Was Stalin necessary for Russia’s economic development?

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Economic historians consider Soviet industrialization as one of the few catch-up episodes in non-Western countries

Created an important global player

Is a quintessential example of Big Push

- Influenced generations of development economists
- Inspired top-down industrialization policies in many developing countries including China, India, and Turkey

But was it worth the unprecedented tragedies of famine, repression and terror?
Figure: Real GDP and sectoral labor share in Russia in 1885-1940.
Was Stalin Necessary?

- **General agreement**: Stalin’s policies unnecessarily brutal

- **Critics**: rapid growth may be just a catch-up to pre-WWI trend

- **Supporters**: Stalin’s policies fundamentally improved economic allocations

- **Main channels:**
  - “Big Push”: massive state intervention kick-starts productivity growth
  - Stalin’s policies “broke barriers” that existed under the tsars

(Rosenstein-Rodan (1943), Murphy, Schleifer and Vishny (1989), Allen (2003), Acemoglu and Robinson (2012))
This paper

- **Creates consistent dataset of aggregate and sectoral variables for Russia:**
  - under the tsars (1885-1913)
  - under Stalin (1928-1940)

- **Standard two-sector neoclassical growth model**
  - use sectoral data to measure wedges/distortions under different regimes
  - different policies map into different wedges, can help to differentiate between different stories

- **Counterfactuals: compare**
  - Simulated Tsarist economy (with tsarist’s distortions) (1914-…)
  - Stalin’s economy (1928-1940) and simulations without WWII (1941-…)
  - Extension of New Economic Policy (1921-28) until 1940 and post-1940
  - Japan (1885-1940) and extrapolation of Russian economy with Japan’s wedges
Japan as a counterfactual for Russia

![Graphs showing Real GDP per capita, Share of Labor Force in Agriculture, and Share of Value Added in Agriculture for Russia and Japan from 1885 to 1935.](image-url)
Main Results

- **Tsarist economy (1885-1913):**
  - substantial distortions, especially in the intersectoral labor wedge

- **Stalin's economy (1928-40):**
  - large welfare costs early on
  - eventually lower distortions but also lower productivity level

Consumption is significantly lower under Stalin than under tsarist counterfactuals in 1928-1940, but higher after 1940

- representative agent loses $-1$ to $-5\%$ under Stalin if born in 1928, gains $+8$ to $+16\%$ if born in 1941
- Stalin's gains include 5% due to change in trade – would take place anyway

Both paths are much worse than that of Japan

- representative agent gains $+31\%$ if born in Japan in 1928, gains $+23\%$ if born in Japan in 1941

Extrapolated “New Economic Policy” would perform same or better

- “NEP” would bring 0 to 20% to generation-1928, and $-3\%$ to $+28\%$ to generation-1941 relative to Stalin
Different views on Stalin’s economic policies

- Return to pre-WWI trend? X
  - Soviet economy eventually reaches a higher level
- Russia would have industrialized anyway? ?
  - no trends in distortions pre-WWI, distortions higher in 1928-29
  - Japan succeeded in the inter-war period despite similar dynamics pre-WWI
- Productivity growth? X
  - productivity is below trend in both sectors
- “Brutal way to break barriers”? ✓
  - distortions eventually go down, reallocation does take place
  - consistent with the view that autocratic ruler can improve allocations if far away from technological frontier, but hard to allocate resources efficiently
Theoretical framework: two-sector growth model (I)

- **Consumers:**

  \[
  \sum_{t=0}^{\infty} \beta^t \left[ \eta \log \left( c_t^A - \gamma^A \right) + (1 - \eta) \log c_t^M \right], \quad \gamma_A \geq 0
  \]

- **Producers:**
  - manufacturing (non-agriculture)
    \[
    Y_t^M = F_M \left( K_t^M, N_t^M \right) = A_t^M \left( K_t^M \right)^{\alpha_M} \left( N_t^M \right)^{\beta_M}
    \]
  - agriculture
    \[
    Y_t^A = F_A \left( K_t^A, N_t^A \right) = A_t^A \left( K_t^A \right)^{\alpha_A} \left( N_t^A \right)^{\beta_A}
    \]

- **Capital and labor shares:**

  \[
  \alpha_{K,A} + \alpha_{N,A} < 1
  \]

  \[
  \alpha_{K,M} + \alpha_{N,M} = 1
  \]
Theoretical framework: two-sector growth model (II)

- Goods market clearing:

\[ N_t c_t^A + ex_t^A = Y_t^A \]
\[ N_t c_t^M + ex_t^M + G_t^M + I_t = Y_t^M \]

- Labor and Capital markets clearing:

\[ N_t^A + N_t^M = \chi_t N \]
\[ I_t + (1 - \delta) K_t = K_{t+1} \]
\[ K_t^A + K_t^M = K_t \]

- Exports (exogenous at price \( q_t \)):

\[ q_t ex_t^A + ex_t^M = 0 \]
Benchmark: competitive equilibrium with no distortions

- Competitive equilibrium is optimal
- First order conditions \((p^M_t = 1)\):

\[
\frac{F_{M,K}(t)}{p_{A,t} F_{A,K}(t)} = \frac{r_M(t)}{r_A(t)} = 1
\]
\[
\frac{F_{L,K}(t)}{p_{A,t} F_{L,K}(t)} = \frac{w_M(t)}{w_A(t)} = 1
\]
\[
\frac{U_{C,A}(t)}{U_{C,M}(t)} = p_{A,t}
\]
\[
U_{C,M}(t) = U_{C,M}(t + 1) \beta (1 + F_{M,K}(t) - \delta)
\]

- The data will reject the implications of this frictionless economy
Economy with frictions

- Chari, Kehoe, McGrattan (2007) accounting procedure:
  - compute wedges from observed quantities/prices
  - Given these wedges, neoclassical equilibrium replicates data exactly.
  - In our context: $A_t^M, A_t^A, G_t, q_t ex_t^M, ex_t^A, K_0$ plus
    - **Inter-sectoral capital wedge:**
      \[
      1 + \tau_R(t) = \frac{F_{M,K}(t)}{p_{A,t} F_{A,K}(t)} = \frac{r_M(t)}{r_A(t)}
      \]
    - **Inter-sectoral labor wedge:**
      \[
      1 + \tau_W(t) = \frac{F_{L,K}(t)}{p_{A,t} F_{L,K}(t)} = \frac{w_M(t)}{w_A(t)}
      \]
    - **Price scissors:** (producer faces $p_{A,t}$ and consumer faces $\tilde{p}_{A,t}$)
      \[
      1 + \tau_C(t) = \frac{\tilde{p}_{A,t}}{p_{A,t}} = \frac{U_{C,A}(t)}{p_{A,t} U_{C,M}(t)}
      \]
    - **Intertemporal wedge:**
      \[
      1 + \tau_K(t + 1) = \frac{\beta U_{C,M}(t + 1)}{U_{C,M}(t)} (1 + F_{M,K}(t + 1) - \delta)
      \]
Create consistent dataset for aggregate and sectoral variables.

Tsarist period: data reconstructed using Gregory (1982).

Soviet period: data reconstructed using Moorsteen and Powell (1966) and Davies et al. (1993).

- Quantities are reliable, prices are not.
- Measure quantities in 1913 prices.
Brief History of Stalin’s economic policies

- Following tsars, WWI, Revolution, Civil War, New Economic Policy

- In 1928 Stalin consolidates power, two major economic reforms:
  - **Industrialization**: significant increase in state’s investment in manufacturing, especially in heavy industry
  - **Collectivization**: forced organization of peasants into communes, abolishing private property on means of agricultural production (horses, cows, plows, etc.)
    - “Price scissors”: a mechanism of surplus extraction
    - Peasants were forced to sell agricultural goods at artificially low prices.
Aggregate economic indicators in Russia in 1885-1940

- **Real GDP per capita**
- **Labor Share in Agriculture**
- **Agricultural Value Added to GDP in 1913 prices**
- **Investment to GDP ratio**
- **$p_A/p_M$**
- **Import and Export to GDP ratios**

Figure: CGGT ()

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Calibration

- **Russia and Japan are quite similar before 1913**
  - Use Hayashi-Prescott calibration of preferences and technology in Japan
  - No intermediate goods; assign to labor in $M$, land in $A$

- **Parameters from HP:**
  - **Utility:** $\beta = 0.96; \eta = 0.15; 1 - \eta = 0.85$
  - **Manufacturing sector:** $\alpha_{K,M} = 0.3; \alpha_{N,M} = 0.7$
  - **Agricultural sector:** $\alpha_{K,M} = 0.14; \alpha_{N,A} = 0.55$ (the rest is land)

  (also similar to Caselli and Coleman (2001))

- **Other parameters:**
  - **Subsistence** $\gamma^A$
    - set to 28 rubles per capita in 1913 prices;
    - 72% of agricultural consumption in 1885
  
  - **Fraction of labor force to population** $\chi_t$
    - set to 1897 census = 0.53;
    - slightly higher than 1926, 1939 census
Wedges
Intersectoral Labor Wedge

\[
\frac{(1+\tau_W)}{(1+\tau_C)} - 1
\]

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Russia with and without Communists

- **Tsarist counterfactual:**
  - Extrapolate average (1885-1913) tsarist wedges
  - Actual population for the whole period

- **1928-1940:** compare paths and welfare
  - Data under Stalin
  - Tsarist counterfactual

- **1941-onward (with no WWII):**
  - Simulated economy with Stalin’s average 1937-40 wedges
  - Tsarist counterfactual
  - Assume same TFP growth post-1940 (probably too generous for Stalin)

- These assumptions are probably biased in favor of Stalin
  - Stalin manages to grow TFP with tsarist trend
  - Tsar does not reduce wedges
Extrapolating Wedges

A_M

A_A

G_M/Y_M and ex_A/Y_A

\(\tau_W\) and \(\tau_R\)

\(\tau_C\)

\(\tau_K\)
Russia without the Communist Revolution

- **1928-1940**: Consumption in both sectors is significantly lower
  - Welfare loss **-24.1%** of consumption

- **1941-onward**: Consumption is higher under Stalin
  - Lower wedges lead to higher capital accumulation and reallocation of labor
  - Welfare gain **+16.5%** of consumption

- **Net effect on Generation 1928**: lifetime welfare loss **-1.0%**
### Wedges and Welfare: Decomposition

#### Stalin vs. Tsar

<table>
<thead>
<tr>
<th>Period</th>
<th>[28-40]</th>
<th>[28-∞]</th>
<th>[40-∞]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contribution</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\tau_K$</td>
<td>-2.2%</td>
<td>4.7%</td>
<td>9.9%</td>
</tr>
<tr>
<td>$\tau_C$</td>
<td>11.4%</td>
<td>13.0%</td>
<td>9.9%</td>
</tr>
<tr>
<td>$\tau_W$</td>
<td>-10.1%</td>
<td>-4.6%</td>
<td>3.6%</td>
</tr>
<tr>
<td>$A_M$</td>
<td>-1.9%</td>
<td>-6.6%</td>
<td>-10.2%</td>
</tr>
<tr>
<td>$A_A$</td>
<td>-15.4%</td>
<td>-7.4%</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Trade</td>
<td>5.5%</td>
<td>5.4%</td>
<td>5.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>-24.1%</td>
<td>-1.0%</td>
<td>16.5%</td>
</tr>
</tbody>
</table>
Effects of Policies on Welfare

- **Manufacturing TFP falls:** large welfare losses
- **Wedges fall:** long-run welfare gains
- **Trade collapse:** sped up transition, welfare gains
  - Hard to attribute to Stalin: ToT deteriorated in the 30s
## Stalin vs. Tsarist: Wedges and Structural Change

<table>
<thead>
<tr>
<th>Policy</th>
<th>$\Delta \frac{N_A}{N}$ in 1945</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\tau_K$</td>
<td>-3%</td>
<td>23%</td>
</tr>
<tr>
<td>$\tau_C$</td>
<td>-3%</td>
<td>24%</td>
</tr>
<tr>
<td>$\tau_W$</td>
<td>-4%</td>
<td>31%</td>
</tr>
<tr>
<td>$G_M$ and $\tau_R$</td>
<td>-0.3%</td>
<td>3%</td>
</tr>
<tr>
<td>$A_M$</td>
<td>0.4%</td>
<td>-4%</td>
</tr>
<tr>
<td>$A_A$</td>
<td>-0.2%</td>
<td>2%</td>
</tr>
<tr>
<td>Trade</td>
<td>-3%</td>
<td>21%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>-13%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
Alternative post-1940 growth scenarios

- Assuming Tsarist TFP trend post 1940 may be too favorable to Stalin
- Alternative scenario: extrapolate 1937-40 average trend

**Incremental results:**
-4.5% for generation-1928
-7.8% for generation-1940
Another counterfactual: What if NEP continued after 1928?

- Allen (2003): Industrialization, but NO Collectivization
  - Fast capital accumulation (low investment wedge)
  - Trend growth in TFP (no drop in 1930s)
  - Labor barrier intact (labor distortion fixed, price scissors fixed)

- Collectivization reduces welfare in the short run, improves allocations in the long run

- Problem:
  - NEP included post-war recovery hence very fast TFP growth (10% p.a.)
  - Clearly unsustainable
  - We use Tsarist trend 0.5% as a lower bound for post-1928
  - But also check the scenario with TFP growth at 2% (Japan post-war)
What if NEP continued: Wedges

[Graphs showing TFP, Wedges, and Normalized Wedges over time]

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What if NEP continued: Results

- Stalin vs NEP 0.5% and vs NEP 2%
- Collectivization is costly in the short-run, improves allocation in the long run
- NEP’s performance crucially depends on assumption about productivity

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<tbody>
<tr>
<td>( \tau_C )</td>
<td>-2.6%</td>
<td>3.0%</td>
<td>7.3%</td>
</tr>
<tr>
<td>( \tau_K )</td>
<td>6.5%</td>
<td>6.0%</td>
<td>1.6%</td>
</tr>
<tr>
<td>( \tau_W )</td>
<td>20.7%</td>
<td>26.5%</td>
<td>34.8%</td>
</tr>
<tr>
<td>( G_M ) and ( \tau_R )</td>
<td>4.0%</td>
<td>-0.5%</td>
<td>-3.9%</td>
</tr>
<tr>
<td>( A_M ) (0.5%)</td>
<td>-23.6%</td>
<td>-29.9%</td>
<td>-34.6%</td>
</tr>
<tr>
<td>( A_M ) (2%)</td>
<td>-30.1%</td>
<td>-50.8%</td>
<td>-66.0%</td>
</tr>
<tr>
<td>( A_A )</td>
<td>-8.4%</td>
<td>-4.1%</td>
<td>-0.8%</td>
</tr>
<tr>
<td>( ex ) and ( q )</td>
<td>-0.3%</td>
<td>-0.8%</td>
<td>-1.2%</td>
</tr>
<tr>
<td>Total (0.5%)</td>
<td>-3.7%</td>
<td>0.2%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Total (2%)</td>
<td>-9.8%</td>
<td>-20.1%</td>
<td>-27.7%</td>
</tr>
</tbody>
</table>
What if NEP continued: GDP

Real GDP per capita

- Stalin
- Tsarist Trend
- New Economic Policy (0.5%)
- New Economic Policy (2%)

PPP 1990 international dollars

1928 1935 1940 1950 1960

1400 1600 2000 2600 3200 3800 4400 5000
Russia and Japan undertake major economic reforms around the same time
- both because of fear of external aggression
- Similar growth rates and levels of GDP per capita 1885-1913
Alternative counterfactual: Stalin vs. Japan

- **Experiment**: Russia replicates Japanese transition after 1913:

\[
\tau^Rus_t = \tau^Rus_{1913} \times \frac{\tau^{Jap}_t}{\tau^{Jap}_{1913}}.
\]

- After 1940 take the average growth rate of wedges for 1928-1940.
Faster Manufacturing TFP growth in Japan

Barriers lower under Stalin, not enough to overcome TFP losses

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</tr>
<tr>
<td>$\tau_W$</td>
<td>3.5%</td>
<td>4.5%</td>
<td>12.4%</td>
</tr>
<tr>
<td>$A_M$</td>
<td>-17.4%</td>
<td>-36.6%</td>
<td>-53.1%</td>
</tr>
<tr>
<td>$A_A$</td>
<td>-12.9%</td>
<td>-5.7%</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Total</td>
<td>-41.3%</td>
<td>-31.0%</td>
<td>-22.7%</td>
</tr>
</tbody>
</table>
Conclusions

- **Stalin’s policies:**
  - Eventually lowered barriers and succeeded in reallocation
  - Substantial reduction in productivity

- **Welfare:**
  - Large short-run cost of policies
  - Modest long-run benefits
  - Short-run costs outweigh long-run benefits

- **Could Russia have done better?**
  - Projected tsars’ and Stalin’s policies much worse than experience of Japan
  - If tsarist or NEP economy managed to reduce at least some wedges to Japan’s levels, Russia would significantly outperform Stalin