POST-WAR GROWTH, PRODUCTIVITY CONVERGENCE AND RECONSTRUCTION

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I. INTRODUCTION

The most outstanding stylized facts of the economic development in the industrialized countries in the post-war period are the extraordinary high growth rates of output and labour productivity during the first quarter-century after the war. In this paper, it is argued that the growth miracles of the European countries and Japan during post-war reconstruction can be explained with neo-classical capital deepening and arguments from endogenous growth models, without referring to country-specific growth factors. The destruction of productive capacities implied a temporary deviation from the steady state, and a part of the high growth after the war can be understood as the return to the steady state. It is shown that the growth differences in the early post-war period 1947–1950 correspond closely to the gap between actual production and the technological potential of those countries, i.e. those countries which were most damaged by the war grew fastest afterwards.

A large part of the differences of productivity growth in the industrial countries since the fifties can be explained with growth models relying on knowledge spillovers, technological diffusion and convergence towards ‘best practice’ technology. However, the empirical analysis here reveals that aggregate cross-country analyses of the growth process should also take reconstruction effects into account. It is shown that those countries which grew fastest during the period 1950–1988 are again those which were most damaged during the war and which grew fastest during the early reconstruction phase 1947–1950. Of course, ‘pure’ reconstruction was probably responsible only for a small part of the economic success of those countries, since pre-war productivity levels were achieved already at the beginning of the fifties. However, the technological development had not stopped during the war, and the enormous growth in the early reconstruction phase had created an economic atmosphere with demand increases and high physical

1 I would like to thank the Editorial Board and a referee for helpful comments on an earlier version.
2 For overviews of this discussion, see Dumke (1990), Eichengreen (1995a) and Lindlar (1997).
and R&D investment which was favourable for economic growth afterwards.

The empirical results reveal that the standard arguments for productivity convergence since the fifties, i.e. neoclassical capital deepening and technological diffusion, should be augmented with specific arguments which were most favourable for the European countries and Japan during reconstruction. Firstly, the technological potential acquired during the war was still above actual production at the beginning of the fifties. Secondly, other authors emphasized the role of institutional factors for the fast reconstruction. For instance, Eichengreen and Uzan (1992) and Eichengreen (1995a) argue that the rebuilding of the market system, the Marshall Plan and the international cooperation within the GATT and the Bretton Woods exchange system contributed importantly to the recovery after the war.

The results in the paper can be compared with those of Crafts and Mills (1996) and the literature associated with the Janossy hypothesis. In contrast to this work, the results here neither imply convergence to country-specific trends nor do they imply convergence to a common growth rate. Instead, they indicate that the long-run development is dominated by convergence of total factor productivity levels towards best practice technology, based on the international diffusion of technological knowledge. The United States exhibited a rather low productivity growth rate since the fifties, and the European countries could achieve higher growth 1950–1980 because their initial productivity level was lower. This catching-up is based on capital deepening and technological diffusion. In addition, the catching-up was faster in the fifties due to the favourable circumstances during reconstruction. This can be understood as a catching-up with respect to the past.

The data source for the empirical investigation are Maddison’s (1991) long-run data on real GDP for 16 industrialized countries 1900–1989 and data on labour productivity 1950–1988 from the Penn World Tables (Summers and Heston, 1991) for the corresponding countries. After a brief discussion of the long-run trends of output and labour productivity, the analysis proceeds with a reassessment of the growth miracles in Europe during the early reconstruction phase 1946–1950, a recapitulation of productivity convergence since the fifties and a discussion of the sources of productivity growth during the fifties.

II. ECONOMIC GROWTH: A LONG-RUN PERSPECTIVE

The outstanding characteristic of figures of economic growth for the European countries and for Japan during this century is the breakdown of production at the end of World War II. After the war, many countries faced

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3 See also Hennings (1982), Dumke (1990) and Crafts and Toniolo (1996).
4 Crafts and Mills (1996) report unit root tests from the long-run data. For a discussion of this literature, see Dumke (1990).
a breakdown of production to about one half of pre-war levels. Reconstruction in Europe started soon after the end of the war and in 1950/1951, real output in the most damaged countries reached pre-war levels. The fifties brought a period of rapid growth with about a doubling of the capital stock, output and labour productivity.

The most outstanding stylized facts of the economic development since the fifties are the extraordinary high growth rates of labour productivity. However, growth rates slowed down since the seventies, and the United States who ‘... was the world’s most productive economy by virtually any measure’ (Nelson and Wright, 1992, p. 1931) for a long time after the war experienced a much slower rate of productivity advance almost during the whole period. The most prominent hypothesis for this development is the catching-up of the follower countries with respect to the leader. After the war, the United States was the productivity leader in virtually every industry. The most cited reason for this lead are the economies of a large market which permitted taking advantage of scale economies and knowledge spillovers. Another reason is the destruction of productive capacities and economic institutions in many European countries and in Japan during the war. The hypothesis for catching-up is that the reasons for the technological leadership of the United States had eroded. The increasing international cooperation through trade and foreign direct investment opened the opportunity for the followers to catch up. The waning of opportunities then offers a partial explanation for the observed slowdown of productivity growth since the seventies in the follower countries.

A theoretical background for the catching-up hypothesis is found both in the neoclassical growth model and in endogenous growth models. In neoclassical models, a country’s labour productivity growth rate tends to be inversely related to its starting level due to diminishing returns of reproducible capital. Many endogenous growth models, in contrast, focus on diffusion of technology through knowledge spillovers and vanishing differences of total factor productivity levels. A related argument relevant to the convergence debate is reconstruction growth. After the war, a large gap existed between actual output and the technological potential of many European countries and in Japan. Part of the high growth of those countries in the early post-war period can be attributed to the closing of this gap.

In the following analysis, it is shown that cross-country analyses of productivity growth and convergence in the post-war period should take these reconstruction effects into account. Reconstruction effects are firstly explained within the neoclassical growth framework. The destruction of

5See e.g. Abramovitz (1986), Baumol (1986) and Nelson and Wright (1992).
productive capacities by the war implied a temporary deviation from the steady state, and a part of the growth miracles of the European countries and Japan after the war was simply return to the steady state. This kind of reconstruction was probably responsible only for a small part of the economic success of those countries, since pre-war output levels were achieved already in 1950/1951. However, the technological development had not stopped during the war. In the paper, it is argued that the enormous growth in the early reconstruction phase was favourable to economic growth afterwards. These reconstruction effects can explain the successful growth performance of e.g. Germany and Japan in the fifties which often appear as outliers in cross-country analyses of the growth process in the post-war period.9

III. THE EARLY POST-WAR PERIOD: RECONSTRUCTION

During the war and immediately afterwards, many countries (Germany, Japan, Italy, Austria, France and the Netherlands) faced a breakdown of production to about one half of pre-war levels. The United States, in contrast, exhibited strong GDP growth during the war-time period 1939–1945. Reconstruction started soon after the end of the war 1945/1946, but in those years, the differences between the countries were still large. Especially in the Netherlands, in France and in Italy, strong reconstruction growth occurred already in 1946. Germany, in contrast, experienced the strongest breakdown of production in this year, and the United States exhibited a strong output reduction due to the return to peace-time output levels.

In the upper panel of Figure 1, average reconstruction growth during the years 1947–1950 is depicted against the war-time gap 1946 as compared with 1938.10 The remarkable feature of this figure is the strong correlation of reconstruction growth with the extent of war-time destruction, i.e. those countries which were most damaged by the war exhibited the strongest growth afterwards. On the one hand, Germany and Austria who started with output levels of about one half of pre-war levels in 1946 exhibited the strongest output growth of above 15 percent during the early reconstruction phase. On the other hand, the United States and Canada who experienced the strongest increase of production during the war exhibited low growth rates of only 3 percent. In between, the other countries which were less severely damaged during the war or experienced strong reconstruction growth already in 1946 exhibited growth rates of about 6 percent.


10Reconstruction growth is defined as the average growth rate of real GDP 1947–1950, and the war-time gap is defined as the logarithm of real GDP 1946 as compared with the pre-war GDP level 1938. The country codes correspond to those of Maddison (1991). Figure 1.1 in Eichengreen (1995a) depicts a similar result for a slightly different time period.
Figure 1. Reconstruction growth 1947–1950

Reconstruction growth: Growth rate of real GDP.
In the lower panel of the figure, the annual growth rates 1947–1950 are depicted against the war-time gap in $t - 1$ vs. 1938. The figure reveals that especially in Germany (marked in the figure) growth rates slowed down as the war-time gap reduced. A corresponding result is revealed for most of the other countries in Figure 2. The differences of the growth rates became smaller as the war-time gap closed.

In Table 1, some estimation results on reconstruction growth are reported. They firstly confirm the strong correlation of reconstruction growth and the extent of war-time damage. The war-time gap explains more than 80 percent of the variance of reconstruction growth rates of those countries (version 1). About 11 percent of the war-time gap 1946 vs. 1938 were closed each year 1947–1950. In addition, the past growth experience of the countries during the period 1920–1938 and the labour productivity gap vs. the United States in 1938 do not contribute significantly to the explanation of reconstruction growth (version 2–4). The source of the productivity data for 1938 is Maddison (1991). Corresponding data for 1946 were not available.

Figure 2. Annual reconstruction growth
and country-specific long-run trends were not important for this period. Note that reconstruction in Japan was slower, as compared with the wartime gap, and the United Kingdom experienced very slow growth during the years 1947–1950. However, a dummy variable for Japan did not prove significant and hardly changed the coefficient of the war-time gap.

In the panel below, some estimates with the pooled annual data are reported. They yield about the same results for reconstruction growth. With pooled data, about 52 percent of the variance of the annual growth rates can be explained (version 5); introducing time dummies for each year hardly affects the estimates (version 6); introducing country dummies for each country does not change the adjustment coefficient and increases the $R^2$ only slightly to about 59 percent (version 7).
Finally, in the bottom panel estimates for each year are reported. They reveal that the average adjustment with respect to the pre-war level is most significant in 1948 and 1949. In 1946, the differences between the countries were large, and for 1950, the coefficient of the war-time gap is much smaller. In addition, the standard deviation of the gap became smaller (from 0.43 in 1945 to 0.21 in 1950) and the standard deviation of the growth rates became smaller (from 0.24 in 1946 to 0.03 in 1950) as the output gap closed (see also Figure 2).

These empirical results reveal the fast recovery of output to pre-war levels in the most damaged European countries and in Japan. At the beginning of the fifties, those countries had achieved at least the pre-war level of production. The estimation results also show that the growth miracles of those countries in the early post-war period need not be explained with country-specific growth factors, but rather can be seen as the general development after the breakdown during the war. Most of the differences of reconstruction growth correspond closely to the extent of war-time damage. Even the timing of reconstruction growth rates can to a large extent be explained within the neoclassical growth framework as the return to the steady state level of production and within growth models relying on the stock of knowledge as the recovery of the technological potential of those countries, i.e. as a ‘catching-up with respect to the past’:

12For instance, Hennings (1982) discusses the importance of the inflow of qualified workers from the eastern area and institutional changes such as the monetary reform for reconstruction in Germany.

Cross section estimates, 16 observations. t-values in parentheses.
First, physical capital was not destroyed to the extent expected by observers in the early post-war period. For instance, Krengel’s (1958) estimates for Germany imply that war-time investments exceeded the extent of war-time damage.

Second, the help from the Marshall Plan contributed to the fast rebuilding of the capital stock. This argument was emphasized by Eichengreen and Uzan (1992).

Third, the technological potential which was achieved during the war in Europe and Japan was not destroyed by the war. Note that the level of production and investment during the war exceeded pre-war levels in many countries. In Germany, for instance, annual war-time investments in the investment goods industry were more than twice the value of 1936/37.13

Fourth, the breakdown of international trade during the war enhanced the efficiency gains from rising import and export shares after the war.

Finally, those countries were endowed with a well educated work force and quickly rebuild (restored) the necessary institutions for economic and technological advancement. This argument is emphasized by Abramowitz (1986), who coined the term of the ‘social capability’ for catching-up.

IV. PRODUCTIVITY CONVERGENCE 1950–1988

In the early post-war period, the United States was the productivity leader in virtually every industry. In 1950, the level of GDP per worker in the United States was about twice as high as the productivity level of the major European countries, three times as high as in Germany, Austria and Italy, and seven times as high as in Japan. The most prominent hypothesis for the catching-up of the follower countries after the war is that the reasons for the technological leadership of the United States had eroded. Trade in natural resources expanded and countries became less dependent on local materials, war-time deconstruction ceased to be important, and a large market for industrial products also emerged in Europe.

Productivity convergence can firstly be explained within the neoclassical growth framework.14 In neoclassical models, labour productivity growth tends to be inversely related to the level of productivity due to diminishing returns to reproducible capital. The destruction of productive capacities by the war implied a temporary deviation from the steady state, and a part of the high growth after the war can be explained as the return to the steady state; catching-up is simply convergence of capital-labour ratios. However, pre-war output levels were achieved already in 1950/1951, and standard

13See again Krengel (1958).
14See e.g. Maddison (1991), Barro (1991), and Mankiw, Romer and Weil (1992).
growth accounting exercises within the neoclassical model leave a large residual not accounted for by the growth of inputs.\textsuperscript{15} Models of technological diffusion, in contrast, focus on knowledge spillovers between firms and scale economies at the aggregate level to explain productivity convergence.\textsuperscript{16} During the fifties, markets and business had become more global, and national technology due to geographical proximity ceased to be important. Mass production technique became widespread, a large market of industrial products also emerged in Europe, and the increasing international trade implied that ‘... efficient companies producing attractive products increasingly faced a world market rather than a national market’ (Nelson and Wright, 1992, p. 1957). This development was accompanied by a large increase of foreign direct investment, and ‘best practice’ technology became available for everybody.

In Table 2, some estimation results on productivity convergence are reported. They firstly confirm the importance of catching-up for productivity growth. The productivity gap with respect to the United States in 1950 explains more than 90 percent of the variance of productivity growth rates 1951–1988 (version 1) and 1951–1973 (version 4). The estimated coefficient in version (1) corresponds to an annual rate of unconditional convergence obtained within the neoclassical growth framework of about 4

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<th>TABLE 2</th>
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<tr>
<td><strong>Labour productivity convergence 1950–1988</strong></td>
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<td>Average labour productivity growth</td>
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<tr>
<td>labour productivity gap vs. the United States 1950</td>
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<td>reconstruction growth 1947–1950</td>
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<tr>
<td>war-time gap 1946 vs. 1938</td>
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<tr>
<td>SEE</td>
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<td>$R^2$</td>
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Cross-section estimates, 16 observations. $t$-values in parentheses.

\textsuperscript{15}See e.g. Maddison (1991) and Dowrick and Nguyen (1989).

percent. Notice the rather slow adjustment of productivity levels with respect to the United States, as compared with the very fast adjustment of output to pre-war levels during the early reconstruction phase.18

These results confirm that productivity catching-up with respect to the United States should be an important ingredient of the explanation of productivity growth in the post-war period. However, the productivity data also reveal that those countries which grew fastest during the period 1951–1988 (Japan, Italy, Austria and Germany) are also those which were most damaged during the war and which grew fastest during the early reconstruction phase. In contrast, the lowest growth rates occurred in the United States, Canada and Australia, i.e. those countries which were not or hardly damaged during the war. In addition, the productivity gap with respect to the United States was to a large extent caused by war-time destruction.19

Finally, Germany and Japan are often mentioned as outliers in analyses of productivity convergence across countries 1950–1988.20

Therefore, in versions (2), (3) and (5), (6) it is tested for reconstruction effects on productivity convergence 1951–1988 and 1951–1973, respectively. For this purpose, the reconstruction growth rate 1947–1950 and the war-time gap 1946 vs. 1938 are added as explanatory variables. Both variables are not significant for the longer time period, but the results for the years 1950–1973 indicate some importance of reconstruction effects for this period. Since a large part of the productivity gap was closed in the fifties, a more detailed look at the productivity performance in this period appears worthwhile.

V. ECONOMIC GROWTH IN THE FIFTIES

In the upper panel of Figure 3, productivity growth of the industrial countries in the fifties is depicted against the productivity gap with respect to the United States in 1950. The above 6 percent productivity growth rates of Japan, Germany, Austria and Italy and the about 4.5 percent growth rates of France and the Netherlands are outstanding as compared with the about 3 percent growth rates of the other European countries and the about 2 percent growth rates of the United States, Canada and Australia. This does not

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17The implied annual rate of convergence \( \lambda \) can be calculated from \( -c \cdot t = 1 - e^{-\lambda \cdot t} \), where \( c \) is the estimated coefficient and \( t \) is the number of time periods. See Mankiw, Romer and Weil (1992), pp. 423–25.
18Results for sub-periods revealed that most of the catching-up occurred until 1980. For the eighties, the productivity gap hardly contributed to the explanation of productivity growth. This corresponds to the about constant productivity gap in this period. In 1980, the other industrial countries had achieved about 75 percent of the productivity level of the United States. See also Smolny (1999).
19For instance, Germany and Japan exhibited a lower productivity level 1950 as compared with 1938 and exhibited large output growth until 1943/1944. The highest war level of output in Germany, Austria and Japan was about 20 percent above the pre-war level 1938. See Maddison (1991).
Labour productivity growth 1951–1960, labour productivity gap vs. the United States 1950

Labour productivity growth 1951–1960, war-time gap 1946 vs. 1938


Source: Maddison (1991), Summers and Heston (1991)

Figure 3. Labour productivity growth in the fifties
contradict the explanation of productivity catching-up in terms of knowledge spillovers, technological diffusion and catching-up with respect to the United States. Those growth rates correspond largely to the respective productivity gap of those countries.

However, the high growth rates in the fifties also correspond to the extent of war-time destruction and the high growth rates during the early reconstruction phase (see the lower panels of Figure 3).

In Germany, Austria and Japan, the level of GDP 1946 was about one half of the pre-war level 1938. Correspondingly, output growth 1947–1950 in Germany and Austria exceeded 15 percent and was about 9 percent in Japan, Italy, France and the Netherlands.

The other European countries grew with rates of about 4 to 6 percent, and the United States exhibited a low growth rate of about 2 percent.

In Table 3, some estimates for the sources of productivity growth in the fifties are reported. In version (1), the productivity gap with respect to the United States is the only explanatory variable. The implied annual rate of convergence in the fifties is about 3.5 percent. In version (2) and (3), only the war-time gap of relative output 1946 vs. 1938 or the average growth rate during the early reconstruction phase 1947–1950 are included. The results reveal that the catching-up with respect to the past exhibits about the same explanatory power for productivity growth as the productivity catching-up

<table>
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<th>TABLE 3</th>
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<tr>
<td><strong>Labour productivity growth in the fifties</strong></td>
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<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
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<td>constant</td>
<td>0.015</td>
<td>0.039</td>
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<td>0.025</td>
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<td></td>
<td>(4.2)</td>
<td>(20.3)</td>
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<td>(−0.8)</td>
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<td>−0.021</td>
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<tr>
<td>1950</td>
<td>(−8.1)</td>
<td>(−3.1)</td>
<td>(−6.4)</td>
<td>(−3.5)</td>
<td>(−7.0)</td>
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<td>(−7.7)</td>
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<td>(−2.5)</td>
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<td>0.138</td>
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<td></td>
<td>(2.3)</td>
<td>(2.1)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>SEE</td>
<td>0.007</td>
<td>0.008</td>
<td>0.010</td>
<td>0.006</td>
<td>0.005</td>
<td>0.005</td>
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<td>$R^2$</td>
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<td>0.795</td>
<td>0.670</td>
<td>0.872</td>
<td>0.913</td>
<td>0.900</td>
<td>0.931</td>
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Cross section estimates, 16 observations. $t$-values in parentheses.
with respect to the United States. In both cases, about 80 percent of the cross-country variance of growth rates are explained.

In versions (4) and (5), the results of the combined model are reported. They reveal that reconstruction effects remain significant even after controlling for the productivity gap with respect to the United States. The productivity gap, the war-time output gap and the growth rate in the early post-war period exhibit a significant and quantitatively large effect on productivity growth in the fifties. The estimates imply that

- the catching-up with respect to the United States explains, on average, about one half of productivity growth in Japan, Germany, Austria and Italy,
- the catching-up with respect to the past explains about one third of productivity growth in Germany, Austria and Japan,
- productivity convergence and reconstruction effects together explain about 90 percent of the variance of productivity growth rates in the fifties,
- the estimated annual rate of convergence is reduced by about 1 percentage point by the inclusion of reconstruction effects.

Once again, excluding Japan from the sample hardly changes the estimated coefficients; instead, the estimated equation explains the development of Japan as well. In versions (6) and (7), the size of the countries (measured as the logarithm of the number of employees) and the investment share are added to the list of explanatory variables. Country size should approximate scale economies, and the results imply that large countries grew slightly faster, i.e. the results indicate some importance of scale economies. The coefficient of the investment share yields an estimate of the contribution of capital accumulation to the catching-up. On average, capital accumulation contributed slightly above 1 percentage point to the explanation of economic growth, i.e. less than the productivity gap with respect to the United States and less than the war-time gap and the reconstruction growth rate for the damaged countries. The results indicate that capital deepening captures a part of the reconstruction effect, the coefficients of the reconstruction variables became smaller. However, the reconstruction effects remain significant, and the productivity catching-up with respect to the United States even gains significance by the inclusion of the investment share. This confirms that catching-up reflects more than neoclassical capital deepening. Note that versions (6) and (7) can be interpreted as tests for conditional convergence within a neoclassical growth model. The implied annual rate of conditional convergence is about 2.5 percent, the implied production elasticity of physical capital is about 0.25.  

21 The source of the data is again Summers and Heston (1991).
22 Neither the population growth rate nor an indicator of human capital add to the explanatory power of the estimated equation.
These estimates show that capital deepening combined with arguments from growth models which place their emphasis on knowledge spillovers, technological diffusion and the stock of knowledge can explain the fast pace of reconstruction after the war, without referring to country-specific growth factors. The estimates also confirm that cross-country analyses of economic growth should take reconstruction effects into account, at least for the fifties.

Pure reconstruction was probably responsible only for a small part of the economic success of those countries, since pre-war productivity levels were achieved already at the beginning of the fifties. However, the technological development had not stopped during the war. War-time investment had increased the technological potential and resulted in a steady state level of output and productivity well above the pre-war level. The low level of production after the war and the help from the Marshall Plan had opened the opportunity for the high growth during the early reconstruction phase.

These growth dynamics, in turn, had created an economic atmosphere with demand increases and high physical investment, and endowed those countries with a highly productive capital stock. Growing markets, complementarities of physical and R&D investments, and increasing international competition had enhanced the opportunities and incentives for the implementation of new production technologies and the introduction of better products.

In addition, the breakdown of international trade during the war had enhanced the efficiency gains from rising import and export shares after the war. Growing international markets led to the realization of gains from specialization and scale economies also for the smaller countries, and technology spillovers from abroad enhanced technological opportunities. This development was further promoted by the advancement of international economic institutions which enhanced trade and competition. The regulations of the GATT had promoted trade and foreign competition through the abolition of trade barriers and the Bretton Woods exchange rate system promoted international cooperation and direct investment by guaranteeing a stable currency for the damaged industrial countries.

Finally, the industrialized countries were endowed with a well educated labour force and quickly rebuilt competitive economic systems and stable monetary institutions in the early post-war period which promoted domestic competition and investment (social capability for catching up). In this sense, the reconstruction effects are not different from the sources of economic growth as emphasized by growth theory, but the period of the fifties provided many opportunities for growth especially for those countries that were most damaged during the war.

23 For instance, the volume of exports in Germany, Austria, Italy and Japan was below pre-war levels in 1950 and more than tripled until 1960 (Maddison, 1991).

It might even be argued that reconstruction effects remained important also after 1960. However, an econometric analysis of reconstruction effects on productivity growth since 1960 within the framework here revealed positive but only weakly significant effects (see Table 4).

### VI. CONCLUSIONS

In this paper, it is shown that the high growth rates of output and labour productivity in many European countries and in Japan after the war can be explained with neoclassical capital deepening combined with arguments from endogenous growth models, without referring to country specific growth factors. The extent of war-time destruction can explain more than 80 percent of the differences of reconstruction growth in the early reconstruction phase. The productivity gap with respect to the United States together with the extent of war-time destruction and the growth dynamics in the early reconstruction phase can explain about 90 percent of the differences of productivity growth rates in the fifties. Reconstruction effects remained important after the pre-war level of output was achieved. Catching-up reflects more than neoclassical capital deepening.

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25For instance, Dowrick and Nguyen (1989) conclude that ‘... a large part of the success of Japan, Germany, Austria and France up until 1973 is not explained by our analysis. We can only speculate that post-war reconstruction may have played some part of their success’. (p. 1025).
It is also shown that cross-country analyses of productivity convergence and the growth process in the post-war period should take reconstruction effects into account. Reconstruction effects are as important for the explanation of productivity catching-up as the productivity distance with respect to the United States and more important than capital deepening for the fifties. These reconstruction effects increased the speed of convergence. Probably, those reconstruction effects lasted even longer into the sixties for some of the countries, especially Japan. They can explain the successful growth performance in many European countries and in Japan in the fifties which often appear as outliers in aggregate analyses of productivity convergence. Reconstruction growth can be understood as a catching-up with respect to the past.

The results finally indicate that corresponding growth miracles in the East European countries after the opening of the Iron Curtain should not be expected. The East European countries do not exhibit a comparable history of high output and productivity levels, but rather inherited the burden of mis-allocation and dis-incentives from the past. In addition, the process of catching-up with respect to best practice technology takes place at a much slower pace as compared with the fast catching-up with respect to the past during post-war reconstruction. It took 5 years to achieve a doubling of output in the early reconstruction phase until 1950. It took 10 years to achieve a doubling of labour productivity in the fifties, as both reconstruction effects and catching-up with respect to best practice technology contributed to the high growth. It took 20 years to increase the relative productivity of the industrialized countries as compared with the United States from 55 percent in 1960 to 75 percent in 1980.

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REFERENCES


26For a more detailed discussion, see Eichengreen and Uzan (1992).

