The East German Economy in the Twenty-First Century

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September 2009
Revised March 2010

Abstract: Twenty years after reunification, the eastern German economy remains the proverbial glass of water – half-full and half-empty at the same time. I argue that high capital and labor mobility after 1989 renders comparisons with other ex-communist countries problematic if not misleading. Seen in this light, progress towards reintegrating the ex-GDR in the world economy has been remarkable. The process has been characterized by significant structural change – with repercussions for the West as well – characterized by both capital deepening (investment in plant and equipment) and labor thinning (net out-migration). The future of eastern Germany is likely to be characterized by nodes of steady or even rapid growth against a backdrop of slow decline and depopulation.

Keywords: German reunification, regional integration, capital mobility, migration, structural change, agglomeration

JEL: F2, J61, P23

*This paper was written for a conference of the German Historical Institute, Washington DC, September 2009. I thank Susanne Schöneberg and Felix Strobel for helpful research assistance.
1. Introduction

Twenty years after reunification, the Eastern German economy remains the proverbial glass of water – half-full and half-empty at the same time. As a modern episode of economic growth and convergence it is hard to beat. It is even more difficult to imagine a more daunting challenge than that faced by German policymakers in early 1990: how to raise standards of living fast enough in the East to keep its inhabitants from leaving in droves and thereby validating their own pessimistic expectations, and simultaneously to attract new investment from the wealthier parts of the world. It was precisely the young, the educated and the productive elites who were first in line to leave, and their departure threatened to make East Germany less attractive for West German and international investors, as well as for those left behind. While it could be viewed as an explicit policy choice made under political constraints, reunification had in fact no viable economic alternative.

For economists, German unification posed questions of central professional interest. Harvard’s Robert Barro boldly predicted that it would take 35 years for the East to close half of the 70% productivity gap with the West (Barro 1991). This prediction, based on remarkably robust econometric evidence from the United States, West European regions, and Japanese prefectures, turned out to be less than accurate, unless one is ready simply to ignore massive increases in productivity which occurred in the years 1991-1994. Second, the expectation that East Germany would someday merely be a simple replication of the West meant, paradoxically, that initial conditions and the path of adjustment would end up determining the resting point of the system – meaning that the final resting point of the region was not unique and in fact path-dependent. In 1990, I augured that one could just as easily imagine an East German economy in 2020 that looked like the highly industrialized Dresden-Leipzig-Halle region in the late 19th century as one in which the new states were nothing but a giant national park, dedicated to biodiversity of flora and fauna, including that of the legendary Ossi.¹ The potential multiplicity of outcomes must have prompted the Kohl government to act as it did, arguably with more decisiveness than the economists who advised it.²

Considering the initial conditions of the German Democratic Republic (GDR) and the standard of living in other comparable communist states at the outset (the Czech Republic and Slovakia, for example), the reunification episode has been nothing short of a minor miracle. Real incomes per capita – allowing for regional price differences for goods and services such as lodging, public transportation, and nontraded goods – have virtually converged (Brück and Peters 2009). Yet the proverbial glass of water remains half-empty in many central respects. Convergence in income per capita does not equate with convergence in productivity per capita or per hour. Eastern productivity remains about three quarters of western levels. Unemployment rates in the East are still on average roughly double of those in the West.

¹ See Burda and Wyplosz (1992).

² Paqué (2009) cites white papers by the Council of Economic Advisors (Sachverständigenrat) as well as the Bundesbank militating against economic and monetary union. For early economic analyses of the German reunification episode, see Akerlof, et al. (1990), Burda (1990, 1991b), Sinn and Sinn (1991), Collier and Siebert (1991), Burda and Wyplosz (1990), and Dornbusch and Wolf (1994).
The Germans insisted on unification their way and paid a heavy price for it; yet Karl-Heinz Paqué (2009) has recently presented convincing evidence that it was worth it. Overall GDP growth has slowed since the mid-1990s, albeit for reasons having to do with structural shifts of production. Much of Eastern Germany was destroyed in 1990 at a stroke of the pen by monetary union, yet having an own currency would have bought them 5-10 and certainly not 20 years of prosperity. The extent of structural change necessary for a planned economy to enter the world league of industrial nations was certainly underplayed by most at the time. With aggregate output per capita at 70% and labor productivity at 80-85%, economists who study Eastern Germany are learning just how stubborn the last bit of convergence is going to be. This is because convergence is not, as Barro surmised in the early 1990s, not only about equating East and West Germans’ levels of physical and human capital, but also endowing them with the same level of social, institutional, business and marketing infrastructure. As a result, it will difficult to achieve the last mile of convergence in productivity per capita and other measures of long-term economic viability without further structural change. Yet because of its trial by fire, the Eastern German economy looks much more vibrant and robust than the macroeconomic numbers appear.

The paper is organized along four themes: 1) economic convergence and its measurement; 2) the mobility race between capital and labor which has taken place since 1990; 3) structural change and the implantation of new institutions which are conducive to economic growth; and 4) agglomeration and economic geography and the roles they can be expected to play in the future of the new German states plus Berlin.

2. Convergence: A Question of Benchmarks

The political promise made by the Federal Republic to Eastern Germans in the run-up to the elections in March 1990 and which certainly determined its outcome was “blossoming landscapes” (blühende Landschaften) of economic growth and prosperity. How does one evaluate two decades of integration?

From the point of view of economic welfare, the central indicator for economists is consumption – those goods and services that bring us pleasure or comfort. Estimates vary, but average consumption per capita in the new states is believed to have reached about 85% of the average Western level. These are differences not widely different for comparisons of poor northern and rich southern states in the western part of Germany. They are strongly influenced by prices of nontradable goods such as housing, food, and personal services, which are in turn dependent on local levels of wealth and productivity in traded goods. More revealing are indicators of consumption of individual goods. Consider Table 1, which shows a remarkable convergence in the consumption patterns of Eastern and Western households, with the former sometimes even overtaking the latter. This evidence is largely confirmed by East Germans’ assessments of their own individual well-being - abstracting from perceptions of political paternalism or even subjugation by the West. From the perspective of consumption or income, Eastern Germany has done

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3 This and related snags in the integration and convergence process were stressed early on by Ragnitz (1999).
4 In a public opinion poll by the Tagesspiegel and the ZDF television in November 2009, 86% of Germans surveyed (85% in West, 91% in the East) described reunification in retrospect as “the right thing to do” (http://www.tagesspiegel.de/politik/deutschland/Deutsche-Einheit/art122,2942683). In the same survey,
well. Most East Germans enjoyed a relatively high standard of living compared with the rest of the communist bloc before the fall of the wall, and this relative status has certainly been maintained in the aftermath.

### Table 1. East-West German Convergence in the Small: Household Ownership of Durable Goods

<table>
<thead>
<tr>
<th>Durable good</th>
<th>1993 East / West</th>
<th>1998 East / West</th>
<th>2006 East / West</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automobile</td>
<td>66 / 74</td>
<td>71 / 76</td>
<td>73 / 78</td>
</tr>
<tr>
<td>Landline telephone</td>
<td>49 / 97</td>
<td>94 / 97</td>
<td>95 / 95</td>
</tr>
<tr>
<td>Cell phone</td>
<td>-</td>
<td>11 / 11</td>
<td>81 / 80</td>
</tr>
<tr>
<td>Personal computer</td>
<td>16 / 22</td>
<td>36 / 43</td>
<td>70 / 73</td>
</tr>
<tr>
<td>Internet access</td>
<td>-</td>
<td>5 / 9</td>
<td>60 / 66</td>
</tr>
<tr>
<td>Television</td>
<td>96 / 95</td>
<td>98 / 95</td>
<td>98 / 95</td>
</tr>
<tr>
<td>Cable access</td>
<td>-</td>
<td>64 / 51</td>
<td>62 / 49</td>
</tr>
<tr>
<td>Satellite dish</td>
<td>-</td>
<td>30 / 29</td>
<td>34 / 42</td>
</tr>
<tr>
<td>Camcorder</td>
<td>36 / 48</td>
<td>61 / 63</td>
<td>71 / 69</td>
</tr>
<tr>
<td>Refrigerator</td>
<td>95 / 95</td>
<td>99 / 99</td>
<td>99 / 99</td>
</tr>
<tr>
<td>Microwave oven</td>
<td>15 / 41</td>
<td>41 / 53</td>
<td>68 / 68</td>
</tr>
<tr>
<td>Dishwasher</td>
<td>3 / 38</td>
<td>26 / 49</td>
<td>52 / 64</td>
</tr>
<tr>
<td>Washing Machine</td>
<td>91 / 88</td>
<td>94 / 91</td>
<td>99 / 95</td>
</tr>
<tr>
<td>Dryer</td>
<td>2 / 24</td>
<td>14 / 33</td>
<td>17 / 38</td>
</tr>
</tbody>
</table>

Source: IW Köln (2008). All households

In the light of this evidence it is difficult to deny the impression of “ein Volk.” Consumption patterns of Table 1 are mirrored in patterns of labor market participation. It is also noteworthy that life expectancy – perhaps the most easily agreed-upon indicator – has also converged for East and West German women and nearly so for men, with West German males still expecting only a single year more of life than Eastern men (IWH, 2009:74).

While consumption is certainly not a sufficient indicator of happiness and well-being, the two are highly correlated. Yet self-esteem and sustainability are certainly aspects which cannot be ignored. Unemployment rates are still roughly double those in the West, even if they have come down considerably in the past five years. Furthermore, if consumption is paid for by transfers from a more productive West, this is hardly a sustainable situation. Thus, a more careful look at macroeconomic “supply side” indicator of productivity per capita – a measure which captures both productivity per employed labor as well as the employment rate – is an essential component of any serious assessment of unification two decades later.

The macroeconomic picture for the region of Eastern Germany – originally with a population of roughly 17 million in the late 1980s – has been rather mixed. Table 2 displays the most commonly used macroeconomic measures of convergence. After the introduction of the Deutsche Mark at the exchange rate 1:1 for current transactions, the decimation of East German manufacturing in the early 1990s was unavoidable – Akerlof, Rose, Yellen and Hessenius (1990) cleverly employed the once top-secret Richtkoeffizienten of the GDR’s planning ministries to infer that less than one fifth of industry was competitive at a 1-1 Ostmark-Mark conversion rate, and were subsequently...
proved more than right. After a collapse of Eastern industrial production to about a third of its 1989 value (Dornbusch and Wolf, 1994), it has risen relative to the West steadily ever since – through the recession of 2001-2 and even in the current downturn. In the past fifteen years, more than half of the per-capita GDP gap between East and West has been closed, in less than half the time predicted by Robert Barro (1991). In August 2009, an Eastern German state (Thuringia: 11.1%) can boast a lower unemployment rate than a Western one (Bremen: 12.2%). If the persistence of macroeconomic developments is any guide, some eastern states such as Thuringia and Saxony are well-poised to overtake weaker western states such as Schleswig-Holstein.

Table 2. East-West German Convergence in the Large: Macroeconomic Indicators

<table>
<thead>
<tr>
<th>Year</th>
<th>Consumption</th>
<th>Nominal wages per hour</th>
<th>Nominal wages per worker</th>
<th>Labor productivity (per hour)</th>
<th>Labor productivity (per Worker)</th>
<th>GDP per capita</th>
<th>Unemployment rate</th>
<th>Participation rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>62</td>
<td>n.a.</td>
<td>57</td>
<td>n.a.</td>
<td>45</td>
<td>43</td>
<td>165</td>
<td>137</td>
</tr>
<tr>
<td>1992</td>
<td>67</td>
<td>n.a.</td>
<td>68</td>
<td>n.a.</td>
<td>57</td>
<td>50</td>
<td>225</td>
<td>121</td>
</tr>
<tr>
<td>1993</td>
<td>73</td>
<td>n.a.</td>
<td>75</td>
<td>n.a.</td>
<td>67</td>
<td>59</td>
<td>193</td>
<td>111</td>
</tr>
<tr>
<td>1994</td>
<td>75</td>
<td>n.a.</td>
<td>77</td>
<td>n.a.</td>
<td>71</td>
<td>64</td>
<td>174</td>
<td>108</td>
</tr>
<tr>
<td>1995</td>
<td>78</td>
<td>n.a.</td>
<td>80</td>
<td>n.a.</td>
<td>72</td>
<td>67</td>
<td>163</td>
<td>108</td>
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<tr>
<td>1996</td>
<td>79</td>
<td>n.a.</td>
<td>80</td>
<td>n.a.</td>
<td>74</td>
<td>68</td>
<td>168</td>
<td>106</td>
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<tr>
<td>1997</td>
<td>79</td>
<td>n.a.</td>
<td>80</td>
<td>n.a.</td>
<td>74</td>
<td>68</td>
<td>177</td>
<td>107</td>
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<tr>
<td>1998</td>
<td>80</td>
<td>73</td>
<td>81</td>
<td>68</td>
<td>74</td>
<td>67</td>
<td>186</td>
<td>107</td>
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<tr>
<td>1999</td>
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<td>69</td>
<td>75</td>
<td>68</td>
<td>195</td>
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<td>2000</td>
<td>81</td>
<td>74</td>
<td>81</td>
<td>70</td>
<td>76</td>
<td>67</td>
<td>221</td>
<td>104</td>
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<tr>
<td>2001</td>
<td>80</td>
<td>75</td>
<td>81</td>
<td>72</td>
<td>77</td>
<td>67</td>
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<td>74</td>
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<td>2003</td>
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<td>81</td>
<td>74</td>
<td>79</td>
<td>69</td>
<td>216</td>
<td>101</td>
</tr>
<tr>
<td>2004</td>
<td>80</td>
<td>76</td>
<td>81</td>
<td>74</td>
<td>79</td>
<td>70</td>
<td>214</td>
<td>100</td>
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<tr>
<td>2005</td>
<td>80</td>
<td>77</td>
<td>82</td>
<td>74</td>
<td>79</td>
<td>70</td>
<td>187</td>
<td>103</td>
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<td>2006</td>
<td>80</td>
<td>77</td>
<td>82</td>
<td>74</td>
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<td>70</td>
<td>189</td>
<td>103</td>
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<tr>
<td>2007</td>
<td>80</td>
<td>78</td>
<td>82</td>
<td>75</td>
<td>78</td>
<td>70</td>
<td>200</td>
<td>104</td>
</tr>
<tr>
<td>2008</td>
<td>n.a.</td>
<td>78</td>
<td>81</td>
<td>76</td>
<td>79</td>
<td>71</td>
<td>204</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

http://www.destatis.de/jetspeed/portal/cms/Sites/destates/InternetDE/Content/Statistiken/Zeitreihen/LargeReihen/Arbeitsmarkt/Content/100/fin/01ga,templateId=renderPrint.psmf
Statistische Ämter der Länder

With hindsight, it is remarkable if not amusing to examine the economic naïveté of the political discussion from the early 1990s, which literally expected a Phoenix to emerge from the ashes in a matter of a few short years. What could they possibly have been thinking? Estimates of the CIA in the late 1980s were certainly inflated for reasons related to defense and national security policy. Moreover, it is hard to imagine a market for most Eastern output, even at an exchange rate corresponding to the average Richtkoeffizienten of 4.4 Ostmarks per DM. The best evidence of this was the collapse of the delivery time for a Trabant or a Wartburg from 4-5 years to zero in the months following November 1989.

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5 The Richtkoeffizienten represented the planning ministries’ own assessment of their ability to raise foreign exchange via international trade. By obtaining these numbers at detailed levels of sectoral disaggregation, George Akerlof and his colleagues were able to assess competitiveness of individual industries at the time with remarkable accuracy.

6 Naturally, it was politically expedient to dismiss the naysayers of the time, such as Oskar Lafontaine, who correctly anticipated the enormous fiscal burden that unification would impose on the West German taxpayer. Indeed, the rush to reunification can be seen as an effort to override any rational discussion of the economic prospects of East Germany, which may have impeded or even hindered reunification.
For this reason, comparisons of East Germany’s experience with other ex-communist countries can be highly misleading. Comparisons of output over time and space are never trivial, and should not be taken lightly. Can we really consider the quality of consumption for a family driving a Trabant and washing their clothes in a Foron WM66 to a one owning an Opel and a Miele? East German consumers voted with their feet in 1990 and 1991 and sealed the fate of most of existing industry at the time. After two decades, however, manufacturing, in particular of consumer and intermediate goods, has been modernized by billions of Euros of new investment and is experiencing an impressive renaissance. Understanding this structural change is essential to constructing scenarios for the Eastern German economy for the decades to come.

To motivate and organize the discussion, it useful to formalize the discussion as follows. Let $\Delta Y / Y$ stand for the rate of growth of real GDP ($Y$) over a time interval, and similarly let $\Delta K / K$ and $\Delta L / L$ denote the rates of growth of capital ($K$) and employed labor ($L$) respectively (the symbol $\Delta$ denotes change over a set interval of time). The equation at the center of attention is the following representation of the “Solow decomposition” (Solow 1957) which tautologically defines the so-called “Solow residual” $\Delta A / A$ by the following relationship:

$$\frac{\Delta Y}{Y} = \frac{\Delta A}{A} + s_k \frac{\Delta K}{K} + \left(1 - s_k\right) \frac{\Delta L}{L},$$

where $s_k$ is the before-tax share of capital in national income, which a number equal to roughly 1/3 in developed economies. The Solow residual captures those determinants of economic growth which are not attributable to growth in capital and employed labor. In a quantitative discussion of the East German economy it is useful to augment and rewrite the Solow decomposition as:

$$\left(\frac{\Delta Y}{Y} - \frac{\Delta N}{N}\right) = \frac{\Delta A}{A} + s_k \frac{\Delta K}{K} - \frac{\Delta N}{N} + \left(1 - s_k\right) \left(\frac{\Delta L}{L} - \frac{\Delta N}{N}\right),$$

with $\Delta N / N$ standing for the growth rate of the working-age population. Since $\left(\Delta L / L - \Delta N / N\right)$ is approximately equal to the change in the employment rate, this equation attributes changes in per capita GDP (per capita productivity) not only to growth in total factor productivity $\left(\Delta A / A\right)$ and growth in physical capital stock per capita $\left(\Delta K / K - \Delta N / N\right)$, but also to improvement in the state of the labor market expressed as the change in the employment rate, the utilization of the available potential of working age individuals.\(^7\) An increase in the employment rate in the East, ceteris paribus, is associated with increasing GDP per capita. This explains why the doggedly high unemployment rate

\(^7\) If the employment rate is denoted by $L/N$, its percentage change is approximately equal to $\Delta L / L - \Delta N / N$ or $\Delta \ln L - \Delta \ln N$. It should be noted that, as it is typically defined, the employment rate does not equal 1 minus unemployment rate (the ratio of unemployed to the labor force, which excludes people of working age who are not actively looking for work).
observed in Eastern Germany is a brake on regional per capita output. In the next section, we turn our attention to the flow of capital ($\Delta K/K$) into and the flow of people ($\Delta N/N$) out of the new states, for a given employment rate.

Using equation (2) it is possible to account for the per capita productivity gap of the five eastern German Länder (Mecklenburg-Lower Pomerania, Brandenburg, Saxony-Anhalt, Saxony and Thuringia), from the average of Western states (again, excluding Berlin) as the sum of parts due to differences in total factor productivity ($A^W - A^E / A^W$), capital equipment/structures per capita ($((K/N)^W - (K/N)^E) / (K/N)^W$), and employment rates ($((L/N)^W - (L/N)^E) / (L/N)^W$). Table 3 presents estimates of this “lateral output gap decomposition” using data from 2000 and 2006.

3. Central Mechanisms of German Integration: Mobility and Structural Change

3.1. Mobility of capital versus labor

Early on, Horst Siebert (1992) presciently described the transformation of the ex-communist economies as an “integration shock,” and there is little doubt that unification was a surprise to economic agents in both East and West. To focus discussion, I employ Eichengreen’s (1990) intuitive definition of economic integration: the achievement of efficient production by two or more geographic regions formed by their union. An integration shock involves several mechanisms. First, internal accumulation of capital in the poor region raises output per capita. This is the mechanism stressed by Barro and Sala-i-Martin (1990) and the motivation for Barro’s (1991) pessimistic prediction. Second, labor moves from the capital-poor to capital-rich region. Third, capital mobility in the form of foreign direct investment (FDI) will benefit the capital-poor region, financed either by international capital markets or at the expense of the capital-rich one (here: West Germany). Fourth, trade between incompletely specialized regions equalizes wages and rates of returns, as capital-rich regions tend to export capital-intensive goods and labor-rich goods tend to export goods which use labor more intensively. Finally, the backward region can adopt technologies, techniques and “soft infrastructure” from the leading region, leading to convergence of total factor productivity. In this section, I focus on the movement of capital and labor as drivers of East-West German integration. In

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8 This is based on arguments I have made elsewhere more formally (Burda 2006, 2009)
terms of equation (2), an increase in capital investment in the East ($\Delta K/K > 0$) will increase GDP per capita, as will outmigration ($\Delta N/N < 0$), ceteris paribus. Holding unemployment constant, an exodus of population will have an equivalent effect on the capital-labor ratio and thus on output per capita.

The reallocation of capital and labor between East and West was intense but variable over the past two decades. In the first five years after the wall fell, more than a million people left the East. Through the early 1990s, this rate declined to a trickle, then rose again after 1995, when growth in the region declined and unemployment rates rose. Similarly, there was a burst of capital investment in the early 1990s, reaching a peak in mid-decade, then declining since then. An unusually large fraction (2/3) of the cumulated investment flow in Eastern Germany was dedicated to residential and business structures, compared with about 1/3 in business fixed equipment. The large run-up in investment spending on structures is frequently seen not only as the outcome of distorted investment incentives, but also as having longer run consequences for the structure of output and factor demands (Sinn 2000). After a very strong start in the 1990s, investment rates in the East have declined significantly and now are hardly different from those in the West (see Table 4).

Table 4. Capital Formation in Eastern and Western Germany (1991-2005)

<table>
<thead>
<tr>
<th>Region</th>
<th>Average investment rate (% of GDP)</th>
<th>Average annual investment per capita (EUR, 2000 prices)</th>
<th>Average annual investment per employed worker (EUR, 2000 prices)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Equipment</td>
<td>Structures</td>
<td>Equipment</td>
</tr>
<tr>
<td>East</td>
<td>11.3</td>
<td>20.9</td>
<td>1896.5</td>
</tr>
<tr>
<td>West</td>
<td>8.9</td>
<td>10.5</td>
<td>2282.9</td>
</tr>
</tbody>
</table>

Source: Burda (2008)

The real recapitalization of the Eastern German economy was a prime determinant of the rapid rise in productivity per employee documented above in Table 2. It was driven not only by the growth of investment from outside Eastern Germany but also by labor shedding, especially in the first years following reunification. In some sectors, capital-labor ratios have even overshot Western levels. For example, the official estimate of eastern aggregate capital-labor ratio in manufacturing was virtually at par with the West in 2002 at 99%; this conceals variation ranging from 66% in textiles/clothing and 81% in metallurgy to 125% in chemicals and 122% in the automobile sector. Even higher ratios can be found in intermediate materials (average 123% of the West), basic chemicals (143%) and mining and quarrying (184%). Overall, however the capital-labor ratio in Eastern Germany remains, according to the Federal Statistical Office, at 84% of the West German level.\(^9\)

3.2. Structural Change

Eastern Germany experienced a phase of intensive factor mobility in both directions. Such massive movements of factors of capital and labor are likely to be accompanied by significant structural change. This is a natural process of adaptation of a region long cut

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\(^9\) Bundesministerium für Verkehr, Bau und Stadtentwicklung (2009).
off from economic forces of international specialization and trade. Indeed, the recovery of economic activity since the early 1990s in the new states has by no means been uniform. As already mentioned above, Akerlof, et al. (1990) showed, using internal statistics maintained by the central planners of the German Democratic Republic, that only about 20% of industry was internationally competitive at a 1:1 Ostmark-DM exchange rate immediately following unification. The extent of this structural change can be seen in Figure 1, which documents the relative overall evolution of gross sales in industrial sectors in the period 1995-2008. Note not only is the strikingly uneven recovery of East German industry, both absolutely and relative to the West, but more importantly the extent to which a reallocation of production is occurring towards the East in the vast majority of sectors. It is noteworthy that this shift is consistent with at least a partial restoration of the preeminent position held by central Germany’s industrial economy until World War II.

The strikingly heterogeneous behavior of eastern German industry suggests that aggregate indicators conceal enormous structural shifts under the surface of the East German economy. Just as Hayek described it, many sectors continue to discover their role in the world economy, with exports from the East maintaining a secular growth path relative to Western states. But other aspects are also at work, mostly reflecting the scars of four decades of socialist planning as well as misguided West German policies post-Wall. The boom in construction during the 1990s when generous tax breaks were offered to investment in residential buildings led to an artificially oversized building sector (Sinn and Sinn 1992, Sinn 2000). Reunification did not imply an immediate scale-back of the level of East German government to West German standards but required a steady effort which faced great political obstacles (Paqué 2009). In terms of real GDP, Eastern Germany including Berlin has grown since 1992 by roughly 2.7% annually, and by 3.7% if Berlin is excluded – compared with 1.5% per annum real growth in the West. If only manufacturing industry is considered, real growth amounted to 5.5% in the East (including Berlin) and a whopping 8.1% without the (remarkably nonindustrial) capital city. It is safe to say that the deindustrialization of the East has been stopped and reversed to a surprising extent.

While eastern Germany continues to account for a smaller fraction of total output than its population share and growth rates reflect its low initial condition in the early 1990s, this does not hold uniformly across sectors of activity. Shifts of the output mix across sectors with different growth outcomes will influence overall macroeconomic performance and will do so more positively in the future as slumping sectors disappear and strong ones grow. In manufacturing, the eastern German states excluding Berlin now account for 9% of total German value-added in that sector, up from 7.6% in 2000 and 5.6% in 1995. In striking contrast, the East German value added share in broadly-defined services has hardly risen since 1995 from 11.2% to 11.7%. This reflects a shrinking government and growing private services. The share of construction fell from 27.8% in 1995 to 16.9% in 2005, and remains oversized compared to its West German counterpart.

Given the extent of the transformation of the Eastern German economy, it is inevitable that this structural change would spill over to the West. Indeed, concomitant with the expansion of manufacturing in the new states is a visible change in economic structures in the old states. The two panels of Figure 2, reproduced from Bachmann and Burda (2010), provide evidence for this claim. The first panel shows how the employment shares in the West began changing significantly after 1990, the year of German unification. Since 1990, the West German economy has lost roughly a fifth of its
socially insured employment in industry, while significantly increasing the number of jobs in services, especially business-related services (Bachmann/Burda 2010).

**Figure 1. Structural Change in Germany, 1995-2008**

*Note:* Each point corresponds to one of the following industrial sectors: mining and quarrying (MQ); coal mining, peat, oil and gas production (CG); food processing and tobacco (FP); textiles and clothing (TC); leather production and processing (LP); wood products excluding furniture (WP); paper and printing (PP); coke and oil refining (CO); chemical manufactures (CM); rubber and plastic products (RP); glass, ceramics and stone processing (GC); metal production and processing (MP); machinery and machine tools (MM); office equipment, data processing and electronics (OE); automotive and automobile production (AP); furniture, jewelry and musical instruments (FJ). In addition, the following aggregated sectors are marked red: mining, quarrying, coal, oil, peat and gas production (MI); durable manufactures (DG); nondurable manufactures (NG); intermediate goods (II); all manufacturing (M); investment goods (IG); and total industry (IN).

*Source:* Statistisches Bundesamt, author’s calculations.
Figure 2. Indicators of Structural Change in western Germany

a) Sectoral fraction of socially insured employment

b) Lillien index of employment growth turbulence at different lags

Source: Bachmann and Burda (2009)
The second panel displays the evolution of Lillien indexes of disparity in sectoral employment growth first proposed by Lillien (1982). These numbers, which are similar in behavior to weighted standard deviations of employment growth rates, show a marked increase in entropy of sectoral employment. This conjecture appears even more valid when the changes are measured over longer periods, that is, when short term fluctuations are filtered out by measuring employment growth over longer intervals. Note that the increase in the indexes is centered around 1990, the year of German unification.

One of the most important focal points of structure change is the labor market. Eastern Germany has experienced wrenching structural change – the loss of more than half of all industrial jobs by some estimates – and this outcome has starkly limited the strategy space of players in collective bargaining. Table 5 the extent to which the vaunted (West) German collective bargaining model has collapsed in the East. Following an initially successful campaign for legitimacy in wage bargaining in the first years following unification, not only has high unemployment decimated union membership rolls from well over 50% to now less that 20%, but more significantly, growing frustration with a collective bargaining system not attending to their needs has driven eastern German companies to abandon employers’ associations (Arbeitgeberverbände), weakening the legitimacy of collective bargaining at the industrial-regional level typical for Germany (Boeri et al. 2007). The result has been a steady reduction of unit labor costs in the new states, once decried by Sinn and Sinn (1992) as the highest in the world, are now significantly lower than in Western Germany and represent a source of competitive advantage for new foreign direct investment (Figure 3). Overall, Eastern Germany looks to emerge as a foil for labor market rigidities frequently stressed in the discussion of West German labor markets (Merkl and Snower 2006).

Table 5. Membership in Employers Associations, Union Coverage and Pay in Eastern Germany, 1993-2003

<table>
<thead>
<tr>
<th></th>
<th>1993</th>
<th>1998</th>
<th>2003</th>
</tr>
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<tbody>
<tr>
<td>Share of all firms which are members of an employers’ association (%*)</td>
<td>36</td>
<td>21</td>
<td>10</td>
</tr>
<tr>
<td>Share of all workers employed by members of an employers’ association (%*)</td>
<td>76</td>
<td>45</td>
<td>29</td>
</tr>
<tr>
<td>Share of all firms paying less than the usual local contract wage (%*)</td>
<td>35</td>
<td>41</td>
<td>47</td>
</tr>
<tr>
<td>Share of all workers paid less than the usual local contract wage</td>
<td>12</td>
<td>28</td>
<td>36</td>
</tr>
</tbody>
</table>

Source: DIW
4. Wild Cards: Agglomeration and Location

It is certainly possible to paint a gloom and doom picture of East Germany – the region continues to lose population each year absolutely, with outmigration at about 40-50,000 per year. Investment has stabilized at levels which, while significant, do not match record levels in the mid-1990s. Even the neoclassical model with constant returns to scale would link this to a permanent reduction in the steady state of the economy and, under certain technical conditions, to the hysteresis phenomenon in which history matters (see e.g. Burda 2006, Böhm 2009). As long as people of working age continue to leave Eastern Germany, the steady state physical and human capital requirements for sustainable development will also decline commensurately.

The implications of this analysis for economic policy are strikingly anti-
\textit{laissez-faire}. A series of positive policy shocks which lead to increased investment in the East would alter the expectations of workers and firms, which would in turn militate against a migration decision; the retention of workers increases the productivity of capital in the region and increases the rate of return, attracting more investment, etc. The creation of a virtuous cycle was certainly behind the policies of the Kohl government – pouring hundreds of billions of Euros over the first decade of the unification episode.

\footnote{This potential scenario, driven by increasing returns and the loss of critical mass in labor market networks, was highlighted in the writings of Marshall and has been applied to the East German case by Uhlig (2006).}
Yet there is more reason to question the Panglossian prescription of no-intervention for Eastern Germany. Agglomeration is defined by economists as the violation of the neoclassical assumption in the spatial dimension, in particular, that a doubling of the scale of economic activity in the same economic space will lead to a more than doubling of the output of that economic space. The reasons for agglomeration are manifold, but a convincing case for them has been around at least since Alfred Marshall in the late 19th century. Among other things, Marshall argued that large markets can support more product diversity, more efficiency in connecting input producers and users of intermediate inputs, where “support” means the payment of fixed costs. As Krugman and others stressed, areas in economic decline face the opposite effect, and this has been observed widely in Eastern Germany as smaller communities are faced with rising average costs of infrastructure put into place in the go-go years of the past decade. Cuts in services and institution of usage fees have in turn driven more to migrate, aggravating the process. This logic can be extended to many phenomena in the private domain, including labor market “thickness”, which can lead to endogenous, slow decline of these regions.

After almost two decades, the force of agglomeration has begun to show up in an increasingly lattice-like development of Eastern Germany. Figure 4 displays net population changes in 2007 at the level of Landkreis (comparable to counties) which appeared in a recent review of the East German economy (IWH 2009). While the mechanism of endogenous decline clearly appears to be operative, there are at least ten light colored nodes of population growth in this period besides Berlin. Evidently, those who have stressed the depopulation of Eastern Germany have underplayed internal migration, not just to Berlin but also to larger cities such as Dresden, Leipzig, Jena, and a number of cities associated with the hinterlands (the so-called Speckgürtel) of Berlin. As pointed out by Hunt (2006) and Burda and Hunt (2001), East Germans have proved to be less mobile than econometric evidence predicts, judging solely from wage gains available through migration. In retrospect, a selective policy of regional development focused on these areas (and perhaps extended to smaller cities such as Chemnitz, Cottbus, Gera, Magdeburg, Rostock and Schwerin) might have a better alternative to a carte-blanche subsidy approach which ended up in poorly chosen infrastructure projects. Arguably, a tough triage policy might have saved more of East Germany from economic decline.

A little-considered advantage of Eastern Germany which will interact with the effects just described is related to the region’s proximity to growth markets of the next 2-3 decades. Poland, Czech Republic, Slovakia, Hungary and other markets of Central and Eastern Europe have grown rapidly in the past decade and their demand for consumer and investment goods has spilled over to Germany, and given the importance of location in trade and foreign investment, it is no surprise that East Germany has benefited from this demand. At the same time, FDI activity from Germany these countries (especially Poland) has been nothing short of phenomenal. The deepening integration of Eastern Germany with Poland and other growing economies, combined with the accumulation of wealth there is likely to lead to a renaissance of border communities and a stabilization of real estate values. This may be the ultimate triumph of economics over nationalism when East Germany begins to benefit from FDI by Polish and Czech firms and real estate acquisition by wealthy Polish and Czech families.
5. Conclusion

Eastern Germany, with approximately the land mass of Tennessee and a population density nearly three times as great, offers economists with a fascinating case study in economic integration two decades after the fact. The region can expect a highly heterogeneous economic future – not only in the qualitative, but also in both a sectoral and spatial sense. Its experience contains lessons for the future of Central and Eastern Europe. In this integration process, production factors move in opposite directions, even as output is rising. This mobility race, combined with deep structural change, has severely constrained the options available to policymakers. For example, the adoption of a second currency would have yielded little gain in the absence of money illusion and, in the light of high labor mobility, real wages denoted in an Eastern German currency would have risen as much as they did under monetary union. Factor mobility has been the hallmark of the German integration episode distinguishing it from similar episodes in economic history. Barriers related to language, institutions, and culture in unified Germany are negligible; convergence of behavior in the past 15 years has been so significant that one can really speak of a common representative household.\textsuperscript{11} It is

\textsuperscript{11} Recent research by Burda and Hunt (2001), Fuchs-Schuendeln (2004), and Dohmen et al. (2005) suggest convergence in the behavior of eastern and western Germans over time.
testimony to this that German economic policy achieved a high level of consumption for its citizens early on, tackling the harder problem of sustainability in a second, longer phase.

At the outset of post-unification period, Eastern Germany was isolated from world trade and was burdened with an outdated capital stock and uncompetitive structure of output (Akerlof et al., 1991). The lack of brands, corporate headquarters and R&D centers also hamper the achievement of West German levels of total factor productivity. Yet absent distortions, the neoclassical economic paradigm sets a high bar for justifying policy interventions. Naturally there are significant deviations of the German economy from this benchmark in product, labor and financial markets. One could have justified and did justify any number of interventions, all of which were rejected in the pressure-cooker atmosphere of reunification as impractical (Bleibeprämien) or subject to massive problems of political economic capture ex-post (wage subsidies, Eastern exemptions from value added tax). In the current German fiscal environment such policies are even less likely to be pursued.

Looking forward, I venture to assert that the glass is more half-full than half-empty. The decades to come will see relatively strong growth in Eastern Germany, which by virtue of its location will be closer to the growth markets of the future in Central and Eastern Europe. By virtue of the reunification episode, Eastern German labor markets are more flexible than their western counterparts; the brunt of recent collapse in demand for high-end investment and durable goods are likely to induce further patterns of structural change in the West which the East has already experienced. While structural change and adaptation will save a core of highly efficient industry in the new states, the steady drain of population to the West guarantees that the East of the 21st century will be a lattice of growth poles alternating with areas of chronic outmigration, dependency on transfers, and local economic decline. Given that East Germany comprises the land mass of the equivalent of the US state of Tennessee (108,333 km² or 41,828 sq mi), this may not seem like a problem, but it is important to keep in mind that the population density of the former GDR (including all of Berlin) remains roughly 150 persons/km² compared with 265 and 58 in Western Germany and Tennessee, respectively.

For these reasons, I offer a much more nuanced but also optimistic view of the eastern German States than do my colleagues Sinn (2000) or Uhlig (2006). A slow bleeding of population is inevitable, but with a North-South divide in which old locational advantages and traditional agglomeration patterns in the southern Eastern states are reasserted and reinforced. The radical structural change in product and labor markets has steeled East Germany for the challenges of globalization and made it particularly poised to profit from the continuing growth and prosperity of the new market economies of Central and Eastern Europe. It would not surprise me if the population trend is reversed in the next decade, as East Germany reassumes its role – after more than half a century –as the center of the European economic area.
References


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