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End of previous Forum article

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Convergence of the German Bundesländer: Lessons for the EU*

Evaluating real convergence or divergence in the EU is challenging because it is difficult to find an appropriate counterfactual or comparison benchmark, or to formulate one. Should we compare the status quo with convergence that would have been obtained had the European Union (EU) never existed? Or under different monetary arrangements – flexible or fixed exchange rates, or a monetary union? With or without deep trade integration, or factor mobility as in the United States? I will exploit recent research and discuss real convergence in the EU, using the new and old German *Bundesländer* (states) since reunification as a foil for the integration process. German unification provides an excellent laboratory: an economy populated by Europeans with labour and capital mobility unimpeded by national boundaries, trade barriers, or culture, tradition and institutions after 1990.[1]

My answer will disappoint those who expected or even promised *blühende Landschaften* (blossoming landscapes) in the new Eastern Länder. While incomes per capita and standards of living have indeed converged, value added per capita has not and shows little sign of doing so soon. The agglomeration of economic activity has led to persistent variation of value added and income per capita, even in a densely populated economy like Germany's. Furthermore, there is little evidence that the previous centres of industrial agglomeration that arose in the late 19th century will reassert themselves. Rather, the German integration process is best described as a culmination of shocks with persistent if not permanent character. Unification can be seen as one in a long sequence of shocks to regional production possibilities.

A crucial element of the discussion is the distinction drawn by Barro[2] and Barro and Sala-i-Martin[3] between absolute and conditional convergence. On the metric of productivity, is it reasonable to expect countries or regions within countries to converge at all? In my assessment of East-West German integration, the answer is no. Rather than imposing the same aggregate production possibilities on the nations or regions of Europe, it is more reasonable to consider each as producing with an individualised level of total factor productivity that is as much predetermined by technical progress as by the cumulative forces of history, economic geography and luck. This, in turn, has implications for the persistence of long-term inequality that can be expected in Europe without explicit transfers.

A theoretical framework for thinking about regional integration

It is important to begin with a definition of economic integration. Two different perspectives are important: the first involves efficiency, while the second stresses notions of equity or fairness. The first definition, which is certainly more palatable to economists, follows Eichengreen[4] and

* Summary of talk at Intereconomics/CEPS Conference "Economic Convergence or Divergence in the EU?", Brussels, 9 October 2018.

1 M. Burda, B. Severgnini: Total factor productivity convergence in German states since reunification: Evidence and explanations, in: Journal of Comparative Economics, Vol. 46, No. 1, 2018, pp. 192–211; M. Burda, M. Weder: The Economics of German Unification after Twenty-Five Years: Lessons for Korea, Working Paper, Adelaide School of Economics, July 2017.

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2 R. Barro: Economic Growth in a Cross Section of Countries, in: Quarterly Journal of Economics, Vol. 106, No. 2, 1991, pp. 407-443; R. Barro: Convergence and Modernization, in: Economic Journal, Vol. 125, 2015, pp. 911-942.

3 R. Barro, X. Sala-i-Martin: Convergence across States and Regions, in: Brookings Papers on Economic Activity, Vol. 1991, No. 1, 1991, pp. 107-182; R. Barro, X. Sala-i-Martin: Convergence, in: Journal of Political Economy, Vol. 100, No. 2, 1992, pp. 223-251; R. Barro, X. Sala-i-Martin: Economic Growth, New York 1995, McGraw Hill.

4 B. Eichengreen: One Money for Europe: Lessons from the US Currency Union, in: Economic Policy, Vol. 5, No. 10, 1992, pp. 117-188.

associates economic integration of two or more regions with achieving the best allocation of resources made possible by their union. The counterfactual is usually taken to be a parallel existence of neoclassical convergence à la Barro and Sala-i-Martin.[5] "Best" is usually, but not necessarily, measured in terms of GDP per capita and without regard to the owners of production factors. Alternatively, the definition of integration focusing on equity or fairness stresses achieving a quantifiably low dispersion of income per capita, happiness, health, or some other measurable indicator of well-being. To the extent that the ownership of capital is highly concentrated, this would in turn implicate the functional distribution of income.

This framework for thinking about economic integration involves not only markets for goods and services, but also for factors of production (capital and labour). The benchmark is economic growth predicted by standard growth models of closed economies, explicitly recognising the role of transfers of information, ideas and institutions. In fact, the Federal Republic of Germany and the German Democratic Republic (GDR) operated side by side until 1990 with remarkably little interaction. On an efficiency criterion, home-grown economic growth is augmented by trade in goods of different factor intensities (factor-proportions trade), labour mobility and capital mobility. Each of these mechanisms contribute to attaining the efficiency criterion via goods and factor price convergence, with many possible steady states outcomes. The speed at which these mechanisms operate determines their roles in the integration process. In the environment of a common currency, trade in goods and services between East and West exploded after unification, leading to product price convergence and the rapid bankruptcy of many East German production units. West German producers saw the East more as a retail market to be conquered than a set of potential production locations. They also seemed to have anticipated the massive mobility of younger, well-trained East German workers who could increase their labour income by three or four-fold by migrating to the West. As economic theory predicts, outmigration attenuated the pace of capital mobility and ultimately required government capital subsidies, giveaways by the state property agency (Treuhandanstalt) and accelerated depreciation (especially for residential investment) as a sweetener for investment commitments in the East.

Central for the success of German integration was the relative absence of institutional uncertainty. East Germany joined the Federal Republic of Germany under the terms of the latter's constitution, and with few exceptions, the rules of the game in West Germany were adopted by the new states. At the same time, the East was open to a flood of new knowledge and best practice. This transfer of ideas and institutions was offset by a system of revenue sharing and fiscal transfers considered by some to have induced a fiscal poverty trap.[6]

It is important to stress several political constraints in Germany at the outset that are absent in the European context. Politicians had no choice but to accept labour mobility at its natural level given the demands of complete mobility within a unified Germany; anything less would have meant no unification at all. Similarly, calls for low tax regimes in the East, on incomes and on value-added, were rejected on the grounds that they would become permanent. This fear was justified, given the continued existence of the income tax surcharge paid by all German taxpayers since 1991 to finance unification (*Solidaritätszuschlag*). For the same reason, the privatisation of the capital stock of the state-planned GDR economy was hastily completed by 1994, reflecting fears that political forces resisting the market economy would prevent Eastern Germany from becoming a market economy.[7]

The integration scorecard in reunified Germany, 25 years later

It is tempting to view German integration in terms of equity-based criterion, and to see it as an unadulterated success. In 1991, per capita disposable income in the new Länder (including Berlin) was 57% of that in the West; by 2016 it had risen to 85% of the western average, virtually the same relation as between Saarland and Bavaria, the poorest and richest West German states. Per capita consumption of Eastern Germans had already reached 85% of Western levels by 2001. Data from the Federal Statistical Office on ownership of cars, household appliances and other consumer durables confirm this impression of convergence. Life expectancy, a convincing measure of living standards, converged dramatically after a gap had widened following the mid-1970s. The difference in female life expectancy in the East closed from three years in the late 1980s to zero by 2005; for men, the gap declined from three-and-a-half years to just over one. One of the most convincing statistics of all, taken from Pew Research, shows that East Germans are just as satisfied

5 R. Barro, X. Sala-i-Martin: Economic Growth, op. cit.

6 N. Potrafke, M. Reischmann: Fiscal Transfers and Fiscal Sustainability, in: Journal of Money, Credit and Banking, Vol. 47, No. 5, 2015, pp. 975-1005.

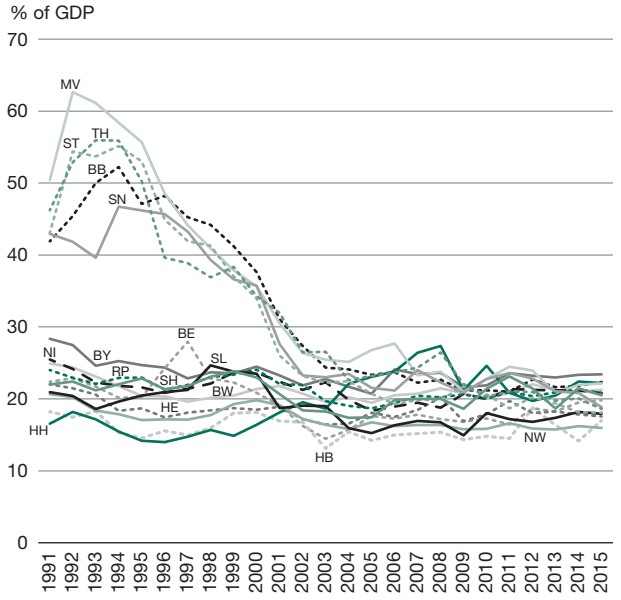
7 B. Breuel: Die Treuhandanstalt – Zielvorgeben, Rahmenbedingungen und Ergebnisse, in: B. Breuel, M. Burda (eds.): Ohne historisches Vorbild, Die Treuhandanstalt 1990 bis 1994: Eine kritische Würdigung, Berlin 2005, Bostelmann & Siebenhaar; T. Waigel: Die finanzpolitischen Rahmenbedingungen des Treuhandmodells, in: B. Breuel, M. Burda (eds.), op. cit.

Table 1
Hourly productivity in German states, 2017
GDP/hour worked, in euros

State/Region	Total	Agriculture	Industry	Services
Baden-Württemberg	58.27	14.44	62.36	48.42
Bayern	58.09	17.89	61.51	49.63
Berlin	50.68	6.09	57.25	44.07
Brandenburg	43.51	19.09	44.09	38.45
Bremen	59.24	7.65	75.22	47.71
Hamburg	67.93	25.18	80.86	58.16
Hesse	60.08	18.41	59.98	52.79
Mecklenburg-Western Pomerania	40.32	24.50	38.68	36.21
Lower Saxony	52.97	27.71	60.45	43.85
North Rhine-Westphalia	55.57	22.52	55.42	48.66
Rhineland-Palatinate	53.93	21.91	60.81	44.62
Saarland	50.65	15.94	54.64	42.14
Saxony	41.98	19.99	40.97	36.91
Saxony-Anhalt	42.43	27.45	44.14	36.24
Schleswig-Holstein	49.36	20.99	49.65	43.86
Thuringia	41.23	22.07	39.72	36.37
New states including Berlin	44.09	22.22	43.52	38.94
Old states excluding Berlin	56.79	20.47	59.97	48.59
Total Germany	54.42	20.80	57.21	46.73

Source: Volkswirtschaftliche Gesamtrechnung der Länder, December 2018, Reihe 1, Bd. 2; author's calculations.

Figure 1
Investment rates in the German Länder



Note: BW=Baden-Württemberg; BY=Bavaria; BE=Berlin; BB=Brandenburg; HB=Bremen; HE=Hesse; HH=Hamburg; MV=Mecklenburg-Western Pomerania; NI=Lower Saxony; NW=North Rhine-Westphalia; RP=Rhineland-Palatinate; SL=Saarland; SN=Saxony; ST=Saxony-Anhalt; SH=Schleswig-Holstein; TH=Thuringia.

Source: Volkswirtschaftliche Gesamtrechnung der Länder, 2018, Reihe 1, Bd. 3; author's calculations.

with their lives as those in the West, in a dramatic contrast to their counterparts in Poland, Russia and Ukraine.[8]

This positive picture changes when taking the uncompromising economist's view of efficiency: Could total GDP in Germany be further increased by moving labour or capital across regions, by closing down inefficient production in those places where it is inadequate, or by deepening trade integration? In 2017, hourly productivity in the East (including Berlin) was 78% of the West excluding Berlin; in contrast, hourly productivity in the Saarland was 87% of that in Bavaria. The East-West productivity relation has not changed much since 2000, when it was about 70%.[9] Yet even within Eastern Germany the picture is hardly uniform. Table 1 gives more detail on hourly productivity in Germany in 2017 showing that Eastern German productivity is at 72.6% and 80% in industry and services respectively while agriculture is at 108.6% of Western German levels. While the East's large-scale farming highlights EU-driven inefficiency in West Germany, the miniscule size of the agricultural sector in Germany reduces its quantitative importance. Reflecting these productivity differences, East Germany compensation levels per worker were 82.2% of the West in 2017.[10]

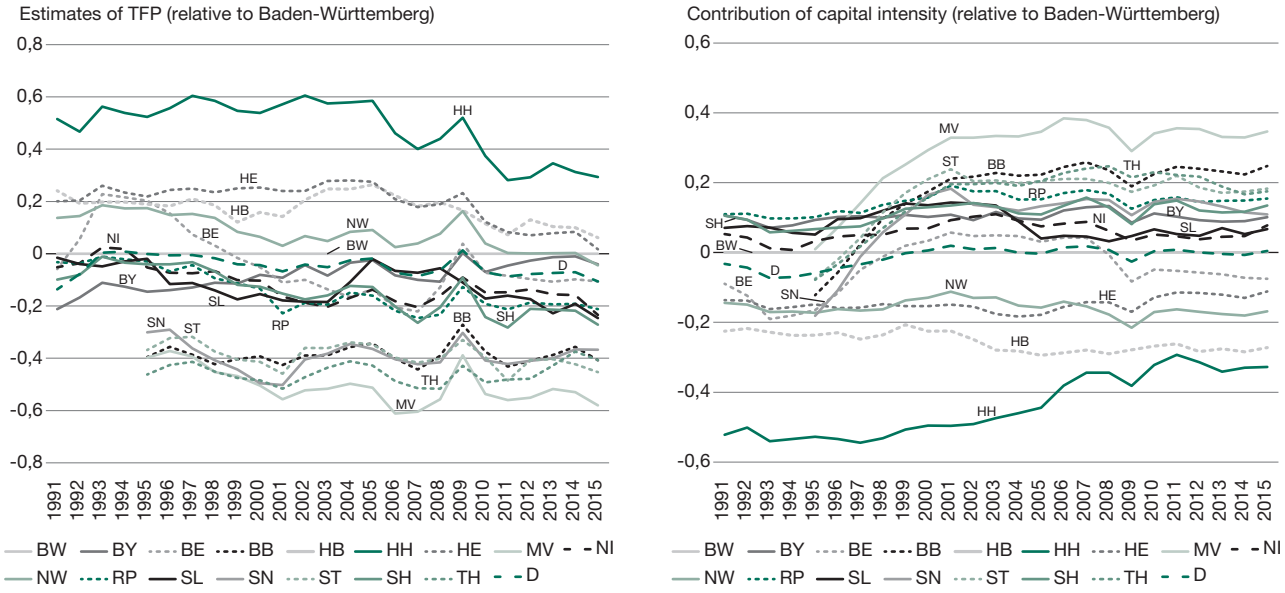
Which forces were dominant in the drive towards regional efficiency? In the first instance, trade flows led to massive trade and current account deficits of the new states financed by private capital flows and government transfers. In the initial years, 1.5 million people left the East, and most moves were permanent. The population of the new states including Berlin declined from 18 million in 1991 to 16.2 million in 2018; excluding Berlin, the figures are even more dramatic (16.4 million to 12.6 million). High rates of investment following unification initially declined after the late 1990s

8 More information available at http://www.pewresearch.org/fact-tank/2014/11/06/east-germans-now-as-satisfied-with-life-as-west-germans/.

9 On the metric of productivity per person, the comparison improves to 82% in 2017, because East Germans work significantly longer hours than their western counterparts.

10 Statistisches Bundesamt: VGR der Länder Arbeitnehmerentgelt, Bruttolöhne und -gehälter in den Ländern der Bundesrepublik Deutschland 1991 bis 2017, Vorabversion zu Reihe 1, Länderergebnisse Bd. 2, Tab. 7, Dezember 2018, available at https://www.statistik-bw.de/VGRdL/tbls/R0B0.jsp?rev=RV2014&tbl=R1B2.

Figure 2
Growth accounting for the German states, 1991-2016



Note: BW=Baden-Württemberg; BY=Bavaria; BE=Berlin; BB=Brandenburg; HB=Bremen; HE=Hesse; HH=Hamburg; MV=Mecklenburg-Western Pomerania; NI=Lower Saxony; NW=North Rhine-Westphalia; RP=Rhineland-Palatinate; SL=Saarland; SN=Saxony; ST=Saxony-Anhalt; SH=Schleswig-Holstein; TH=Thuringia.

Source: Volkswirtschaftliche Gesamtrechnung der Länder, 2018, Reihe 1, Bd. 1, 3; author's calculations.

and are now hardly distinguishable from those in the West (see Figure 1); this investment boom was biased toward residential construction and away from new plant and equipment.[11] Yet this considerable labour and capital mobility plus trade driven by factor proportions failed to lead to convergent wages and labour productivity across Germany.

Conditional convergence and the predominance of TFP

Why are labour productivity and wages so low in the East in spite of mass migration and investment after reunification? The answer lies in its persistently low total factor productivity (TFP), that is, regional output independent of the intensity of factor use. Previous research confirms the role played by TFP in East German convergence.[12] Using a simple Denison-Hall-Jones "growth accounting" decomposition,[13] that assumes a Cobb-Douglas aggregate technology, we can infer the level of TFP (relative to a benchmark or frontier region/country) from observable labour and capital productivity as

$$\Delta \ln\left(\frac{A}{A^*}\right) \equiv \Delta \ln\left[\left(\frac{Y}{L}\right)/\left(\frac{Y}{L}\right)^*\right] - \frac{\alpha}{1-\alpha}\Delta \ln\left[\left(\frac{Y}{K}\right)/\left(\frac{Y}{K}\right)^*\right] \quad (1)$$

where A is TFP, Y is GDP, L is employment, K is an official estimate of the capital stock and * refers to the benchmark. The results for an analysis that takes Baden-Württemburg as the benchmark region are plotted in Figure 2. Burda and Severgnini using indirect methods that eschew capital stock measurements, obtain similar estimates of TFP growth starting in the early 1990s.[14] All evidence points to an abrupt cessation of TFP convergence that began in the mid-1990s.

This finding is remarkable for two reasons. First, the initial rapid growth of TFP and its abrupt standstill is common of all new Länder. Economic historians will recall that Saxony and Thuringia were once powerhouse regions of the interwar automobile, chemical and engineering sectors and crucial to the industrial development of Germany before World War II. That they continue to lag

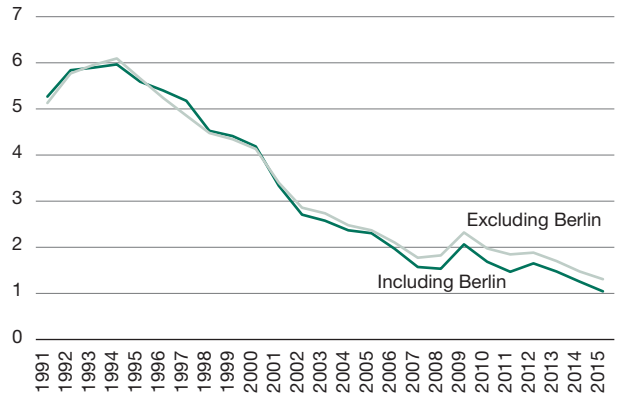
11 H.-W. Sinn, G. Sinn: Kaltstart. Volkswirtschaftliche Aspekte der Deutschen Vereinigung, Tübingen 1991, Mohr Siebeck.
12 M. Burda, M. Weder, op. cit.; M. Burda, B. Severgnini, op. cit.
13 R. Hall, C. Jones: Why Do Some Countries Produce So Much More Output Per Worker Than Others?, in: Quarterly Journal of Economics, Vol. 114, No. 1, 1999, pp. 83-116; F. Caselli: Accounting for Cross-Country Income Differences, in: P. Aghion, S. Durlauf (eds.): Handbook of Economic Growth, Chapter 9, 2005, pp. 679-741.
14 M. Burda, B. Severgnini, op. cit.

behind Western Germany to the same degree as agrarian Mecklenburg-Lower Pomerania and Brandenburg is bad news for theories of integration that downplay history and the accumulation of bad shocks. The concurrent success stories of the manufacturing industry in other initially poorer locations in the Czech Republic, Slovakia and Poland suggest labour flight, sluggish inward capital mobility and agglomeration effects have taken a permanent toll on some previously central locations in Eastern Germany. Population loss across counties (Landkreise) in the period 1995-2013 has concentrated in areas of low population density, while recent overall expansion of the East German population reveals a reshuffling of people into those areas showing economic promise. Not only Berlin, Leipzig and Dresden, but also Erfurt, Jena, Potsdam and Rostock have experienced relative or absolute economic revivals. In contrast, economic geography and agglomeration has heralded the demise of East German industrial towns such as Bitterfeld, Chemnitz, Cottbus, Gera, Halle, Magdeburg and Merseburg.

A second important conclusion to draw is that eastern Länder have offset their persistent TFP disadvantage by increasing capital intensity to levels that now exceed those in the West. This remarkable "overcapitalisation" of economic activity in the East has made it possible to pay higher wages, but implies unusually high capital intensity, even by German standards. These levels have remained higher in the new states than the West since the mid-2000s.

Why does Eastern German TFP fall so uniformly short of western levels? Simple structural differences explain only a modest component – lopsided investment in residential investment in Mecklenburg-Western Pomerania, or agricultural investment in Brandenburg, for example. The loss or lack of human capital cannot explain wage differences at the outset of the reunification episode nor at the present;[15] even in the 1990s, location seems to play an outsised role in earnings determination. Burda and Severgnini find only a minor effect for R&D activities, and a negative effect of aggregate investment on TFP relative to the frontier.[16] They attribute the low TFP levels to low startup density, the lack of large firms, and especially low manager density in the East (managers as a fraction of total employment). Since manager density has been shown to have a causal positive influence on worker productivity in the US context,[17] it

Figure 3
Net resource transfer to the new German states
% of total German GDP



Note: Measured as the difference between gross domestic product and absorption (sum of private consumption, public consumption, and gross capital formation).

Source: Volkswirtschaftliche Gesamtrechnung der Länder, 2018, Reihe 1, Bd. 5; author's calculations.

is plausible that management concentration reflects conscious decisions of profit-maximising firms to substitute capital for management supervision. Finally, one cannot exclude the possibility that trust and social capital essential to modern capitalism were attenuated during the 40-year rule of communism in East Germany and have not yet fully recovered.

Conclusions and lessons for Europe

What does German reunification teach us about Europe and European integration? After a quarter-century of intensive integration between East and West Germany, one lesson is clear: despite ideal cultural, linguistic, legal and institutional conditions, a model of conditional rather than unconditional convergence is more appropriate for assessing the integration of regions. Another is that a region's industrial past is no guarantee for its economic future. In the European context, these effects are likely to be even more important.

If regional agglomeration is strongly coincident with national territories, the standard welfare-improving solution of redistribution to poorer and less productive regions will be difficult to implement, especially in the current political climate. EU citizens appear less willing than ever to accept workers from outside their borders, capital flows from abroad or even free trade in goods and services, the very foundation of the customs union. It seems unlikely that an extensive tax-and-transfer system as in the United States will find much political support. As documented in Figure 3, total resource transfer to the new German states has declined significantly in recent years.

15 W. Smolny, M. Kirbach: Wage differentials between East and West Germany: Are they related to the location or to the people?, in: Applied Economics Letters, Vol. 18, No. 9, 2011, pp. 873-879.
16 M. Burda, B. Severgnini, op. cit.
17 A. Kalnins, F. Lafontaine: Too Far Away? The Effect of Distance to Headquarters on Business Establishment Performance, in: American Economic Journal: Microeconomics, Vol. 5, No. 3, 2013, pp. 157-179.

Evidence from the US suggests that it is unreasonable to expect convergence of per capita output at any rate that exceeds two percent per annum,[18] and GDP per capita across the US states remains quite dispersed. An extensive federal system of expenditures, taxes and transfers enables the US to achieve what the normal processes of economic integration has not. Implementing a comparable system in the European Union appears to be the only way to achieve convergence in an equitable and fair manner.

18 R. Barro: Convergence..., op. cit.