10 shows that the path of Soviet real GDP per capita under NEP but without collectivization would quickly converge to that of Tsarist Russia and remain there after 1940.

Tables 18 and 19 show that collectivization, despite heavy losses in TFP, produced sizeable welfare gains both in the short and in the long run, compared to the economy of NEP. The gains from labor reallocation under Stalin, when compared to NEP, outweight the losses from TFP in the short run. Gains from labor reallocation remain high in the long-run, while the

[2]Without this assumption the path of GDP per capita would be even lower, and the path of consumption worse compared to both Stalin's policies and to the Tsarist trend.

Table 18: Welfare Decomposition: Stalin vs. Allen's NEP

| Policy | Gain from policy for | | |
|:---:|:---:|:---:|:---:|
| | [28-40] | [28-$\infty$] | [40-$\infty$] |
| $\tau_K$ | 1.0% | -1.8% | -3.9% |
| $\tau_C$ | 5.4% | 6.6% | 3.2% |
| $\tau_W$ | 18.2% | 22.7% | 30.5% |
| $G_M$ and $\tau_R$ | 3.8% | 1.8% | 0.3% |
| $A_M$ | -12.5% | -6.5% | -2.2% |
| $A_A$ | -8.0% | -3.8% | -0.5% |
| $ex$ and $q$ | -0.3% | -0.7% | -1.0% |
| Total | 7.5% | 18.2% | 26.3% |

paths of TFP coincide in the long run. The NEP path is inferior compared to the Tsarist trend, both because the labor barrier is substantially higher under NEP (more commune ownership, more equal distribution of land), and because TFP converges to a lower trajectory (due to the industrialization effort).

A big source of net welfare loss under NEP compared to Tsarist trend is the lower starting point, which accounts for almost half of short-run losses. Table 19 is also informative about the comparison if we made alternative assumptions about policies under the NEP. For instance, if we wanted to exclude the welfare losses due to the drop in manufacturing TFP we could assume that TFP under NEP follows the same path as under the Tsars. In that case we can simply exclude lines 7 and 8 of Table 19. Alternatively, we could envision that under the NEP the labor barrier would revert to Tsarist levels. In that case we can exclude line 5 which represents the effect of the barrier to labor reallocation. If we adopted both of these assumptions we could reach a conclusion that NEP policies would be superior to Stalin's policies.

Indeed, a softer version of NEP, which excludes the long-term losses in manufacturing TFP and assumes that the labor barrier and price scissors return to Tsarist levels, is reported in Tables 20 and 21 and presented in Figures 11, 12 and 13 . It shows that the path of the economy under Allen's NEP version 2 could be roughly as good as under Stalin's policies. In this case, the cost in human lives makes Stalin's policies inferior.

Another possible view of NEP is that manufacturing TFP in 1924-28 was in recovery mode and would continue growing from its 1928 level. We consider two modifications to our baseline version of NEP. The first modification assumes that manufacturing TFP grows at the Tsarist

Table 19: Welfare Decomposition: Allen's NEP vs Tsar

| | Gain from policy for | | |
|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] |
| $\tau_K$ | -3.2% | 6.5% | 13.8% |
| $\tau_C$ | 6.0% | 6.4% | 6.8% |
| $\tau_W$ | -28.3% | -27.4% | -26.9% |
| $G_M$ and $\tau_R$ | -1.3% | -0.9% | -0.6% |
| $A_M$ | 10.5% | -0.2% | -8.0% |
| $A_A$ | -7.3% | -3.6% | -0.8% |
| $ex$ and $q$ | 5.8% | 6.1% | 6.2% |
| Total | -31.5% | -19.2% | -9.8% |
| Total net of $K_{1928}$ | -17.8% | -13.0% | -9.4% |

Table 20: Welfare Decomposition: Stalin vs. Allen's NEP v2

| | Gain from policy for | | |
|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] |
| $\tau_K$ | — | — | — |
| $\tau_C$ | 11.5% | 13.0% | 9.9% |
| $\tau_W$ | 1.4% | 0.5% | 4.1% |
| $G_M$ and $\tau_R$ | 3.8% | 2.3% | 1.1% |
| $A_M$ | -12.9% | -11.7% | -10.9% |
| $A_A$ | -8.2% | -4.0% | -0.7% |
| $ex$ and $q$ | -0.1% | -0.4% | -0.6% |
| Total | -4.4% | -0.3% | 3.0% |

Table 21: Welfare Decomposition: Allen's NEP v2 vs Tsar

| | Gain from policy for | | |
|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] |
| $\tau_K$ | -2.2% | 6.5% | 13.8% |
| $\tau_C$ | — | — | — |
| $\tau_W$ | -11.5% | -5.2% | -0.5% |
| $G_M$ and $\tau_R$ | -1.2% | -1.3% | -1.4% |
| $A_M$ | 11.0% | 5.1% | 0.7% |
| $A_A$ | -7.2% | -3.4% | -0.6% |
| $ex$ and $q$ | 5.6% | 5.8% | 5.9% |
| Total | -19.7% | -0.7% | 13.5% |
| Total net of $K_{1928}$ | -5.6% | 5.6% | 13.9% |
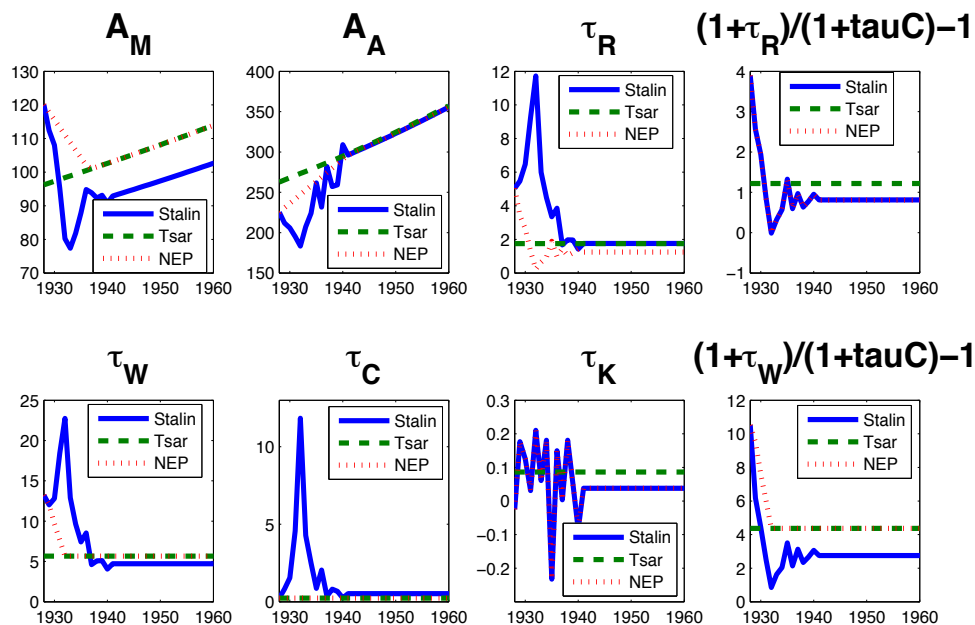
Figure 11: Wedges under Allen's NEP v2
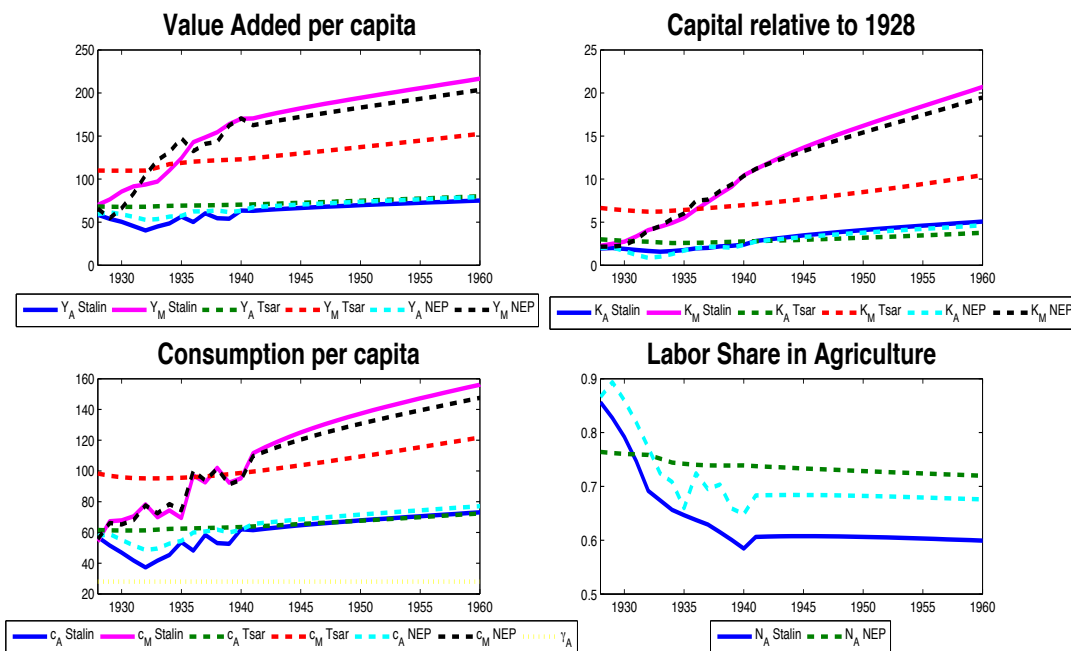


Figure 12: Paths of the economy: Allen's NEP v2 vs Stalin
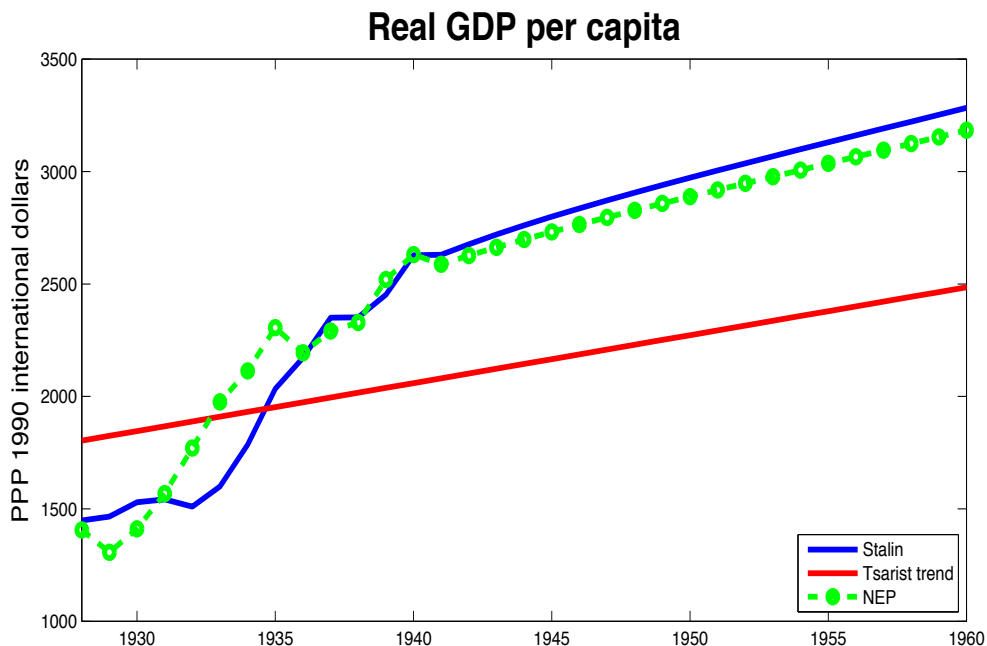
**Real GDP per capita**

Figure 13: Real GDP per capita: Tsar vs Allen's NEP v2 vs Stalin

trend growth rate after 1928 (NEP v3). The second modification assumes that manufacturing TFP grows at the Japanese post-1940 rate (NEP v4).

We find that taking into account the high level of manufacturing TFP in 1928 (v3) more than compensates for the high level of the labor barrier, making NEP look slightly better relative to both Stalin's Russia and Tsarist Russia. Adding a high TFP growth rate similar to Japan further improves our evaluation of NEP. We view this optimistic scenario as an upper bound of what NEP could have achieved.

## 2.3 Alternative Projections of Stalin's wedges

One projected set of wedges for which long-term trajectories are of particular interest are the growth rates of TFP in the two sectors. Ideally we would like to match the actual levels and corresponding growth rates of TFP following World War II.

One way of obtaining estimates of TFP growth is targeting the aggregate rates of growth of GDP, capital and labor from 1937 to 1955 using data from Bergson (1961). Table 26 reports the growth factors of output, and capital and labor inputs from Bergson and compares them to those predicted by our baseline model. We search for growth rates of TFP which allow us

Table 22: Welfare Decomposition: Stalin vs. NEP v3

| | Gain from policy for | | |
|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] |
| $\tau_K$ | 1.0% | -2.1% | -4.4% |
| $\tau_C$ | 5.1% | 6.0% | 2.5% |
| $\tau_W$ | 19.2% | 24.2% | 31.9% |
| $G_M$ and $\tau_R$ | 3.8% | 1.8% | 0.3% |
| $A_M$ | -23.3% | -29.1% | -33.4% |
| $A_A$ | -8.1% | -3.9% | -0.7% |
| $ex$ and $q$ | -0.3% | -0.6% | -0.8% |
| Total | -2.5% | -3.7% | -4.5% |

Table 23: Welfare Decomposition: NEP v3 vs Tsar

| | Gain from policy for | | |
|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] |
| $\tau_K$ | -3.2% | 6.8% | 14.3% |
| $\tau_C$ | 6.4% | 7.0% | 7.4% |
| $\tau_W$ | -29.3% | -28.8% | -26.7% |
| $G_M$ and $\tau_R$ | -1.3% | -0.9% | -0.6% |
| $A_M$ | 21.3% | 22.4% | 23.2% |
| $A_A$ | -7.3% | -3.5% | -0.7% |
| $ex$ and $q$ | 5.9% | 6.0% | 6.1% |
| Total | -21.6% | 2.7% | 21.0% |
| Total net of $K_{1928}$ | -7.6% | 9.0% | 21.4% |

Table 24: Welfare Decomposition: Stalin vs. NEP v4

| | Gain from policy for | | |
|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] |
| $\tau_K$ | 1.0% | -2.4% | -4.9% |
| $\tau_C$ | 4.9% | 5.6% | 2.1% |
| $\tau_W$ | 19.7% | 25.1% | 32.7% |
| $G_M$ and $\tau_R$ | 3.9% | 1.8% | 0.3% |
| $A_M$ | -29.9% | -49.2% | -63.6% |
| $A_A$ | -8.1% | -4.0% | -0.7% |
| $ex$ and $q$ | -0.4% | -0.6% | -0.7% |
| Total | -8.7% | -23.6% | -34.7% |
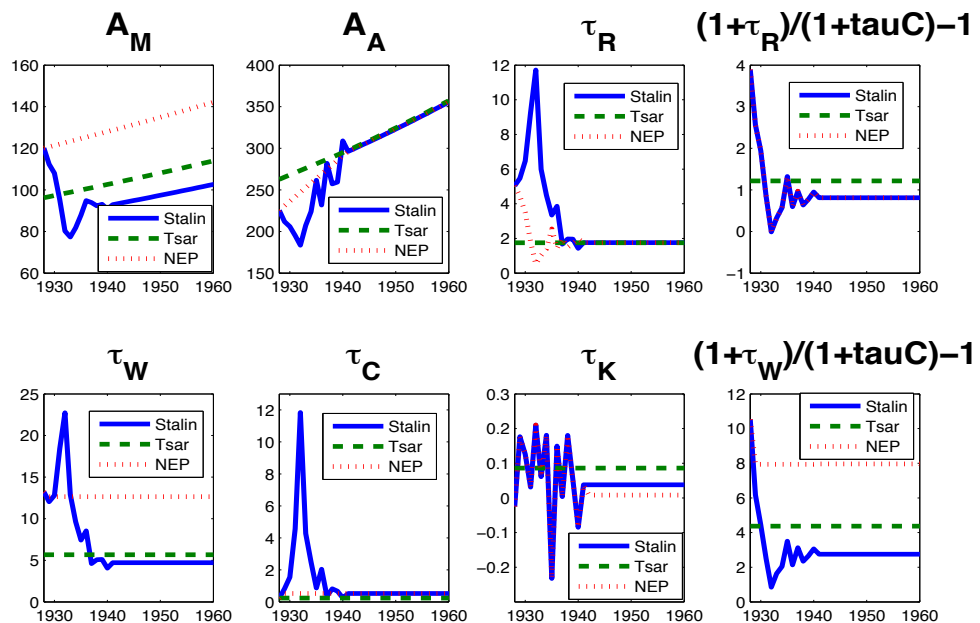
Figure 14: Wedges under NEP v3
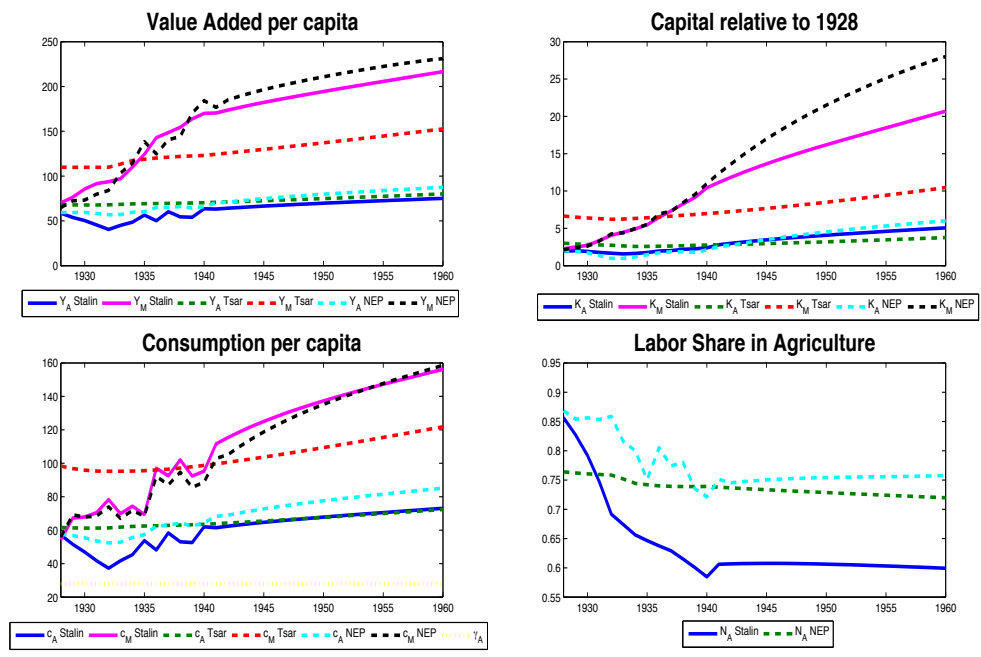


Figure 15: Paths of the economy: NEP v3 vs Stalin

28
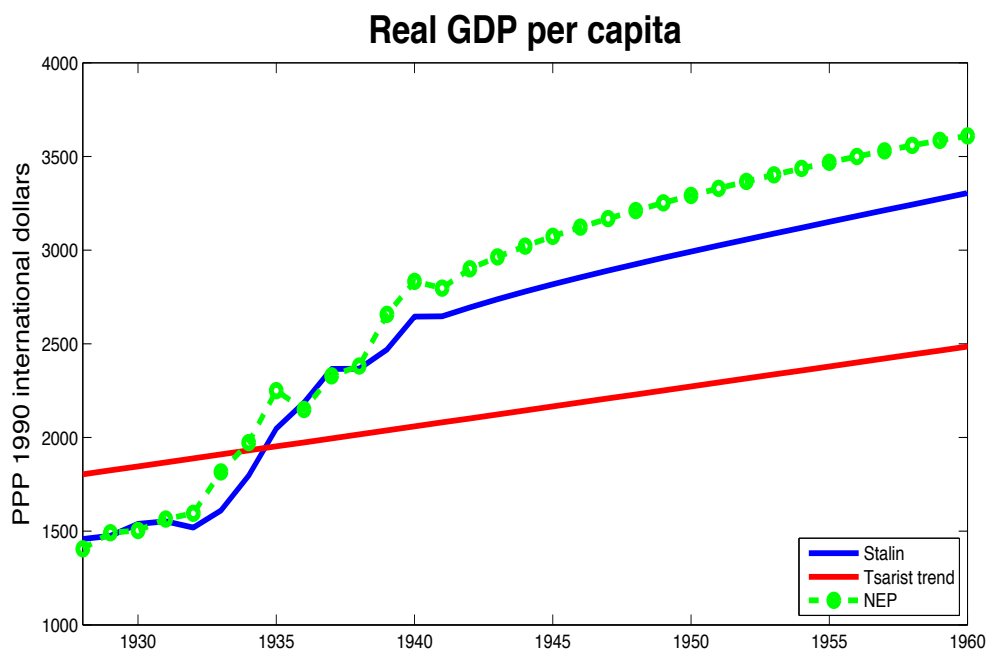
**Real GDP per capita**

Figure 16: Real GDP per capita: Tsar vs NEP v3 vs Stalin

Table 25: Welfare Decomposition: NEP v4 vs Tsar

|  | Gain from policy for | | |
|---|---|---|---|
| Policy | [28-40] | [28-∞] | [40-∞] |
| $\tau_K$ | -3.3% | 7.1% | 14.8% |
| $\tau_C$ | 6.6% | 7.4% | 7.9% |
| $\tau_W$ | -29.8% | -29.7% | -29.1% |
| $G_M$ and $\tau_R$ | -1.3% | -0.9% | -0.6% |
| $A_M$ | 28.0% | 42.6% | 53.2% |
| $A_A$ | -7.3% | -3.4% | -0.6% |
| $ex$ and $q$ | 5.9% | 5.9% | 6.0% |
| Total | -15.4% | 22.6% | 51.1% |
| Total net of $K_{1928}$ | -1.2% | 29.0% | 51.5% |
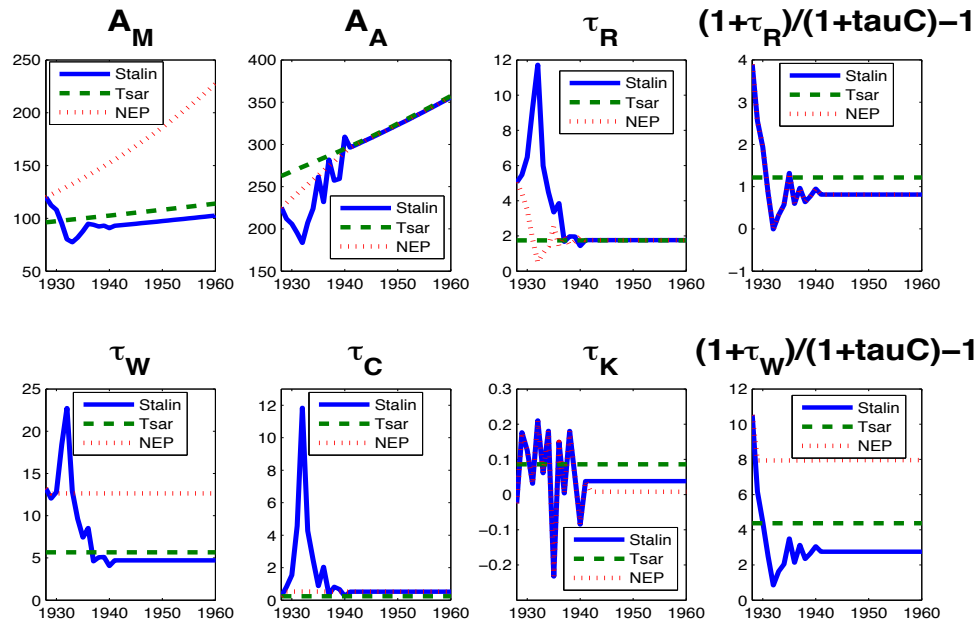
Figure 17: Wedges under NEP v4
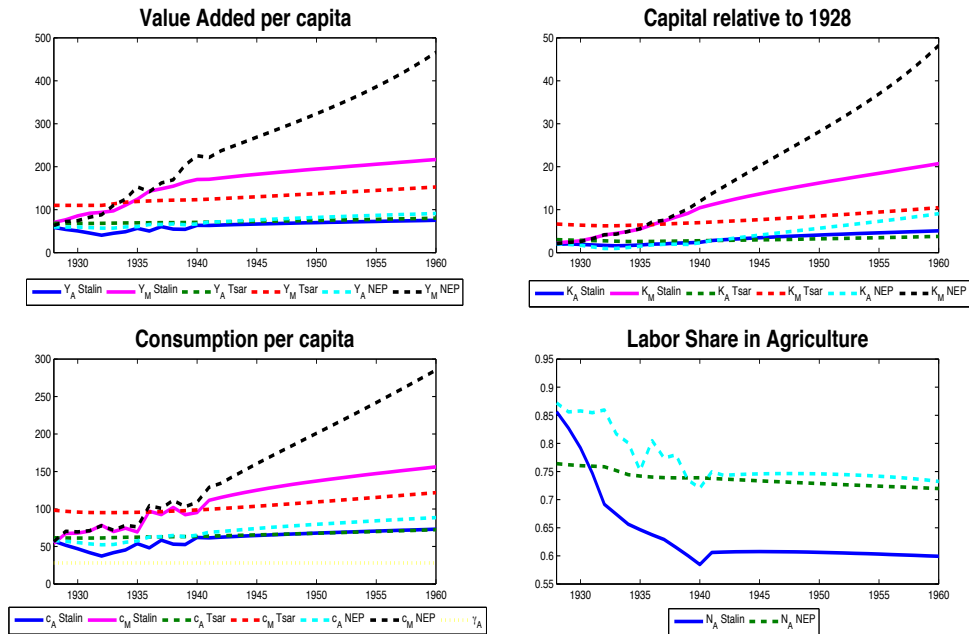


Figure 18: Paths of the economy: NEP v4 vs Stalin
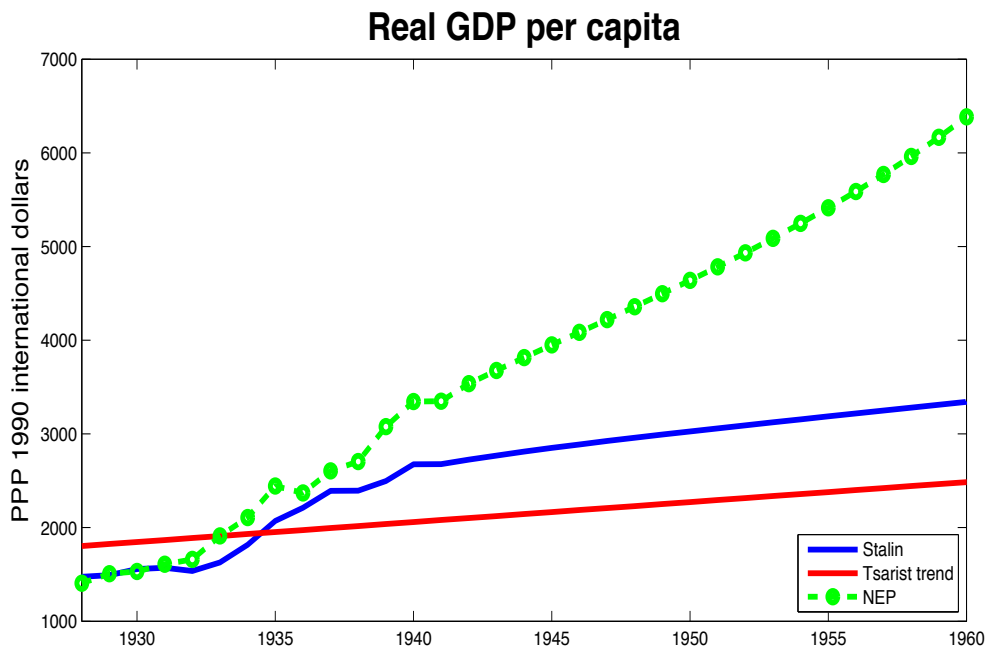
Figure 19: Real GDP per capita: Tsar vs NEP v4 vs Stalin

to come as close as possible to matching the observed growth factors. We find that in order to move these as close as possible to the data, the growth rate of TFP in the manufacturing sector needs to increase approximately three-fold, while the growth rate of TFP in the agricultural sector needs to only increase slightly.

We use these alternative growth rates for projected TFP to evaluate welfare gains of policies and effects on key variables in Tables 27 and 28. The tables shows that short-term losses are almost unaffected by this alternative growth scenario, while the long-term gains nearly double. The implied TFP growth rates are very high, so these results probably represent an upper bound on the long-term welfare gains from TFP growth which could possibly be obtained by Stalin.

Another way of obtaining estimates of projecting TFP is continuing regression lines drawn through data for 1937-1940 consistent with what we do with other wedges. This approach implies a continued decline in manufacturing TFP but a speed-up in agricultural TFP growth. Tables 29 and 30 show that the adverse effect on manufacturing TFP far outweights the favor-able effect on agricultural TFP. The net effect of this alternative path comes at an additional

Table 26: Impact of Growth to Bergson's estimates for 1955 on Welfare Decomposition

| | | Growth factor from 1937 to 1955 from Bergson (1961) | | |
|:---:|:---:|:---:|:---:|:---:|
| Variable | Data | Benchmark | Targeted | Regression |
| $A_M$ growth | — | 0.97% | 1.06% | -1.12% |
| $A_A$ growth | — | 0.61% | 1.84% | 3.05% |
| $GDP$ | 2.15 | 1.40 | 1.98 | 0.92 |
| $Capital$ | 3.00 | 2.50 | 3.26 | 1.18 |
| $Labor$ | 1.30 | 1.29 | 1.29 | 1.29 |

Table 27: Impact of Growth to Bergson's estimates for 1955 on Welfare Decomposition

| | Gain from alternative policy for | | | |
|:---:|:---:|:---:|:---:|:---:|
| Policy | [28-40] | [28-∞] | [40-∞] | [40-∞], $K_{1940}$ |
| $\tau_K$ | 0 | 0.04% | 0.07% | 0.05% |
| $\tau_C$ | 0.20% | 0.59% | 0.17% | 0.15% |
| $\tau_W$ | -0.19% | -0.32% | 0.10% | 0.11% |
| $G_M$ and $\tau_R$ | -0.01% | -0.07% | 0 | -0.01% |
| $A_M$ | 0.21% | 6.13% | 10.68% | 10.73% |
| $A_A$ | -0.01% | 0.24% | 0.45% | 0.38% |
| $ex$ and $q$ | 0 | -0.02% | -0.03% | -0.02% |
| Total | 0.21% | 6.56% | 11.42% | 11.40% |
| Total net of $K_{1928}$ | 0.22% | 6.60% | 11.42% | 11.41% |

welfare cost of around 5 percent of consumption.

An alternative way of obtaining estimates of TFP growth, as well as most other wedges for the post-war period, is to use available data for Soviet sectoral production accounts from Moorsteen and Powell (1966). Moorsteen and Powell provide a rich source of data on components of production as well as capital inputs, which are measured consistently with the data we use for the 1928-1940 period. However, their measure of labor inputs in the two sectors is much less reliable, and inconsistent with our data for the industrialization period. We obtain ballpark estimates for post-war labor inputs by adjusting MP's estimates of labor inputs such that they become comparable to our data for 1928-40.

This procedure along with the assumption that prices remained fixed from 1940 to 1953, allows us to obtain estimates of all wedges except trade wedges for the post-war period under Stalin. Figure 20 shows the behavior of the wedges for the period 1945-1953 - between the end of World War II and until Stalin's death. There is some period of variations in the wedges following the recovery from the devastation of the war. However, by 1950 most of the wedges

Table 28: Impact of Growth to Bergson's estimates for 1955 on Labor Share, Capital and Output

| Policy | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | 0 | 0 | 0 | 0.05% | 0.65% | 0.57% | 0.01% | 0.13% | -0.56% |
| $\tau_C$ | 0 | 0 | 0 | 0.22% | 0.87% | 0.22% | 0.08% | 0.12% | -0.34% |
| $\tau_W$ | 0 | 0 | 0 | -0.26% | -0.63% | 0 | -0.07% | 0 | -0.19% |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0.08% | 0.22% | 0.05% | 0.01% | 0.03% | -0.06% |
| $A_M$ | -0.09% | -0.44% | 0.09% | -0.59% | -2.85% | -1.81% | -0.25% | -1.15% | 4.24% |
| $A_A$ | 0.01% | 0 | 0.03% | 0.03% | -0.06% | 0.01% | -0.01% | -0.02% | 0.17% |
| $ex$ and $q$ | 0 | 0 | -0.02% | 0 | -0.02% | -0.02% | 0 | 0.02% | 0.07% |
| Total | -0.08% | -0.44% | 0.11% | -0.58% | -1.94% | -1.00% | -0.23% | -0.89% | 3.34% |

Table 29: Incremental impact of continued 1937-1940 Growth on Welfare Decomposition

| | Gain from alternative policy for | | | |
|---|---|---|---|---|
| Policy | [28-40] | [28-∞] | [40-∞] | [40-∞], $K_{1940}$ |
| $\tau_K$ | 0 | -0.03% | -0.06% | -0.05% |
| $\tau_C$ | -0.12% | -0.61% | -0.14% | -0.13% |
| $\tau_W$ | 0.10% | 0.38% | -0.09% | -0.10% |
| $G_M$ and $\tau_R$ | 0 | 0.05% | 0 | 0.01% |
| $A_M$ | -0.33% | -8.39% | -14.57% | -14.65% |
| $A_A$ | 0.26% | 4.40% | 7.58% | 7.66% |
| $ex$ and $q$ | -0.04% | -0.30% | -0.50% | -0.52% |
| Total | -0.11% | -4.46% | -7.77% | -7.76% |
| Total net of $K_{1928}$ | -0.12% | -4.48% | -7.77% | -7.76% |

Table 30: Incremental impact of continued 1937-1940 Growth on Labor Share, Capital and Output

| Policy | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | 0 | 0 | 0 | -0.03% | -0.35% | 0.33% | -0.01% | -0.07% | 0.29% |
| $\tau_C$ | 0 | 0 | 0 | -0.12% | -0.46% | 0.13% | -0.05% | -0.06% | 0.18% |
| $\tau_W$ | 0 | 0 | 0 | 0.14% | 0.33% | 0 | 0.04% | 0 | 0.11% |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | -0.04% | -0.11% | 0.03% | -0.01% | -0.02% | 0.03% |
| $A_M$ | 0.14% | 0.67% | -0.11% | 0.89% | 3.95% | 2.62% | 0.38% | 1.63% | -5.39% |
| $A_A$ | -0.11% | -0.50% | 1.10% | -0.65% | -2.75% | -4.34% | -0.27% | -1.15% | 3.33% |
| $ex$ and $q$ | 0.01% | 0.07% | 0.04% | 0.07% | 0.36% | 0.67% | 0.03% | 0.15% | -0.22% |
| Total | 0.04% | 0.24% | 1.02% | 0.32% | 1.03% | -0.57% | 0.13% | 0.49% | -1.70% |

stabilize. We use the average values of Stalin's wedges for the period 1950-1953, reported in Table 2 for the second counterfactual simulation. In this exercise, we replace our projected values for Stalin's wedges for the period after 1940 with the averages of all the wedges for 1950-1953. We set the long-run growth rates of TFP such that the projected levels of TFP match the observed values exactly in 1953.

Tables 31 and 32 report the impacts of this alternative scenario on the baseline tables. We find that most of the wedges take values close enough to our baseline simulation. As a result, their impact is minimal. The biggest changes come from faster TFP growth in the manufacturing sector, and higher prices scissors. However, the joint effect of the wedges is well within confidence bounds generated by a 1 percent measurement error reported in Section 1. This robustness exercise leads us to think that our baseline simulation identifies well the long-run values of distortions and, thus, gives a good approximation of both welfare gains and the speed of transition.
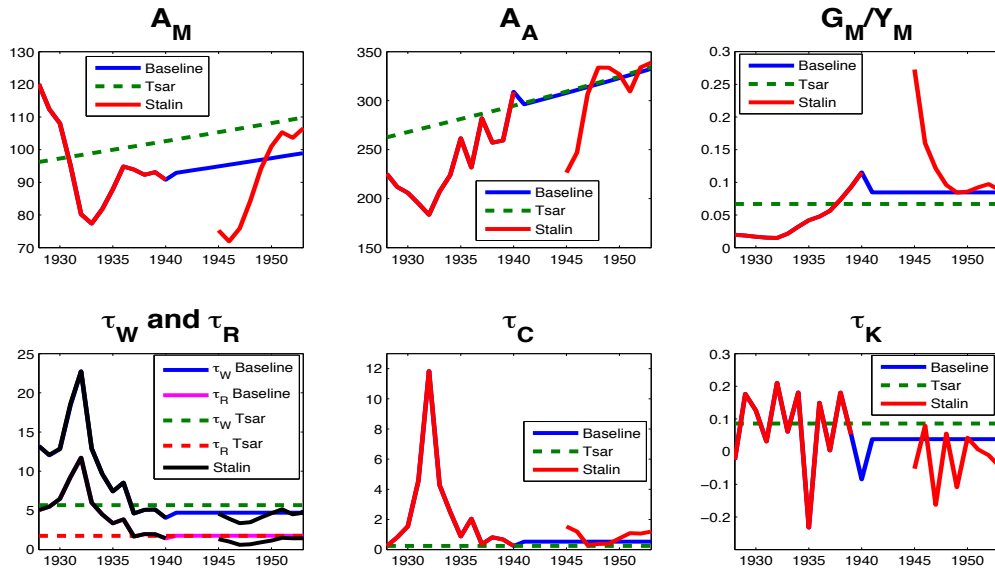


Figure 20: Wedges and sectoral TFPs under Tsar and Stalin.

In a further robustness check, we recompute our wedges under the assumption that 10% of time of agricultural workers is spent on non-agricultural activities, which is consistent with estimates of Moorsteen and Powell (1966) for the Soviet period. Incremental effects on welfare gains of policies and on effects on key variables are shown in Tables 33 and 34. They illustrate

Table 31: Impact of estimates of the wedges for 1950-1953 on Welfare Decomposition

|  | Gain from alternative policy for | | | |
| Policy | [28-40] | [28-∞] | [40-∞] | [40-∞], $K_{1940}$ |
|---|---|---|---|---|
| $\tau_K$ | 0.16 | -0.25% | -0.56% | -0.56% |
| $\tau_C$ | 0.89% | 1.96% | 2.74% | 2.90% |
| $\tau_W$ | -0.30% | -0.07% | 0.11% | 0 |
| $G_M$ and $\tau_R$ | 0.23% | -0.21% | -0.51% | -0.47% |
| $A_M$ | 0.07% | 1.70% | 2.95% | 2.92% |
| $A_A$ | -0.10% | -0.33% | -0.54% | -0.64% |
| $ex$ and $q$ | -0.02% | -0.12% | -0.18% | -0.17% |
| Total | 0.92% | 2.68% | 4.00% | 3.99% |
| Total net of $K_{1928}$ | 0.94% | 2.70% | 4.01% | 3.99% |

Table 32: Impact of estimates of the wedges for 1950-1953 on Labor Share, Capital and Output

| Policy | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
|  | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | -0.07% | -0.38% | -0.51% | -0.24% | 0.80% | -2.83% | -0.17% | -0.42% | -2.48% |
| $\tau_C$ | -0.23% | -1.29% | 4.57% | -1.45% | -6.34% | 1.17% | -0.53% | -3.22% | 5.90% |
| $\tau_W$ | 0.04% | 0.12% | 0.32% | -0.04% | -0.20% | 1.15% | -0.01% | 0.56% | 0.17% |
| $G_M$ and $\tau_R$ | -0.11% | -0.47% | -0.49% | -0.42% | -2.74% | -5.07% | -0.27% | -1.26% | -1.14% |
| $A_M$ | -0.05% | -0.20% | 0.07% | -0.35% | -1.23% | -0.41% | -0.10% | -0.27% | 1.87% |
| $A_A$ | 0.07% | 0.13% | -0.30% | 0.29% | 0.54% | 0.76% | 0.04% | 0.22% | -0.52% |
| $ex$ and $q$ | 0.01% | 0.09% | -0.19% | 0.07% | 0.41% | 0.13% | 0.05% | 0.30% | -0.35% |
| Total | -0.34% | -2.00% | 3.48% | -2.56% | -9.29% | -5.18% | -1.01% | -4.12% | 3.46% |

Table 33: Impact of labor shares from Moorsteen and Powell (1966) on Welfare Decomposition

|  | Gain from alternative policy for | | | |
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
|---|---|---|---|---|
| $\tau_K$ | -0.30% | -0.56% | -0.76% | -0.84% |
| $\tau_C$ | -0.96% | -2.29% | -1.46% | -1.48% |
| $\tau_W$ | 1.81% | 1.44% | -0.68% | -0.70% |
| $G_M$ and $\tau_R$ | -0.61% | -0.35% | -0.15% | -0.17% |
| $A_M$ | -0.33% | -0.08% | 0.12% | 0.16% |
| $A_A$ | 1.60% | 0.77% | 0.15% | 0.19% |
| $ex$ and $q$ | -0.73% | -0.73% | -0.73% | -0.74% |
| Total | -0.27% | -2.13% | -3.55% | -3.61% |
| Total net of $K_{1928}$ | 0.50% | -1.79% | -3.51% | -3.57% |

Table 34: Impact of labor shares from Moorsteen and Powell (1966) on Labor Share, Capital and Output

| Policy | Labor Share | | | Capital | | | Output | | |
| | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
|---|---|---|---|---|---|---|---|---|---|
| $\tau_K$ | 0.08% | 0.27% | 0.23% | 0.32% | -0.33% | 0.28% | -0.12% | -0.57% | -0.35% |
| $\tau_C$ | -0.30% | 0.43% | 0.31% | -6.67% | -7.99% | -2.41% | -7.84% | -1.52% | -1.12% |
| $\tau_W$ | -0.24% | -0.18% | 0.04% | 10.37% | 6.86% | 0.50% | 9.44% | -0.03% | -0.93% |
| $G_M$ and $\tau_R$ | 0.11% | 0.04% | 0.02% | -1.08% | -0.93% | -0.27% | -1.12% | -0.22% | -0.15% |
| $A_M$ | 0.23% | -0.01% | -0.01% | -0.39% | 0.31% | 0.14% | -0.23% | 0.06% | 0.10% |
| $A_A$ | -0.16% | -0.06% | -0.04% | 2.22% | 2.30% | 0.55% | 2.44% | 0.73% | 0.08% |
| $ex$ and $q$ | 0.16% | 0.02% | 0.06% | -0.72% | -0.66% | -0.83% | -0.73% | -0.71% | -0.80% |
| Total | 0.06% | 0.56% | 0.63% | 3.83% | -0.69% | -2.16% | 1.02% | -2.44% | -3.24% |

that most of the welfare losses are higher, both in the short run and in the long-run, if we use these estimates.

# 3 Sensitivity to Calibration

This section reports the results of a sensitivity analysis with respect to calibrated parameters. In each exercise one of the parameters $\{\alpha_{A,K}, \alpha_{A,N}, \alpha_{M,K}, \alpha_{M,N}, \gamma, \eta, \beta, \rho\}$ is changed to its alternative value reported in Table 1. For each alternative calibration new time series for wedges are recovered from the data. These new wedges are used to evaluate welfare gains of policies and effects on key variables similarly to Tables 4 and 6. Tables 35 - 48 report incremental gains to Tables 4 and 6 coming from these alternative calibrations.

Most of these effects are relatively small. The relatively big change comes from varying the subsistence level $\gamma^A$. However, even a 10% decrease in subsistence leaves the signs and magnitudes of most of our results intact, while a 10% increase would only reinforce our conclusions.

An increase in the discout factor $\beta$ (from 0.96 to 0.93) puts a bigger weight to short-term losses coming from Stalin's policies and discounts more the long-term gains. Third, assuming capital and labor to be complements (replacing the unit elasticity of substitution by an elasticity of $\rho = 0.8$) makes capital accumulation more important for long-run development. As capital is less substitutable by labor, the same set of distortion leads to a lower path of development both for Stalin's economy post-1940 and for the Tsarist economy post-1913. Since the path of Stalin's economy relies more strongly on fast capital accumulation than does the development of the Tsarist economy, the long-run gains from Stalin's policies are reduced in this counter-factual exercise. Although the short run losses from Stalin's policies are somewhat lower as well, the overall welfare comparison shifts against Stalin's policies. The overall effect is a reduction of long-run gains from 16.1% to 5.9% and an increase in the welfare loss for generation 1928 from 1% to 4.8%. Thus, the adoption of the assumption that capital and labor are complements also reinforces our main results.

Table 35: Impact of $\alpha_{A,K} = 0.2$ on Welfare Decomposition

| | Gain from alternative policy for | | | |
|---|---|---|---|---|
| Policy | [28-40] | [28-∞] | [40-∞] | [40-∞], $K_{1940}$ |
| $\tau_K$ | 0.07% | 0.55% | 0.92% | 0.74% |
| $\tau_C$ | -1.63% | -0.54% | -0.05% | -0.22% |
| $\tau_W$ | -0.99% | -0.72% | -0.09% | 0.04% |
| $G_M$ and $\tau_R$ | 2.42% | 1.20% | 0.21% | 0.15% |
| $A_M$ | 0.16% | -0.11% | -0.34% | -0.28% |
| $A_A$ | 0.15% | 0 | -0.07% | 0.01% |
| $ex$ and $q$ | -0.09% | -0.16% | -0.22% | -0.24% |
| Total | -1.39% | -0.47% | 0.26% | 0.13% |
| Total net of $K_{1928}$ | 0.10% | 0.22% | 0.36% | 0.20% |

Table 36: Impact of $\alpha_{A,K}$ on Effects on Labor Share, Capital and Output

| | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| Policy | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | -0.07% | 0.02% | 0.25% | -0.27% | -0.50% | -0.05% | -0.24% | 0.13% | 0.86% |
| $\tau_C$ | -0.75% | 0.41% | 0.11% | -2.05% | -1.41% | 0 | -2.38% | 0.94% | 0.13% |
| $\tau_W$ | -0.48% | -0.33% | 0.03% | -0.07% | -1.68% | -0.90% | -1.65% | -1.88% | -0.43% |
| $G_M$ and $\tau_R$ | 1.07% | 0.05% | -0.01% | 2.23% | 2.74% | 0.92% | 3.61% | 1.14% | 0.29% |
| $A_M$ | 0.11% | -0.11% | -0.10% | 0.38% | 0.28% | -0.07% | 0.43% | -0.29% | -0.36% |
| $A_A$ | 0.12% | -0.15% | -0.05% | 0.44% | 0.14% | -0.11% | 0.42% | -0.37% | -0.20% |
| $ex$ and $q$ | 0.01% | -0.05% | -0.05% | 0.02% | 0.08% | 0.02% | -0.02% | -0.13% | -0.20% |
| Total | -0.40% | -0.21% | 0.18% | -1.00% | -1.07% | -0.39% | -2.27% | -0.95% | -0.04% |

Table 37: Impact of $\alpha_{A,N} = 0.61$ on Welfare Decomposition

| | Gain from alternative policy for | | | |
|---|---|---|---|---|
| Policy | [28-40] | [28-∞] | [40-∞] | [40-∞], $K_{1940}$ |
| $\tau_K$ | -0.07% | -0.12% | -0.15% | -0.15% |
| $\tau_C$ | -0.98% | -0.48% | -0.22% | -0.22% |
| $\tau_W$ | 0.87% | 0.24% | -0.12% | -0.13% |
| $G_M$ and $\tau_R$ | -0.09% | -0.05% | -0.02% | -0.02% |
| $A_M$ | 0 | 0.02% | 0.02% | 0.03% |
| $A_A$ | 0.27% | 0.12% | 0.03% | 0.02% |
| $ex$ and $q$ | -0.12% | -0.13% | -0.14% | -0.14% |
| Total | -0.21% | -0.45% | -0.60% | -0.60% |
| Total net of $K_{1928}$ | -0.10% | -0.39% | -0.59% | -0.60% |

Table 38: Impact of $\alpha_{A,N}$ on Effects on Labor Share, Capital and Output

| Policy | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | -0.01% | -0.05% | -0.03% | 0.05% | -0.04% | -0.03% | -0.05% | -0.18% | -0.10% |
| $\tau_C$ | -0.45% | 0.03% | -0.01% | -0.80% | -1.17% | -0.31% | -1.38% | -0.23% | -0.17% |
| $\tau_W$ | 0.40% | -0.11% | -0.06% | 1.12% | 1.02% | 0.17% | 1.37% | -0.12% | -0.15% |
| $G_M$ and $\tau_R$ | -0.03% | 0 | 0 | -0.05% | -0.09% | -0.02% | -0.15% | -0.02% | -0.02% |
| $A_M$ | 0.01% | 0 | 0.01% | 0.01% | 0.07% | 0.02% | 0.02% | 0.03% | 0.01% |
| $A_A$ | 0.12% | 0.01% | -0.01% | 0.16% | 0.30% | 0.09% | 0.38% | 0.11% | 0.01% |
| $ex$ and $q$ | -0.02% | -0.05% | -0.03% | -0.02% | -0.05% | -0.05% | -0.09% | -0.15% | -0.12% |
| Total | -0.01% | -0.17% | -0.14% | 0.48% | 0.04% | -0.13% | 0 | -0.59% | -0.55% |

Table 39: Impact of $\alpha_{M,K} = 0.36$ and $\alpha_{M,N}$ on Welfare Decomposition

| | Gain from alternative policy for | | | |
|---|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | 0.35% | 0.71% | 0.98% | 0.96% |
| $\tau_C$ | -0.24% | 0.03% | 0.06% | 0.12% |
| $\tau_W$ | 0.56% | 0.17% | 0.05% | -0.01% |
| $G_M$ and $\tau_R$ | -0.78% | -0.35% | -0.01% | 0.01% |
| $A_M$ | -0.06% | -0.56% | -0.94% | -0.95% |
| $A_A$ | -0.10% | -0.06% | -0.03% | -0.05% |
| $ex$ and $q$ | -0.03% | 0.02% | 0.06% | 0.06% |
| Total | -1.83% | -0.78% | 0.08% | 0.06% |
| Total net of $K_{1928}$ | -0.29% | -0.03% | 0.17% | 0.14% |

Table 40: Impact of $\alpha_{M,K}$ and $\alpha_{M,N}$ on Effects on Labor Share, Capital and Output

| Policy | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | -0.21% | -0.56% | -0.45% | -1.20% | -2.88% | -2.75% | -0.63% | -0.82% | -0.12% |
| $\tau_C$ | -0.15% | 0.12% | 0.04% | -2.38% | -2.20% | -0.50% | -1.08% | 1.25% | 0.55% |
| $\tau_W$ | 0.33% | -0.11% | -0.08% | 4.64% | 2.87% | 0.98% | 1.97% | -1.10% | -0.19% |
| $G_M$ and $\tau_R$ | -0.12% | 0.03% | 0.01% | -1.36% | -1.14% | -0.28% | -1.37% | 0.13% | 0.06% |
| $A_M$ | -0.12% | -0.07% | -0.04% | -0.91% | -1.21% | -1.52% | -0.19% | -0.98% | -1.22% |
| $A_A$ | 0.14% | 0.03% | -0.02% | 1.16% | 0.92% | 0.29% | 0.40% | -0.30% | -0.16% |
| $ex$ and $q$ | 0 | -0.01% | 0 | -0.07% | -0.01% | -0.03% | -0.01% | -0.03% | 0.08% |
| Total | -0.17% | -0.55% | -0.53% | -0.78% | -4.29% | -3.99% | -3.10% | -2.27% | -1.12% |

Table 41: Impact of $\gamma_A = 25$ on Welfare Decomposition

|  | Gain from alternative policy for | | | |
| :---: | :---: | :---: | :---: | :---: |
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | 0.03% | 0.02% | 0 | 0.06% |
| $\tau_C$ | -0.69% | 1.06% | 0.66% | 0.67% |
| $\tau_W$ | 2.09% | 0.07% | 0.26% | 0.25% |
| $G_M$ and $\tau_R$ | -0.59% | -0.28% | -0.04% | -0.02% |
| $A_M$ | -0.03% | -0.01% | 0.01% | -0.01% |
| $A_A$ | 1.64% | 0.85% | 0.24% | 0.21% |
| $ex$ and $q$ | -0.38% | -0.22% | -0.09% | -0.09% |
| Total | 2.44% | 1.70% | 1.07% | 1.12% |
| Total net of $K_{1928}$ | 2.07% | 1.49% | 1.03% | 1.08% |

Table 42: Impact of $\gamma_A$ on Effects on Labor Share, Capital and Output

|  | Labor Share | | | Capital | | | Output | | |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Policy | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | 0.05% | 0.14% | -0.09% | -0.26% | -0.40% | -0.16% | 0.04% | 0.15% | -0.09% |
| $\tau_C$ | 1.37% | -0.36% | -0.11% | 2.38% | 3.11% | 0.74% | 3.01% | 0.33% | 0.12% |
| $\tau_W$ | -0.61% | 0.37% | 0.13% | -2.02% | -1.28% | -0.03% | -1.47% | 0.19% | 0.32% |
| $G_M$ and $\tau_R$ | -0.45% | 0 | 0.01% | -0.86% | -1.26% | -0.38% | -0.90% | -0.33% | -0.09% |
| $A_M$ | -0.12% | 0.05% | 0.05% | 0.06% | 0.09% | 0.07% | 0.05% | 0.06% | 0.16% |
| $A_A$ | 1.12% | 0.19% | 0 | 2.13% | 2.59% | 0.88% | 2.21% | 0.94% | 0.27% |
| $ex$ and $q$ | -0.16% | -0.17% | -0.15% | -0.33% | -0.41% | -0.31% | -0.37% | -0.33% | -0.19% |
| Total | 1.48% | 0.24% | -0.16% | 1.82% | 3.00% | 0.92% | 3.64% | 1.16% | 0.54% |

Table 43: Impact of $\eta = 0.2$ or $\eta = 0.02$ on Welfare Decomposition

|  | Gain from alternative policy for | | | |
| :---: | :---: | :---: | :---: | :---: |
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | 0 | 0 | 0 | 0 |
| $\tau_C$ | 0 | 0 | 0 | 0 |
| $\tau_W$ | 0 | 0 | 0 | 0 |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 |
| $A_M$ | 0 | 0 | 0 | 0 |
| $A_A$ | 0 | 0 | 0 | 0 |
| $ex$ and $q$ | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 |
| Total net of $K_{1928}$ | 0 | 0 | 0 | 0 |

Table 44: Impact of $\eta$ on Effects on Labor Share, Capital and Output

| Policy | Labor Share 28-36 | Labor Share 37-40 | Labor Share 1945 | Capital 28-36 | Capital 37-40 | Capital 1945 | Output 28-36 | Output 37-40 | Output 1945 |
|---|---|---|---|---|---|---|---|---|---|
| $\tau_K$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\tau_C$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\tau_W$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $A_M$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $A_A$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $ex$ and $q$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 45: Impact of $\beta = 0.93$ on Welfare Decomposition

| Policy | Gain from alternative policy for [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
|---|---|---|---|---|
| $\tau_K$ | 0.17% | -2.25% | 0.02 | -1.24% |
| $\tau_C$ | -0.69% | 0.73% | 1.64% | 0.26% |
| $\tau_W$ | -0.12% | -3.27% | -0.66% | 0.26% |
| $G_M$ and $\tau_R$ | -0.37% | 0.39% | 0.16% | -0.16% |
| $A_M$ | 0.85% | 1.61% | -1.43% | -0.94% |
| $A_A$ | -0.34% | -3.18% | -0.61% | 0.0% |
| $ex$ and $q$ | 0.04% | 0.31% | 0.63% | 0.50% |
| Total | -1.53% | -9.08% | -0.45% | -1.32% |
| Total net of $K_{1928}$ | -0.45% | -5.65% | -0.24% | -1.32% |

Table 46: Impact of $\beta$ on Effects on Labor Share, Capital and Output

| Policy | Labor Share 28-36 | Labor Share 37-40 | Labor Share 1945 | Capital 28-36 | Capital 37-40 | Capital 1945 | Output 28-36 | Output 37-40 | Output 1945 |
|---|---|---|---|---|---|---|---|---|---|
| $\tau_K$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\tau_C$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\tau_W$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $A_M$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $A_A$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $ex$ and $q$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 47: Impact of $\rho = 0.8$ on Welfare Decomposition

| Policy | Gain from alternative policy for | | | |
|---|---|---|---|---|
| | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | -3.91% | -7.55% | -10.27% | -9.96% |
| $\tau_C$ | -4.98% | -2.97% | -0.78% | -0.48% |
| $\tau_W$ | 9.43% | 4.00% | -0.89% | -1.03% |
| $G_M$ and $\tau_R$ | -2.21% | -1.16% | -0.32% | -0.19% |
| $A_M$ | -7.58% | -3.47% | -0.24% | -0.40% |
| $A_A$ | 3.08% | 2.43% | 1.88% | 1.63% |
| $ex$ and $q$ | 0.01% | -0.18% | -0.32% | -0.27% |
| Total | 4.99% | -3.85% | -10.60% | -10.34% |
| Total net of $K_{1928}$ | -6.14% | -8.89% | -10.94% | -10.68% |

Table 48: Impact of $\rho$ on Effects on Labor Share, Capital and Output

| Policy | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | 3.45% | -0.15% | 0.68% | 43.72% | 33.98% | 15.87% | 11.45% | -1.18% | -4.44% |
| $\tau_C$ | 2.08% | -1.14% | -0.47% | 45.68% | 44.65% | 13.47% | 15.28% | -8.34% | -2.43% |
| $\tau_W$ | -1.30% | 0.68% | 0.13% | -58.65% | -41.51% | -13.65% | -9.46% | 9.29% | 1.79% |
| $G_M$ and $\tau_R$ | -1.45% | 0.02% | 0.06% | 2.82% | 3.61% | 1.74% | -2.47% | -2.16% | -0.43% |
| $A_M$ | -0.30% | 0.59% | 0.61% | -10.44% | -19.88% | -5.05% | -14.57% | -2.10% | 0.38% |
| $A_A$ | -1.50% | 0.58% | 0.75% | -17.01% | -13.83% | -3.57% | -3.83% | 3.62% | 2.91% |
| $ex$ and $q$ | -0.07% | 0.13% | 0.10% | 0.39% | -0.03% | 0.55% | -0.12% | 0.45% | 0.03% |
| Total | 0.16% | 0.47% | 1.78% | 30.93% | 10.73% | 10.10% | 4.68% | 0.81% | -1.94% |

Table 49: Impact of $\tau_K$ on Welfare Decomposition

| Policy | Gain from alternative policy for | | | |
|---|---|---|---|---|
| | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | 0.23% | -0.90% | -1.74% | -1.74% |
| $\tau_C$ | 0.07% | 0.10% | 0.08% | 0.15% |
| $\tau_W$ | -0.04% | 0.09% | 0.22% | 0.17% |
| $G_M$ and $\tau_R$ | 0.02% | 0.01% | 0.01% | 0.03% |
| $A_M$ | 0 | -0.01% | -0.02% | -0.04% |
| $A_A$ | -0.02% | 0.01% | 0.03% | -0.01% |
| $ex$ and $q$ | 0 | 0.05% | 0.07% | 0.09% |
| Total | 0.25% | -0.64% | -1.34% | -1.35% |
| Total net of $K_{1928}$ | 0.26% | -0.65% | -1.35% | -1.34% |

# 4 Sensitivity to Projected Wedges

This section reports the results of a sensitivity analysis with respect to projections of the wedges into the future. In each exercise one of the projected long-term values for the wedges is changed to its alternative value reported in Table 2. Each alternative wedge value is used to evaluate welfare gains of policies and effects on key variables similarly to Tables 4 and 6. Tables 49 - 70 report incremental gains to Tables 4 and 6 coming from alternative assumptions about future fundamentals.

Each number in a Table represents an effect of a 1% change in a fundamental. If we believed that the data has a 2% std measurement error, and that each 1% change in a wedge translated into 2-3% std of the wedge as shown in Table , then we would multiply all numbers in the following Tables by a factor 4 to 6. This would give us the rough standard deviation of the confidence bounds on our main estimates due to potential measurement errors in the data. As is evident from the Tables, these confidence bounds are quite narrow.

Table 50: Impact of $\tau_K$ on Effects on Labor Share, Capital and Output

| Policy | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | -0.10% | -0.54% | -0.79% | -0.58% | -2.25% | -5.43% | -0.28% | -1.21% | -2.63% |
| $\tau_C$ | 0 | -0.04% | 0 | -0.11% | -0.08% | -0.21% | 0 | -0.10% | -0.01% |
| $\tau_W$ | 0.01% | 0.05% | -0.02% | 0.08% | 0.17% | 0.46% | 0.02% | 0.20% | 0.13% |
| $G_M$ and $\tau_R$ | -0.01% | -0.02% | -0.01% | -0.01% | -0.11% | -0.07% | -0.03% | -0.07% | -0.04% |
| $A_M$ | -0.01% | 0 | 0 | -0.04% | -0.02% | -0.02% | 0 | 0.05% | 0.11% |
| $A_A$ | 0.02% | 0.03% | 0 | 0.07% | 0.10% | 0.13% | 0.01% | 0.04% | 0.04% |
| $ex$ and $q$ | 0 | 0 | 0.01% | 0 | 0 | 0.02% | 0 | 0.03% | 0.05% |
| Total | -0.09% | -0.53% | -0.81% | -0.70% | -2.34% | -5.20% | -0.28% | -1.07% | -2.37% |

Table 51: Impact of $\tau_C$ on Welfare Decomposition

| Policy | Gain from alternative policy for | | | |
|---|---|---|---|---|
| | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | 0 | 0 | 0.01% | 0 |
| $\tau_C$ | 0.03% | 0.20% | 0.33% | 0.33% |
| $\tau_W$ | -0.01% | -0.02% | -0.03% | -0.04% |
| $G_M$ and $\tau_R$ | 0 | 0 | -0.01% | 0 |
| $A_M$ | 0 | 0 | 0 | 0 |
| $A_A$ | 0 | 0 | 0.01% | 0 |
| $ex$ and $q$ | -0.01% | -0.01% | -0.02% | -0.01% |
| Total | 0.03% | 0.18% | 0.29% | 0.29% |
| Total net of $K_{1928}$ | 0.03% | 0.18% | 0.28% | 0.29% |

Table 52: Impact of $\tau_C$ on Effects on Labor Share, Capital and Output

| Policy | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | 0 | 0 | 0 | 0 | 0.08% | 0 | 0 | 0.02% | -0.03% |
| $\tau_C$ | -0.01% | -0.07% | 0.20% | -0.09% | -0.36% | -0.05% | -0.04% | -0.17% | 0.27% |
| $\tau_W$ | 0 | 0.01% | 0 | 0.01% | 0.03% | 0.02% | 0.01% | 0.03% | -0.02% |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 | 0 | 0 | -0.01% | 0 | 0 |
| $A_M$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01% | -0.02% |
| $A_A$ | 0 | 0 | 0 | 0.01% | 0 | 0.02% | 0 | 0 | 0 |
| $ex$ and $q$ | 0 | 0 | 0.01% | 0 | 0.01% | 0.01% | 0 | 0.01% | 0 |
| Total | -0.01% | -0.06% | 0.20% | -0.07% | -0.24% | -0.01% | -0.03% | -0.11% | 0.19% |

Table 53: Impact of $\tau_W$ on Welfare Decomposition

| | Gain from alternative policy for | | | |
|---|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | 0 | 0 | 0 | 0 |
| $\tau_C$ | -0.01% | -0.02% | 0 | -0.01% |
| $\tau_W$ | 0 | -0.17% | -0.32% | -0.32% |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 |
| $A_M$ | 0 | -0.01% | -0.01% | -0.01% |
| $A_A$ | 0 | 0 | 0 | 0 |
| $ex$ and $q$ | 0 | 0.01% | 0.02% | 0.02% |
| Total | -0.01% | -0.17% | -0.30% | -0.31% |
| Total net of $K_{1928}$ | -0.01% | -0.18% | -0.31% | -0.30% |

Table 54: Impact of $\tau_W$ on Effects on Labor Share, Capital and Output

| | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| Policy | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | 0 | 0 | 0 | -0.01% | -0.04% | 0.10% | 0 | 0 | 0.05% |
| $\tau_C$ | 0 | 0 | 0 | -0.01% | -0.04% | 0.04% | -0.01% | -0.01% | 0.03% |
| $\tau_W$ | 0 | 0.02% | -0.24% | 0.04% | 0.17% | -0.33% | 0.02% | 0.06% | -0.35% |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 | 0 | 0.01% | 0 | 0 | 0 |
| $A_M$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01% |
| $A_A$ | 0 | 0 | 0 | 0 | -0.01% | -0.01% | 0 | -0.01% | 0 |
| $ex$ and $q$ | 0 | 0 | 0 | 0 | 0 | 0.02% | 0 | 0 | 0.02% |
| Total | 0 | 0.02% | -0.24% | 0.03% | 0.09% | -0.18% | 0.01% | 0.05% | -0.25% |

Table 55: Impact of $G_M$ on Welfare Decomposition

| | Gain from alternative policy for | | | |
|---|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | 0 | -0.01% | 0 | 0 |
| $\tau_C$ | -0.07% | -0.03% | -0.01% | -0.01% |
| $\tau_W$ | 0.06% | 0.02% | -0.01% | -0.01% |
| $G_M$ and $\tau_R$ | -0.06% | -0.29% | -0.48% | -0.49% |
| $A_M$ | 0 | 0 | 0 | 0.01% |
| $A_A$ | 0.01% | 0 | 0 | 0 |
| $ex$ and $q$ | -0.01% | -0.01% | -0.03% | -0.02% |
| Total | -0.06% | -0.32% | -0.52% | -0.52% |
| Total net of $K_{1928}$ | -0.07% | -0.32% | -0.52% | -0.52% |

Table 56: Impact of $G_M$ on Effects on Labor Share, Capital and Output

| | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| Policy | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | 0 | 0 | 0 | -0.02% | -0.20% | -0.21% | -0.01% | -0.04% | -0.06% |
| $\tau_C$ | 0 | 0 | 0 | -0.07% | -0.26% | -0.07% | -0.03% | -0.04% | -0.03% |
| $\tau_W$ | 0 | 0 | 0 | 0.08% | 0.18% | 0 | 0.02% | 0 | -0.02% |
| $G_M$ and $\tau_R$ | 0.03% | 0.13% | 0.24% | 0.15% | 0.78% | 0.63% | 0.07% | 0.35% | 0.53% |
| $A_M$ | 0 | 0 | 0 | 0.01% | 0 | 0 | 0 | -0.01% | -0.03% |
| $A_A$ | 0 | 0 | 0 | -0.01% | 0.01% | -0.01% | 0 | 0 | 0 |
| $ex$ and $q$ | 0 | 0 | 0.01% | 0 | 0.02% | 0.01% | 0 | 0 | 0 |
| Total | 0.02% | 0.13% | 0.25% | 0.18% | 0.58% | 0.35% | 0.07% | 0.27% | 0.38% |

Table 57: Impact of $\tau_R$ on Welfare Decomposition

| | Gain from alternative policy for | | | |
|---|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | 0 | 0 | 0 | 0 |
| $\tau_C$ | -0.02% | 0 | 0 | 0 |
| $\tau_W$ | 0.01% | 0 | 0 | 0 |
| $G_M$ and $\tau_R$ | -0.02% | 0 | 0.02% | 0.02% |
| $A_M$ | 0 | 0 | -0.01% | 0 |
| $A_A$ | 0 | 0 | 0 | 0 |
| $ex$ and $q$ | 0 | 0 | 0 | 0 |
| Total | -0.02% | 0 | 0.02% | 0.01% |
| Total net of $K_{1928}$ | -0.02% | 0 | 0.01% | 0.02% |

Table 58: Impact of $\tau_R$ on Effects on Labor Share, Capital and Output

| | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| Policy | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | 0 | 0 | 0 | -0.01% | -0.05% | -0.12% | 0 | -0.01% | -0.01% |
| $\tau_C$ | 0 | 0 | 0 | -0.02% | -0.06% | -0.04% | -0.01% | -0.01% | 0 |
| $\tau_W$ | 0 | 0 | 0 | 0.02% | 0.04% | 0 | 0.01% | 0 | 0 |
| $G_M$ and $\tau_R$ | 0.01% | 0.04% | 0.04% | 0.04% | 0.22% | 0.37% | 0.02% | 0.10% | 0.10% |
| $A_M$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $A_A$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -0.01% | 0 |
| $ex$ and $q$ | 0 | 0 | 0 | 0 | -0.01% | -0.02% | 0 | -0.01% | 0 |
| Total | 0.01% | 0.03% | 0.04% | 0.04% | 0.14% | 0.20% | 0.02% | 0.07% | 0.07% |

Table 59: Impact of $A_M$ on Welfare Decomposition

| | Gain from alternative policy for | | | |
|---|---|---|---|---|
| Policy | [28-40] | [28-∞] | [40-∞] | [40-∞], $K_{1940}$ |
| $\tau_K$ | 0 | 0 | 0.01% | 0.01% |
| $\tau_C$ | 0.03% | 0.06% | 0.02% | 0.01% |
| $\tau_W$ | -0.04% | -0.04% | 0.01% | 0.01% |
| $G_M$ and $\tau_R$ | 0 | -0.01% | 0 | 0 |
| $A_M$ | 0.04% | 0.53% | 0.92% | 0.92% |
| $A_A$ | 0 | 0 | 0.01% | -0.01% |
| $ex$ and $q$ | 0 | 0 | -0.01% | 0 |
| Total | 0.04% | 0.56% | 0.96% | 0.95% |
| Total net of $K_{1928}$ | 0.04% | 0.56% | 0.95% | 0.96% |


Table 60: Impact of $A_M$ on Effects on Labor Share, Capital and Output

| | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| Policy | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | 0 | 0 | 0 | 0 | 0.11% | -0.25% | 0 | 0.02% | -0.13% |
| $\tau_C$ | 0 | 0 | 0 | 0.04% | 0.15% | -0.09% | 0.01% | 0.02% | -0.08% |
| $\tau_W$ | 0 | 0 | 0 | -0.05% | -0.11% | 0 | -0.01% | 0 | -0.04% |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0.01% | 0.04% | -0.02% | 0 | 0 | -0.02% |
| $A_M$ | -0.02% | -0.08% | 0.09% | -0.10% | -0.49% | 0.73% | -0.04% | -0.20% | 1.03% |
| $A_A$ | 0 | 0 | 0 | 0.01% | 0 | 0.04% | 0 | 0 | 0.01% |
| $ex$ and $q$ | 0 | 0 | 0 | 0 | -0.01% | 0 | 0 | 0 | 0.02% |
| Total | -0.01% | -0.07% | 0.08% | -0.10% | -0.33% | 0.43% | -0.04% | -0.15% | 0.78% |


Table 61: Impact of $A_A$ on Welfare Decomposition

| | Gain from alternative policy for | | | |
|---|---|---|---|---|
| Policy | [28-40] | [28-∞] | [40-∞] | [40-∞], $K_{1940}$ |
| $\tau_K$ | 0 | 0 | 0.01% | 0.01% |
| $\tau_C$ | 0.02% | 0.03% | 0.01% | 0.01% |
| $\tau_W$ | -0.02% | -0.02% | 0 | 0 |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 |
| $A_M$ | 0 | -0.01% | -0.01% | -0.01% |
| $A_A$ | 0.03% | 0.26% | 0.44% | 0.43% |
| $ex$ and $q$ | -0.01% | -0.01% | -0.03% | -0.02% |
| Total | 0.02% | 0.25% | 0.42% | 0.41% |
| Total net of $K_{1928}$ | 0.02% | 0.25% | 0.41% | 0.42% |

Table 62: Impact of $A_A$ on Effects on Labor Share, Capital and Output

| Policy | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | 0 | 0 | 0 | 0 | 0.06% | -0.01% | 0 | 0.01% | -0.06% |
| $\tau_C$ | 0 | 0 | 0 | 0.02% | 0.09% | 0 | 0 | 0.01% | -0.03% |
| $\tau_W$ | 0 | 0 | 0 | -0.03% | -0.07% | 0 | 0 | 0 | -0.02% |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0.01% | 0.02% | 0 | 0 | 0 | -0.01% |
| $A_M$ | 0 | 0 | 0 | 0 | -0.03% | 0 | 0 | -0.01% | 0.05% |
| $A_A$ | -0.01% | -0.05% | 0.16% | -0.06% | -0.30% | 0.01% | -0.03% | -0.13% | 0.47% |
| $ex$ and $q$ | 0 | 0.01% | -0.01% | 0.01% | 0.03% | 0.01% | 0 | 0.02% | -0.03% |
| Total | -0.01% | -0.05% | 0.15% | -0.06% | -0.20% | 0.01% | -0.02% | -0.09% | 0.36% |

Table 63: Impact of $A_M$ growth on Welfare Decomposition

| Policy | Gain from alternative policy for | | | |
|---|---|---|---|---|
| | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | 0 | 0 | 0.01% | 0.01% |
| $\tau_C$ | 0.01% | 0.04% | 0.01% | 0.01% |
| $\tau_W$ | -0.01% | -0.02% | 0 | 0 |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 |
| $A_M$ | 0.01% | 0.30% | 0.53% | 0.54% |
| $A_A$ | 0 | 0 | 0.01% | 0 |
| $ex$ and $q$ | 0 | 0 | 0 | 0 |
| Total | 0.01% | 0.33% | 0.56% | 0.56% |
| Total net of $K_{1928}$ | 0.01% | 0.32% | 0.56% | 0.56% |

Table 64: Impact of $A_M$ growth on Effects on Labor Share, Capital and Output

| Policy | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | 0 | 0 | 0 | 0 | 0.03% | 0.02% | 0 | 0.01% | -0.02% |
| $\tau_C$ | 0 | 0 | 0 | 0.01% | 0.04% | 0.01% | 0 | 0 | -0.01% |
| $\tau_W$ | 0 | 0 | 0 | -0.01% | -0.04% | 0 | 0 | 0 | 0 |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 | 0.01% | 0 | 0 | 0 | -0.01% |
| $A_M$ | 0 | -0.02% | 0 | -0.03% | -0.14% | -0.10% | -0.01% | -0.06% | 0.21% |
| $A_A$ | 0 | 0 | 0 | 0 | 0 | 0.01% | 0 | 0 | 0 |
| $ex$ and $q$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01% |
| Total | 0 | -0.02% | 0 | -0.03% | -0.10% | -0.05% | -0.01% | -0.04% | 0.16% |

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Table 65: Impact of $A_A$ growth on Welfare Decomposition

| | Gain from alternative policy for | | | |
|---|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | 0 | 0 | 0.01% | 0 |
| $\tau_C$ | 0 | 0.02% | 0.01% | 0 |
| $\tau_W$ | -0.01% | -0.02% | 0 | 0 |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 |
| $A_M$ | 0 | -0.01% | -0.01% | -0.01% |
| $A_A$ | 0.01% | 0.23% | 0.40% | 0.39% |
| $ex$ and $q$ | -0.01% | -0.01% | -0.03% | -0.02% |
| Total | 0.01% | 0.22% | 0.38% | 0.37% |
| Total net of $K_{1928}$ | 0.01% | 0.22% | 0.37% | 0.38% |

Table 66: Impact of $A_A$ growth on Effects on Labor Share, Capital and Output

| | Labor Share | | | Capital | | | Output | | |
|---|---|---|---|---|---|---|---|---|---|
| Policy | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 | 28-36 | 37-40 | 1945 |
| $\tau_K$ | 0 | 0 | 0 | 0 | 0.02% | 0.06% | 0 | 0.01% | -0.02% |
| $\tau_C$ | 0 | 0 | 0 | 0.01% | 0.04% | 0.03% | 0 | 0 | -0.01% |
| $\tau_W$ | 0 | 0 | 0 | -0.01% | -0.03% | 0 | 0 | 0 | 0 |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 | 0.01% | 0.01% | 0 | 0 | 0 |
| $A_M$ | 0 | 0 | 0 | 0 | -0.01% | -0.03% | 0 | 0 | 0.01% |
| $A_A$ | 0 | -0.02% | 0.05% | -0.03% | -0.13% | -0.20% | -0.01% | -0.06% | 0.15% |
| $ex$ and $q$ | 0 | 0 | 0 | 0 | 0.01% | 0.03% | 0 | 0.01% | 0 |
| Total | 0 | -0.02% | 0.05% | -0.03% | -0.09% | -0.11% | -0.01% | -0.03% | 0.12% |

Table 67: Impact of $ex$ on Welfare Decomposition

| | Gain from alternative policy for | | | |
|---|---|---|---|---|
| Policy | [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
| $\tau_K$ | 0 | 0 | -0.01% | -0.01% |
| $\tau_C$ | -0.02% | -0.03% | -0.01% | -0.01% |
| $\tau_W$ | 0.01% | 0.01% | -0.01% | -0.01% |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 |
| $A_M$ | 0 | 0.01% | 0.01% | 0.01% |
| $A_A$ | 0 | -0.01% | 0 | 0 |
| $ex$ and $q$ | -0.02% | -0.24% | -0.41% | -0.41% |
| Total | -0.01% | -0.25% | -0.42% | -0.42% |
| Total net of $K_{1928}$ | -0.01% | -0.25% | -0.42% | -0.42% |

Table 68: Impact of $ex$ on Effects on Labor Share, Capital and Output

| Policy | Labor Share 28-36 | 37-40 | 1945 | Capital 28-36 | 37-40 | 1945 | Output 28-36 | 37-40 | 1945 |
|---|---|---|---|---|---|---|---|---|---|
| $\tau_K$ | 0 | 0 | 0 | -0.01% | -0.04% | 0.11% | 0 | -0.01% | 0.10% |
| $\tau_C$ | 0 | 0 | 0 | -0.01% | -0.05% | 0.04% | -0.01% | -0.01% | 0.06% |
| $\tau_W$ | 0 | 0 | 0 | 0.01% | 0.03% | 0 | 0.01% | 0 | 0.04% |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | -0.01% | -0.01% | 0.01% | 0 | 0 | 0.01% |
| $A_M$ | 0 | 0 | 0 | 0 | 0.02% | -0.05% | 0.01% | 0.01% | -0.09% |
| $A_A$ | 0 | 0 | 0 | 0 | 0.02% | -0.01% | 0 | 0 | -0.01% |
| $ex$ and $q$ | 0 | 0.03% | -0.51% | 0.02% | 0.13% | -0.29% | 0.01% | 0.06% | -0.67% |
| Total | 0 | 0.03% | -0.51% | 0.03% | 0.11% | -0.19% | 0.01% | 0.06% | -0.57% |

Table 69: Impact of $q$ on Welfare Decomposition

| Policy | Gain from alternative policy for [28-40] | [28-$\infty$] | [40-$\infty$] | [40-$\infty$], $K_{1940}$ |
|---|---|---|---|---|
| $\tau_K$ | 0 | 0 | 0 | 0 |
| $\tau_C$ | 0 | 0 | 0 | 0 |
| $\tau_W$ | 0 | 0 | 0 | 0 |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 |
| $A_M$ | 0 | 0 | 0 | 0 |
| $A_A$ | 0 | 0 | 0 | 0 |
| $ex$ and $q$ | 0 | 0 | 0.01% | 0 |
| Total | 0 | 0 | 0.01% | 0 |
| Total net of $K_{1928}$ | 0 | 0 | 0.01% | 0.01% |

Table 70: Impact of $q$ on Effects on Labor Share, Capital and Output

| Policy | Labor Share 28-36 | 37-40 | 1945 | Capital 28-36 | 37-40 | 1945 | Output 28-36 | 37-40 | 1945 |
|---|---|---|---|---|---|---|---|---|---|
| $\tau_K$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\tau_C$ | 0 | 0 | 0 | 0 | 0.01% | 0 | 0 | 0 | 0 |
| $\tau_W$ | 0 | 0 | 0 | 0 | -0.01% | 0 | 0 | 0 | 0.01% |
| $G_M$ and $\tau_R$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| $A_M$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -0.01% |
| $A_A$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -0.01% | 0 |
| $ex$ and $q$ | 0 | 0 | 0 | 0 | -0.01% | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | -0.01% | 0 | 0 | 0 | 0 |