Introduction

This monograph revisits a major topic in the economic history of modern Germany. The quarter century that followed World War II has been enshrined in collective memory as perhaps the most remarkable era of macroeconomic stability and social progress in the Western world (Milward 1992). In striking contrast with the period that Churchill (1948) famously labelled the Second Thirty Years War, this 'golden age of economic growth' (Crafts 1995) was marked by an amalgamation of rapid technological advancement, widening prosperity, and sound governance. Among that of all the Western industrialised nations, the economic performance of West Germany during these decades was arguably the most impressive, especially against the backdrop of military defeat in 1945 and the disintegration in the years that followed. Astonished contemporaries thought of witnessing an 'economic miracle', and the notion of the *Wirtschaftswunder* found resonance in subsequent academic research at home and abroad. World War II inflicted an unprecedented scale of material damage upon the defeated, demoralised, and in large part displaced population of the Third Reich. The devastating impact of strategic bombing has been documented in both German and international historiography (see Mirzejewski 1988; Eichholz 1999; Friedrich 2002; and Tooze 2006). On the day of the unconditional surrender of all German land, sea, and air forces, not a single bridge spanned the Rhine, and industrial production had come to a standstill with the destruction of the transport system. Demolished buildings and roads clogged the urban landscape and scenes of human misery were impossible to avoid. Not surprisingly, contemporary observers were astounded by the rapidity with which the German economy propelled itself forward, akin to a phoenix rising from ashes.

The earliest accounts of the *Wirtschaftswunder* were in accord that the West German revival began in 1948 and that it was engineered by the combination of radical economic reforms and Western economic aid. The 'structural break hypothesis', as this institutional view has been referred to in German historiography, attributed an instrumental role to the Social Market Economy in the success of post-war reconstruction. Firmly in line with the 'Freiburg school' of liberal economics that dominated the political philosophy, even if not always the policy praxis, of post-war West German governments, this interpretation posited that the institutional framework of the Federal Republic was fundamentally different from that of Imperial Germany, Weimar, and the Third Reich, for it had been built on the ruins of a vanquished and devastated country.[1] Wallich (1955) presented the seminal critique of this traditional view by identifying favourable supply-side conditions and the reintegration of the Bonn Republic into the international economic order as 'the mainsprings of the German revival'. However, the notion of Ground Zero (*Stunde Null*) was still very much present in the subsequent writings of Hoffmann (1965) and Roskamp (1965). They believed, alongside many others, that the German growth miracle was driven by extraordinary levels of investment that replaced the outdated and largely destroyed productive arsenal of German industry, and thus they suggested an important catalysing role for economic policy.

A new wave stormed into the German historiography of the post-war era after 1966, when Jánossy (1969) proposed an inspiring theory to explain the economic miracles that the world had witnessed since 1945. In a nutshell, the 'reconstruction thesis', as the work of the prominent Hungarian economist has been referred to in the international literature, proposed that war-shattered economies would automatically recover to their long-run productive potential following the cessation of hostilities and the removal of the most immediate impediments to normal market activity. Wartime destruction and distortions in the efficient allocation of productive forces promised high returns on future investment, prompting accelerated capital accumulation in the reconstruction phase. Once the economy had returned to its long-run growth path, the rate of economic growth would abate abruptly and dramatically. The potential for further growth in productivity would depend solely on improvements in labour qualifications and technical knowledge.

The Jánossy thesis was published at a critical juncture during the first economic recession Germany had endured since the first years after the war, which signalled the end of the reconstruction period, but the role of reconstruction dynamics in post-war growth is, in fact, a much older notion. John Stuart Mill had already talked about a *vix mediatrix naturae* that lifted nations out of their devastation and restored them to their normal conditions (cited in Abelshauser 2004, 282). Modern

[1] For a general summary of this literature, see Klump (1985), 23–5 and Borchardt (1991), 99–103.

economists, including Milton Friedman, remarked on this phenomenon, claiming that the wartime dislocation of economies can give rise to extraordinarily high growth rates in the post-war period (Friedman quoted in Klein 1961, 291). Jánossy formalised this concept and applied it specifically to explain the growth miracles of his age. Abelshauser (1975, 1983), Manz (1985), and Borchardt (1991) introduced his pioneering work into the German literature. After two world wars and two severe interwar slumps, they argued, an 'accumulated developmental deficit made it possible, as long as it had not been fully absorbed, to achieve significantly higher growth rates of per capita national product than prior to the onset of [the above] crises' (Abelshauser 1983, 92). In turn, as the growth potential inherent in post-war reconstruction had been exhausted by the early 1960s, the ensuing slowdown of the West German economy was interpreted as the necessary outcome of re-convergence to an established growth path. This interpretation left little room for the political and economic reforms after 1948 as the propellers of the *Wirtschaftswunder*. Instead it introduced an economic dimension to the emerging revisionism in German historiography, exhibited most notably in the works of Fischer (1969, 1979) and Wehler (1973, 1975), that placed growing emphasis on historical continuities in the development of German society over the discontinuities brought by the major calamities of the early twentieth century.

The international scholarship on post-war growth also recognised the relevance of the Jánossy model (see Carlin 1996 and Crafts and Toniolo 1996, among others). Cliometric studies have confirmed the presence of a powerful reconstruction dynamic in Western industrialised nations during the 1950s (Dumke 1990; Wolf 1995; Temin 2002; Eichengreen and Ritschl 2009). My contributions to this literature have shown that the relative growth performance of member states of the Organisation for Economic Co-operation and Development (OECD) reflected, above all, the scale of post-war dislocation until the late 1960s (Vonyó 2008) and that the falling behind of Eastern European economies in the early post-war era was, in large part, due to significantly stronger reconstruction dynamics in the West (Vonyó 2017). My econometric analysis has confirmed that the reconstruction thesis has particularly strong predictive power for the West German growth record. The reconstruction effect was more persistent than it seemed to have been on the basis of earlier studies. The absorption of this unique growth potential, in turn, caused the sharp slowdown of the fastest-growing Western economies in the early 1970s. Nations shattered by war, Germany included, maintained their war-induced potential for high productivity growth even after their industrial and public infrastructure had been rebuilt and the bottlenecks to efficient factor allocation resulting from wartime destruction had been eliminated.

One of the key contributions of these cross-country investigations has been to integrate the Jánossy model into the broader literature on the drivers of post-war growth. The sheer vastness of this scholarship makes a comprehensive overview impossible and arguably superfluous. It is still in order here to delineate the most prominent interpretations, for they provide the context in which the West German growth miracle has to be understood. For three decades, the dominant view has seen post-war growth as the product of high investment in physical and human capital and cross-country convergence in productivity (Abramovitz 1986; Maddison 1991; Wolff 1991; Nelson and Wright 1992; Crafts 1995). This interpretation was derived from the neo-classical theory of economic growth that was itself the product of the post-war era (Solow 1956; Cass 1965). The seminal contributions in economics on cross-country convergence (Baumol 1986; Dowrick and Nguyen 1989; Barro 1991; Barro and Sala-i-Martin 1992; 1995; Mankiw, Romer, and Weil 1992) have all been conducted using harmonised cross-country data from this period.

Economic historians adopted the concept of conditional convergence mainly from Abramovitz (1986, 1994), who argued that catching up through successful technology adoption was conditional on the presence of adequate 'social capabilities for growth' and 'technological congruence' between converging economies. Both relate to the capacity of societies to accumulate a sufficient stock of physical and human capital and to use these endowments efficiently in the production process. European nations and Japan, it was argued, reached this developmental stage by the early post-war period, from whence they began to close the vast transatlantic productivity gap that had emerged since the nineteenth century. Subsequent empirical work has supported this view. The canonical article of Hall and Jones (1999) argued that the 'social infrastructure' of different countries determined the rate of accumulation in both physical and human capital as well as technological efficiency, and these factors, in turn, accounted for the striking variance in levels of labour productivity across countries. Economic historians (Crafts 1995; Broadberry 1996; Toniolo 1998) have shown that convergence in income and productivity between Western industrialised nations was much stronger during the post-war golden age than in any period before or since.

Comparative growth accounts (Maddison 1991, 1996; Crafts 1995; Van Ark 1996; O'Mahony 1999; Bosworth and Collins 2003; Crafts and Toniolo 2010) have confirmed that robust economic growth in post-war Europe was driven by both capital deepening, meaning the intensified use of production tools per unit of labour, and by advancements in productivity. O'Mahony (1996) showed that convergence in labour productivity between the United States, north-western Europe, and Japan from the 1950s to the late 1970s reflected convergence in both capital-labour ratios and joint factor productivity. Structural modernisation has long been viewed as an important source of catch-up growth in addition to capital accumulation. Denison (1967) was the first to show quantitatively that the growth miracles of several European countries were strongly associated with the reallocation of labour from agriculture to manufacturing and market services (see also Feinstein 1999). Kaldor (1966) argued that modern growth was driven by industrial expansion and thus the relative growth potential of different economies depended on their capacity to boost industrial employment. Temin (2002) showed that relative growth performance in Western Europe during the post-war golden age reflected substantial differences across countries in the share of agricultural employment at the start of the period. Broadberry (1997b), among others, stressed the role of the same factor in explaining the striking growth differential between West Germany and the United Kingdom.

In large part because of the influence of the reconstruction thesis, the theory of conditional convergence has featured much less prominently in German historiography. The main exception is the work of Lindlar (1997), who argued that the West German growth miracle should be understood within an international context and as the consequence of technological catch-up rather than post-war reconstruction. What neither cross-country investigations nor the literature on the *Wirtschaftswunder* explored in detail are the actual dynamics of reconstruction growth and the exact nature of wartime destruction and post-war dislocation. Focussing on the aggregate growth effect ignores perhaps the most critical contribution of the Jánossy thesis, in which reconstruction is understood as an inherently structural process that entails the reorganisation of production and the reallocation of production factors in post-war economies. Beyond the destruction of physical assets, the war caused serious distortions in the allocation of both capital and labour across industries and regions. This phenomenon, which Jánossy termed 'structural incongruence', represented a unique source of growth. Subsequent investment and organisational efforts aimed at restoring the structural balance, in other words reducing the disproportion and misallocation of the complementary factors of production, were bound to generate high growth. This more nuanced interpretation of the Jánossy model concurs with the revisionist historiography of the West German growth miracle, which argued that the war had merely dislocated the German economy; it had not destroyed its foundations.

Even though, economically, the notion of Ground Zero has been considered out of date in the prism of this literature, it has survived, at least in a subtler version. Hockers (1986) formulated the concept of a foundational crisis (*Gründungskrise*) to emphasise the severity of the political and socioeconomic challenges that the early post-war years had imposed on Germany and that its subsequent growth miracle so remarkably cleared from collective consciousness. In this conceptualisation, the reconstruction process is to be evaluated against these inauspicious starting conditions. This view demands the incorporation of political decisions about the legal and economic constitution as well as the social infrastructure of post-war Germany into any comprehensive study on the revival of the West German economy. Historical accounts emphasising the role of the post-war economic reforms retained some ground in the literature not least thanks to the new institutional theories that offered an alternative explanation for the uniqueness of the golden age in the history of advanced Western democracies.

In a hugely polemical thesis, Olson (1982) postulated that stable democracies were eventually doomed to face a slowdown of economic growth because the undisturbed accumulation of 'distributional coalitions' would gradually undermine the efficient functioning of markets through the misallocation of resources and the incomes generated by their application. Olson located the origins of post-war supergrowth in the defeated powers of Germany, Japan, and Italy precisely in these very dynamics. He argued that the demolition of distributional coalitions, both trade unions and corporatist industrial organisations, by the authoritarian or totalitarian regimes between the wars, and under Allied occupation after 1945, allowed free markets to function more efficiently than in many stable democracies hampered by bad institutional legacies. Even when special interest groups re-emerged after 1950, they were more encompassing and less distortive to market mechanisms than their predecessors had been until the 1920s. Murrell (1983) developed an Olsonian view of post-war Germany postulating that the institutional inertia associated with the corporatist organisation of German industry were effectively swept away between 1933 to1948 and that, therefore, the institutions of the West German economy in the 1950s should be regarded as new.

Eichengreen (1996, 2007) offered a more elaborate and more widely accepted explanation for the persistence of high growth rates in post-war Europe. To the extent that economic growth emerges from the shifting of resources from present-day consumption to investment in future gains, economic development is conditioned by the social contract between employees and employers on how to redistribute profits between labour and capital. In dynamic game theory, the social contract is undermined by what economists call the time inconsistency of optimal plans. Workers have no incentive to support wage moderation if they are not certain that firms reinvest their profits, and firms have no incentive to reinvest profits if they are not sure that unions will accept wage moderation in return. Eichengreen saw the institutional reforms of the early post-war era and, in particular, the enhanced role of governments in industrial relations as novel contract-enforcement mechanisms binding social partners to their commitments. This, together with international trade liberalisation and the avoidance of competitive devaluations thanks to the international monetary regime conceived at Bretton Woods, was instrumental in sustaining an equilibrium characterised by high investment, high productivity, and wage moderation in most Western economies during the golden age and that facilitated convergence between them. Eichengreen and Iversen (1999) provided empirical support for this view. This interpretation has placed the Social Market Economy into an international perspective. As Spoerer (2007) has recently argued, if West German catch-up after the war was a miracle, then it was a European rather than a German miracle, at least one shared by the Western economies that introduced some form of coordinated capitalism.

Economic historians, for the most part, have been critical of these new institutional interpretations. The year 1945 did not represent a *tabula rasa* in the evolution of political, social, and economic institutions (Maier 1981; Reich 1990). Trade unions and industrial organisations managed to regroup very shortly after the war and, in reality, did not become significantly more encompassing than they had been in the interwar period (Booth, Melling, and Dartmann 1997). The development of institutions in the former belligerent nations showed more signs of continuity than discontinuity, and the differences one can observe in the characteristics of distributional coalitions across countries cannot account for the large variance in growth rates among Western economies in the 1950s and 1960s (Paqué 1994; Ritschl 2005). Recent research has shown that even in Scandinavia wages, in fact, increased faster than productivity during the golden age, and that the result of wage bargaining depended on power relations and trade union ideology rather than on government regulation (Bengtsson 2015). There is equally scarce evidence to support the existence of a broadly based social consensus in post-war Germany. The presence of surplus labour rather than institutional reforms was the prime reason for wage moderation and accelerated capital accumulation in the reconstruction phase (see especially Paqué 1995). This view concurs with the theory of Kindleberger (1967), in which labour-supply flexibility arising from underemployment in agriculture, rising labour participation, or immigration limited real-wage growth and thereby made investment more profitable in post-war economies. Investment in new technology, in turn, enhanced labour productivity, which further raised the profitability of investment.

Just as John Maynard Keynes in *The Economic Consequences of the Peace* forecasted that the troubles of interwar Europe would be the outcome of the Carthaginian peace settlement of 1919, *The Economic Consequences of the War* postulates that the origins of post-war growth in Europe, and West Germany in particular, are to be searched in the calamities of the 1940s and the economic conditions they had left behind. My aim has been to add quantitative substance to the existing literature of the *Wirtschaftswunder* with a detailed account of industrial development, both its internal and external determinants, in wartime and post-war Germany. The thorough analysis of contemporary statistical material and the vast secondary literature that, in large part, has remained unknown to the international audience, revisits the origins of the West German growth miracle in five major chapters.

Chapter 1 gives an overview of the early years of post-war recovery in West Germany between 1945 and 1948, which set the stage for the growth miracle that followed. I open with an audit on the impact of the war on productive capacity and the labour force. As the title of the grand memoir from Meinecke (1946) suggested, the outcome of six years of carnage and twelve years of totalitarianism was nothing short of catastrophic. The earliest accounts painted a gloomy picture about the long shadow of the war. They estimated that much of the pre-war capacity of West German industry had been destroyed and, on this basis, accentuated fears of 'deindustrialisation' (Niederschlag 1947; Eisendraht 1950). Such claims were soon proved erroneous, when the reports of the United States Strategic Bombing Survey were published and made available to researchers. Subsequent analyses of this material revealed that the productive assets of the German economy had survived the war with remarkably little damage, and that the industrial capital stock had even increased substantially, despite wartime destruction, as a result of colossal investments in new equipment during the late 1930s and early 1940s. Moreover, in spite of the initial intentions to the contrary, the dismantling of machinery under the post-war reparations regime was surprisingly modest in scale.

Post-war West Germany was also endowed with a plentiful supply of labour. Even with the enormous wartime casualties, especially among men of working age, there was robust population growth between 1939 and 1950. This was the joint consequence of the expulsion of ethnic Germans from East and Central Europe, in accord with the Potsdam Agreement, and the exodus of refugees from the part of post-war Germany under Soviet occupation. However, a deeper introspection into the literature and the examination of census data offers a differentiated picture. Both the age and gender composition of West German society were severely distorted, and millions of returning soldiers were often physically or mentally incapacitated for work. The miserable urban living conditions and poor public health of the late 1940s further limited the ability of industrial firms to draw on these labour reserves.

The final section of the chapter reviews the literature and contemporary sources on the economic institutions of Allied occupation and how they inhibited post-war recovery in West Germany. The two most important features were the lack of a stable currency, on the one hand, that made rigid price controls and widespread rationing necessary and severe restrictions on foreign trade on the other, which resulted in recurrent shortages of input materials in several industries. Together, they had created a shortage economy, in which firms were guided by the principle of resource hunger rather than profit maximisation, and where conventional trade practices were replaced by barter. As money wages were practically worthless, industrial employers could provide little incentive for their workers, and absenteeism was rampant. These conditions, the literature has proposed, prevailed until the currency and market reforms of July 1948 and the lifting of import restrictions in 1949 restored business confidence; rationalised the use of production inputs; and, with the help of Western aid, eliminated most of the remaining production bottlenecks.

Chapter 2 challenges this consensus and demonstrates that the impact of post-war dislocation on West German industry was much more persistent than previously argued. The economy remained dislocated until the early 1950s, even though the raw material shortages and institutional chaos of the immediate post-war years had already been overcome. The chief limiting factor of industrial expansion was the regional misallocation of labour that resulted from the wartime destruction of the urban housing stock. On paper, German industry had ample endowments in factors of production at the start of its post-war recovery. Still, production levels were well below their pre-war peak even by 1950. Available capacities in urban industry, which had been considerably enhanced during the war, remained underutilised, even though demand for manufactures was booming at both domestic and international markets. By contrast, mass unemployment raged over the countryside, which had seen its productive assets diminished after 1939, when the resources of the rural economy were systematically diverted for the purposes of war production.

As the influx of expellees and refugees from the East swelled the population of rural and small-town Germany, urban labour scarcity coexisted with rural unemployment and capital shortage. Under normal economic conditions, factor markets would have cleared, but the urban housing deficit was far too large to surmount without extensive state intervention, which was not feasible before the establishment of a sovereign West German government and the restoration of functioning capital markets. These conditions, in turn, created the potential for a growth miracle in the 1950s. The temporarily displaced labour reserves of the country were gradually absorbed as the urban housing stock was rebuilt in a gigantic national housing program between 1949 and 1957. At the same time, the rural economy with its surplus labour could build up capital rapidly in an era of high rates of investment and wage moderation. Reconstruction growth in the early 1950s was driven by the improved allocation of productive forces, induced by relative scarcities in the complementary factors of production: labour and capital. The analysis of detailed regional statistics reveals the geographic dimension of the West German growth miracle that the literature had previously overlooked. It contributes to the growing body of quantitative work on historical economic geography, particularly to a recent line of research on the lasting impact of war-induced shocks on local economies (Fishback and Cullen 2013; Brakman, Garretsen, and Schramm 2004).

Geography was only one dimension of post-war dislocation in the German economy; production structure was another. Chapter 3 presents an in-depth account of industrial development in West Germany from the late 1930s to the late 1960s. Methodologically, I follow the standard growth accounting approach, originally developed by Solow (1957) and commonly used by economists to isolate the contributions of factor accumulation and productivity advancements to economic growth (see Crafts 2009). Drawing from contemporary statistical data, I construct index numbers for net industrial production, labour input expressed in annual hours worked, and the stock of physical capital in thirty-two branches of mining and manufacturing. With this dataset I compute labour productivity at the industry level, and use these estimates to determine Total Factor Productivity, the residual in growth-accounting formulae that measures the overall efficiency with which the factors of production are used. Finally, I apply simple decomposition techniques to demonstrate the contribution of individual industries and structural change to aggregate labour-productivity growth.