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The East German Economy in the Twenty-First Century

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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 policy makers 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. Although it could be viewed as an explicit policy choice made under political constraints, reunification had no viable economic alternative.

For economists, German unification posed questions of central professional interest. Harvard's Robert Barro boldly predicted that it would take thirty-five years for the East to close half of the 70 percent productivity gap with the West.[1] 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 sharp increases in productivity in the years 1991–4. 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 it was not unique and was path dependent. In the early 1990s, I argued

[1] Rober Barro, "Eastern Germany's Long Haul," *The Wall Street Journal*, May 3, 1991.

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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 nineteenth century, or instead a scenario 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.[2] This multiplicity of potential outcomes must have prompted the government of Chancellor Helmut Kohl to act as it did, arguably with more decisiveness than the economists who advised it.[3]

Considering the initial conditions of the German Democratic Republic (GDR) and the standard of living in other comparable communist states at the outset (e.g., the Czech Republic and Slovakia), 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.[4] 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. The overall unemployment rate in the East is now slightly less than double of that in the West.

The Germans insisted on unification their way and paid a heavy price for it. Overall gross domestic product growth has slowed since the mid-1990s, partly due to the new tax burdens induced by reunification, partly for reasons having to do with structural shifts in production patterns. Much of the Eastern German economy was destroyed in 1990 by monetary union, at a stroke of the pen; yet having its own currency would have bought five but certainly not twenty years of prosperity. The extent of structural

[2] See Michael Burda and Charles Wyplosz, "Labor Mobility and German Integration: Some Vignettes," in *The Transformation of Socialist Economies*, ed. H. Siebert (Tübingen, 1992).

[3] Karl-Heinz Paqué, *Die Bilanz: Eine wirtschaftliche Analyse der Deutschen Einheit* (Munich, 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 George Akerlof, Janet Yellen, Andrew Rose, and Helen Hessenius, "East Germany in from the Cold: The Economic Aftermath of Currency Union," *Brookings Papers on Economic Activity*, 1991:1; Michael Burda, "Les Conséquences de l'Union Economique et Monétaire de l'Allemagne," *Revue de l'OFCE* (1990); Michael Burda, "Capital Flows and the Reconstruction of Eastern Europe: The Case of the GDR after the Staatsvertrag," in *Capital Flows in the World Economy*, ed. H. Siebert (Tübingen, 1991); Hans-Werner Sinn and Gerlinde Sinn, *Kaltstart: volkswirtschaftliche Aspekte der deutschen Vereinigung* (Munich, 1991); Irwin Collier and Horst Siebert, "The Economic Integration of Post-Wall Germany" *American Economic Review* 81 (1991): 196–201; Michael Burda and Charles Wyplosz, "Labor Mobility and German Integration: Some Vignettes," in *The Transformation of Socialist Economies*, ed. H. Siebert (Tübingen, 1992); Michael Burda, "Labor and Product Markets in Czechoslovakia and the Ex-GDR: A Twin Study," *European Economy*, July 1991.

[4] Tilman Brück and Heiko Peters, "Twenty Years of German Unification: Evidence on Income Convergence and Heterogeneity," DIW Discussion Paper 925, October, 2009.

change necessary for a planned economy to compete internationally was certainly underestimated by most observers at the time. With aggregate output per capita currently hovering at 70 percent and labor productivity at 80 percent of West German levels, further convergence will be slow because it is not only about equipping East Germans with adequate physical and human capital but also about endowing them with the same level of social, institutional, business, and marketing infrastructure, and the right output mix.[5] As a result, the last mile of convergence in productivity per capita and other measures of long-term economic viability will be difficult without further structural change. Yet because of its initial trial by fire, the Eastern German economy looks much more vibrant and robust than the macroeconomic numbers lead one to believe. Karl-Heinz Paqué has recently presented convincing evidence that the overall "investment" was worth it.[6]

This essay is organized along four themes: (1) economic convergence and its measurement; (2) the mobility race between capital and labor that has taken place since 1990; (3) structural change and the implantation of new institutions that 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.

CONVERGENCE: A QUESTION OF BENCHMARKS

The political promise made by Chancellor Kohl to Eastern Germans in the run-up to the elections in March 1990 and that certainly determined its outcome was the prospect of *blühende Landschaften* – "blossoming landscapes" of economic growth and prosperity. How does one evaluate that promise after 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 percent of the average Western level. This gap is not significantly larger between poor northern and rich southern states in the western part of Germany. These differences in consumption are strongly influenced by prices of nontradable goods such

[5] This and related snags in the East-West German integration and convergence process were stressed early on by Joachim Ragnitz, "Warum ist die Produktivität ostdeutscher Unternehmen so gering? Erklärungsansätze und Schlussfolgerungen für den Konvergenzprozess," *Konjunkturpolitik* 45, no. 3 (1999): 165–87.

[6] Paqué, *Die Bilanz*.

Table 7. *East-West German Convergence in the Small: Fractions of Households Owning Key Durable Goods (%)*

	Year		
	1993	1998	2007
Durable Good	East/West	East/West	East/West
Automobile	66/74	71/76	72/78
Landline telephone	49/97	94/97	95/96
Cell phone	–	11/11	82/82
Personal computer	16/22	36/43	70/73
Internet access	–	5/9	56/61
Television	96/95	98/95	97/96
Cable access	–	64/51	61/48
Satellite dish	–	30/29	33/41
Video recorder	36/48	61/63	71/69
Refrigerator	95/95	99/99	99/99
Microwave oven	15/41	41/53	68/69
Dishwasher	3/38	26/49	54/64
Washing machine	91/88	94/91	99/95[a]
Dryer	2/24	14/33	22/44

[a] Year: 2006.
Source: IW Köln (2009). All households.

as housing, food, and personal services, which are in turn dependent on local levels of wealth and productivity in traded goods. More revealing are consumption levels of individual goods. Consider Table 7, which shows a striking convergence in 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.[7] From the perspective of consumption or income, Eastern Germany has done 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.

In the light of this evidence it is difficult to deny the impression of "ein Volk." Consumption patterns of Table 7 are mirrored in patterns of labor

[7] In a public opinion poll by the *Tagesspiegel* newspaper and 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 [accessed April 24, 2013]). In the same survey, however, 60% of West Germans believe that East Germans profited most from reunification, while the largest share of East Germans surveyed (34%) thought that West Germans were the main beneficiaries.

market participation. It is also noteworthy that life expectancy – perhaps one of the most easily agreed-upon indicators of well-being – has 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 East German men.[8]

Although consumption is certainly not a sufficient indicator of happiness and well-being, the two are highly correlated. At the same time, self-esteem and self-sufficiency are aspects that also 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. Consumption paid for by transfers from a more productive West hardly represents a sustainable situation in the long term. Thus a more careful look at macroeconomic "supply side" indicator of productivity per capita – a measure that captures both productivity per employed labor as well as the employment rate – is an essential component of any comprehensive assessment of unification two decades later.

The macroeconomic picture for the region of Eastern Germany – originally with a population of roughly seventeen million in the late 1980s – has been rather mixed. Table 8 displays the most commonly used macroeconomic measures of convergence. After the introduction of the D-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 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 Eastern mark-D-Mark conversion rate, and were subsequently proved more than right.[9] After a collapse of Eastern industrial production to about one-third of its 1989 value,[10] 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 gross domestic product gap between the East and West has been closed in less than half the time predicted by Robert Barro.[11] In August 2009, an Eastern German state (Thuringia: 11.1 percent) could boast a lower unemployment rate than a Western one (Bremen: 12.2 percent). If

[8] Institut für Wirtschaftsforschung, Halle (hereafter referred to as IWH), "Ostdeutschland Transformation seit 1990 im Spiegel wirtschaftlicher und sozialer Indikatoren," Sonderheft 1/2009.

[9] Akerlof et al., "East Germany in from the Cold." The *Richtkoeffizienten* represented the planning ministries' own assessment of their ability to raise foreign exchange through international trade. By obtaining these numbers at detailed levels of sectoral disaggregation, Akerlof and his colleagues were able to assess competitiveness of individual industries at the time with remarkable accuracy.

[10] Rudiger Dornbusch and Holger Wolf, "Eastern German Economic Reconstruction," in *The Transition in Eastern Europe*, vol. 1, ed. Oliver Jean Blanchard, Kenneth A. Froot, and Jeffrey D. Sachs (Chicago, 1994).

[11] Barro, "Eastern Germany's Long Haul"; and Barro, Robert, and Xavier Sala-i-Martin, *Economic Growth* (New York, 1995).

Table 8. *East-West German Convergence in the Large: Macroeconomic Indicators (as % of Western German value)*

Year	Consumption	Nominal Wages Per Hour	Nominal Wages Per Worker	Labor Productivity (per hour)	Labor Productivity (per worker)	Gross Domestic Product Per Capita	Unemployment Rate	Participation Rate
1991	62	n.a.	57	n.a.	45	43	165	137
1992	67	n.a.	68	n.a.	57	50	225	121
1993	73	n.a	75	n.a.	67	59	193	111
1994	75	n.a.	77	n.a.	71	64	174	108
1995	78	n.a.	80	n.a	72	67	163	108
1996	79	n.a.	80	n.a	74	68	168	106
1997	79	n.a.	80	n.a	74	68	177	107
1998	80	73	81	68	74	67	186	107
1999	81	74	81	69	75	68	195	106
2000	81	74	81	70	76	67	221	104
2001	80	75	81	72	77	67	235	102
2002	81	75	81	74	79	69	226	102
2003	81	75	81	74	79	69	216	101
2004	80	76	81	74	79	70	214	100
2005	80	77	82	74	79	69	187	103
2006	80	77	82	74	79	70	188	103
2007	80	78	82	75	78	70	200	104
2008	n.a.	79	82	76	79	71	204	104
2009	n.a.	80	83	n.a.	n.a.	n.a.	186	n.a.

Source: Statistisches Bundesamt (Volkswirtschaftliche Gesamtrechnung der Länder), Bundesagentur für Arbeit.

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 Lower Saxony or Schleswig-Holstein.

With hindsight, it is remarkable if not amusing to examine the economic naïveté in political discussion during the early 1990s, which literally expected a phoenix to emerge from the ashes in a matter of a few short years.[12] What could they possibly have been thinking? Estimates of the Central Intelligence Agency 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 *Richtkoeffizient* of 4.4 Eastern marks per D-Mark. The best evidence of this was the collapse of the delivery time for a Trabant or a Wartburg from 4 to 5 years to zero in the months following November 1989.

[12] 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. 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 the process.

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 thinking about growth and productivity as follows. Let $\Delta Y/Y$ stand for the rate of growth of real gross domestic product (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 Δ denotes change over a year). The equation at the center of attention is the following representation of the "Solow decomposition,"[13] which tautologically *defines* the so-called Solow residual $\Delta A/A$ through the following relationship:

$$\underbrace{\frac{\Delta Y}{Y}}_{\substack{\text{Output}\\ \text{growth}}} = \underbrace{\frac{\Delta A}{A}}_{\substack{\text{total factor}\\ \text{productivity}}} + \underbrace{s_K\frac{\Delta K}{K}}_{\substack{\text{output growth}\\ \text{due to capital}}} + \underbrace{(1-s_K)\frac{\Delta L}{L}}_{\substack{\text{output growth}\\ \text{due to employment}}}, \tag{1}$$

where s_K is the before-tax share of capital in national income, a number roughly equal to about one-third in developed economies. The Solow residual captures those determinants of economic growth that 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:

$$\underbrace{\left(\frac{\Delta Y}{Y}-\frac{\Delta N}{N}\right)}_{\substack{\text{Output}\\ \text{growth per}\\ \text{capita}}} = \underbrace{\frac{\Delta A}{A}}_{\substack{\text{growth of}\\ \text{total factor}\\ \text{productivity}}} + \underbrace{s_K\left(\frac{\Delta K}{K}-\frac{\Delta N}{N}\right)}_{\substack{\text{contribution of}\\ \text{changing endowment}\\ \text{of capital per capita}}} + \underbrace{(1-s_K)\left(\frac{\Delta L}{L}-\frac{\Delta N}{N}\right)}_{\substack{\text{contribution of changing}\\ \text{employment rate}}}, \tag{2}$$

with $\Delta N/N$ standing for the growth rate of the population. Because ($\Delta L/L-\Delta N/N$) is approximately equal to the change in the employment rate, this equation attributes changes in per capita gross domestic product (per capita

[13] Robert Solow, "Technical Change and the Aggregate Production Function," *Review of Economics and Statistics* 39 (1957): 312–20.

Table 9. *Accounting for Per Capita Gross Domestic Product East-West Gap*

Per Capita Gross Domestic Product East-West Gap (in %)		Attributable to Gap (in %) in . . .		
		Total Factor Productivity	Capital Endowment	Employment Rate
1995	32.2	9.0	17.4	5.9
2000	31.2	10.5	12.1	8.6
2006	26.7	8.9	9.5	8.3

Note: The state of Berlin is excluded from this analysis.

productivity) not only to growth in total factor productivity ($\Delta A/A$) and growth in physical capital stock per capita ($\Delta K/K$–$\Delta N/N$), but also to improvement in the state of the labor market expressed as the change in the employment rate, the utilization of available working-age individuals.[14] An increase in the employment rate in the East, *ceteris paribus*, is associated with increasing gross domestic product per capita. This explains why the doggedly high unemployment rate 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 states (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 9 presents estimates of this "lateral output gap decomposition" using data from 1995, 2000, and 2006.

CENTRAL MECHANISMS OF GERMAN INTEGRATION: MOBILITY AND STRUCTURAL CHANGE

Mobility of Capital versus Labor

Early on, Horst Siebert presciently described the transformation of the ex-communist economies as an "integration shock,"[15] and there is little doubt that unification was a surprise to economic agents in both the East and West. To focus discussion, I employ Eichengreen's intuitive definition of economic integration: the achievement of efficient production by two or more geographic regions formed by their union.[16] 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 and the motivation for Barro's pessimistic prediction.[17] 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 that use labor more intensively. Finally, the backward region can adopt technologies, techniques, and "soft infrastructure" from the leading region, heading 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.[18] In terms of equation (2), an increase in capital investment in the East ($\Delta K/K > 0$) will increase gross domestic product 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 the 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 (two-thirds) of the cumulated investment flow in Eastern Germany was dedicated to residential and business structures, compared with about one-third 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

[14] If the employment rate is denoted by L/N, its percentage change is approximately equal to $\Delta L/L - \Delta N/N$ or $\Delta lnL - \Delta lnN$. 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).

[15] Horst Siebert, *Das Wagnis der Einheit: Eine wirtschaftspolitische Therapie* (Stuttgart, 1992).

[16] Barry Eichengreen, "One Money for Europe: Lessons from the U.S. Currency Union," *Economic Policy* 10 (1990): 117–87.

[17] Robert Barro and Sala-i-Martin Xavier, "Convergence Across States and Regions," *Brookings Papers on Economic Activity*" 1 (1991): 107–82; Barro, "Eastern Germany's Long Haul."

[18] This is based on arguments I have made elsewhere more formally: Michael Burda, "Factor Reallocation in Eastern Germany after Reunification," *American Economic Review* 96 (2006): 368–74 and Michael Burda, "What Kind of Shock Was It? Regional Integration and Structural Change in Germany after Unification," *Journal of Comparative Economics* 36 (December 2008): 557–67.

Table 10. *Capital Formation in Eastern and Western Germany (1991–2007)*

Region	Average Investment Rate (% of GDP)		Investment Per Capita (EUR. 2000 Prices)		Average Annual Investment Per Worker Employed (EUR. 2000 Prices)	
	Equipment	Structures	Equipment	Structures	Equipment	Structures
East (excl. Berlin)	11.6	21.7	1836.6	3440.4	4338.3	8126.9
West	9.0	10.2	2372.9	2694.7	4946.3	5616.9
Berlin	8.5	11.3	1928.7	2544.4	4162.6	5491.6

Source: Statistisches Bundesamt, Volkswirtschaftliche Gesamtrechnung der Länder.

of output and factor demands.[19] 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 10).

Rising capital endowment in the Eastern German economy was thus a prime determinant of the rapid rise in productivity per employee documented in Table 11. It was driven not only by the growth of investment spending but also by labor shedding, especially in the first years following reunification. In some sectors, capital intensity has even overshot Western levels. For example, the official estimate of eastern aggregate capital-labor ratio in manufacturing was virtually at par with the West as early as 2002 at 99 percent; this average concealed variation ranging from 66 percent in textiles/clothing and 81 percent in metallurgy to 125 percent in chemicals and 122 percent in the automobile sector. Even higher ratios could be found in intermediate materials (average 123 percent of the West), basic chemicals (143 percent), and mining and quarrying (184 percent). Overall, however, the capital-labor ratio in Eastern Germany remains, according to the Federal Statistical Office, at 84 percent of the West German level.[20]

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 off from economic forces of

[19] Hans-Werner Sinn, "EU Enlargement and Lessons from German Unification," *German Economic Review* 3 (2000): 299–314.

[20] Bundesministerium für Verkehr, Bau und Stadtentwicklung, *Jahresbericht der Bundesregierung zum Stand der Deutschen Einheit* (2009).

Table 11. *Membership in Employers' Associations, Union Coverage and Pay in Eastern Germany, 1993–2003*

	1993	1998	2003
Share of all firms which are	36	21	10
	76	45	29
Share of all firms paying less	35	41	47
Share of all			

Source: DIW. This survey has been discontinued and comparable, more recent data on unionization are unavailable.

international specialization and trade. The recovery of economic activity since the early 1990s in the new states has by no means been uniform. As already mentioned, Akerlof and his colleagues showed, using internal statistics maintained by the central planners of the GDR, that only about 20 percent of industry was internationally competitive at a 1:1 Ostmark-D-Mark exchange rate immediately following unification.[21] The extent of this structural change can be seen in Figure 6, which documents the relative overall evolution of gross sales in industrial sectors in the period 1995–2008. Noteworthy is not only the strikingly uneven recovery of East German industry but also the relative reallocation of production from the West toward the East in the vast majority of sectors. It is also 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 Friedrich Hayek would have 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.[22] Reunification did not imply an immediate scale-back of the level of East German government to West German standards but required a steady effort that faced great political obstacles.[23] In terms of real gross domestic product, Eastern Germany

[21] Akerlof et al., "East Germany in from the Cold."

[22] Sinn and Sinn, *Kaltstart*; Sinn, "EU Enlargement."

[23] Paqué, *Die Bilanz*.

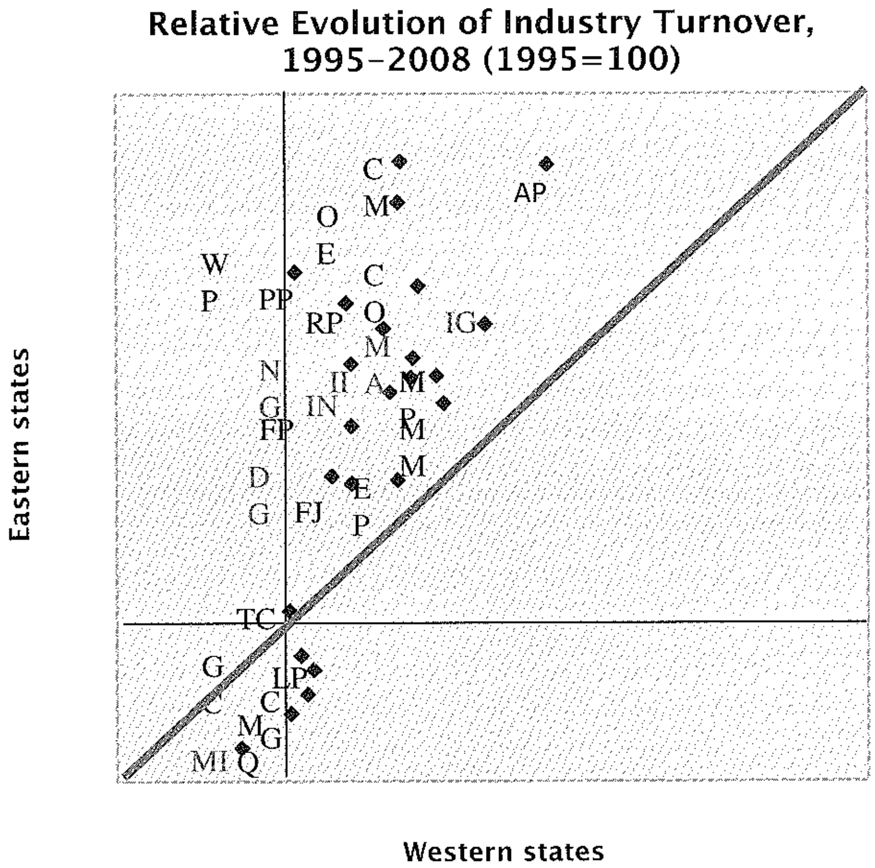

Figure 6. Structural Change in Germany, 1995–2008. *Note:* Each point corresponds to one of the following industrial sectors: mining and quarrying (MQ); coal mining, peat, oil, and gas production (CG); food processing and tobacco (FP); textiles and clothing (TC); leather production and processing (LP); 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.

including Berlin has grown since 1992 by roughly 2.7 percent annually, and by 3.7 percent if Berlin is excluded – compared with 1.5 percent per annum real growth in the West. If only the manufacturing industry is considered, real growth amounted to 5.5 percent in the East (including Berlin) and a whopping 8.1 percent 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.

Although Eastern Germany continues to account for a smaller fraction of total output than its population share, and although 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 percent of total German value-added in that sector, up from 7.6 percent in 2000 and 5.6 percent in 1995. In striking contrast, the East German value-added share in broadly defined services has hardly risen since 1995 from 11.2 percent to 11.7 percent. This reflects a shrinking government and growing private services. The share of construction fell from 27.8 percent in 1995 to 16.9 percent 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. Concomitant with the expansion of manufacturing in the new states is a visible change in economic structures in the old Western states. The two panels of Figure 7 provide evidence for this claim.[24] The first 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 one-fifth of its socially insured employment in industry while significantly increasing the number of jobs in services, especially business-related services.[25]

The second panel displays the evolution of indexes of disparity in sectoral employment growth as proposed by Lillien.[26] 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

[24] Reproduced from Robert Bachmann and Michael C. Burda, "Sectoral Transformation, Turbulence, and Labor Market Dynamics in Germany," *German Economic Review* 11 (2010): 37–59.
[25] Ibid.
[26] David Lillien, "Sectoral Shifts and Sectoral Unemployment," *Journal of Political Economy* 90 (1982): 777–93.

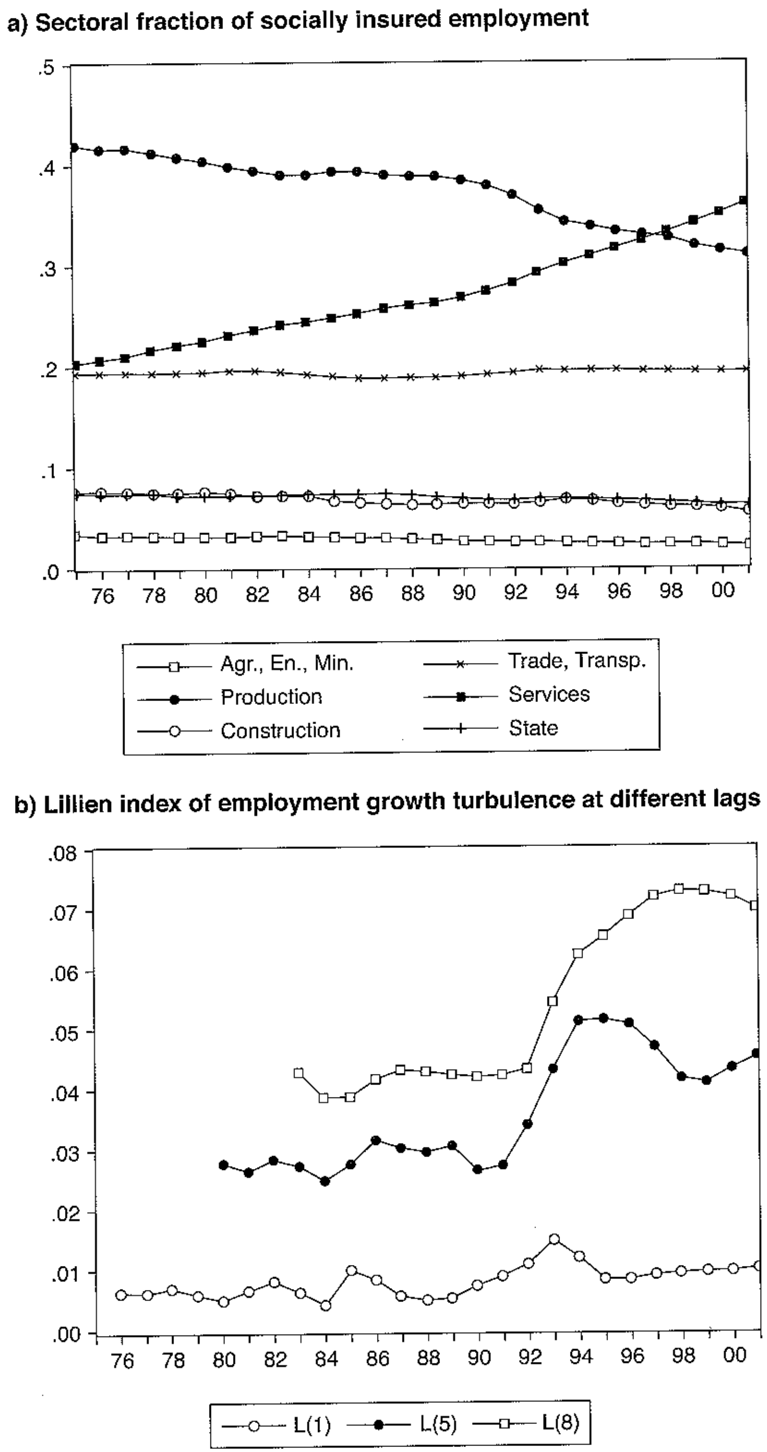

Figure 7. Indicators of Structural Change in Western Germany: (a) Sectoral fraction of

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 begins 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 11 depicts the dramatic loss of influence of the vaunted (West) German collective bargaining model in the East. Following an initially successful campaign for legitimacy in wage bargaining in the first years following unification, membership fell from well more than 50 percent to now less than 20 percent. At the same time, growing frustration with a collective bargaining system has driven eastern German companies to abandon employers' associations (*Arbeitgeberverbände*), weakening legitimacy of collective bargaining at the industrial-regional level, which is typically strong in Germany.[27] The result has been a steady reduction of unit labor costs in the new states, once decried by Gerlinde and Hans-Werner Sinn as having the highest in the world,[28] are now lower than in Western Germany and represent a source of competitive advantage for new FDI (Figure 8). Overall, Eastern Germany looks to emerge as a foil for labor market rigidities frequently stressed in the discussion of West German labor markets.[29]

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 forty to fifty thousand per year. Investment has stabilized at levels that, while significant, do not match record levels in the mid-1990s.[30] 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 "hysteresis" – when long-run

[27] Boeri, Tito, Alison Booth, and Lars Calmfors, *Unions in the Twenty-First Century* (Oxford, 2007).
[28] Sinn and Sinn, *Kaltstart*.
[29] Christian Merkl and Dennis Snower, "The Caring Hand that Cripples: The East German Labor Market after Reunification," *American Economic Review* 96, no. 2 (2006): 275–382.
[30] 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 Harald Uhlig, "Sectoral Transformation, Turbulence, and Labor Market Dynamics in Germany," *German Economic Review* 11 (2006): 37–59.

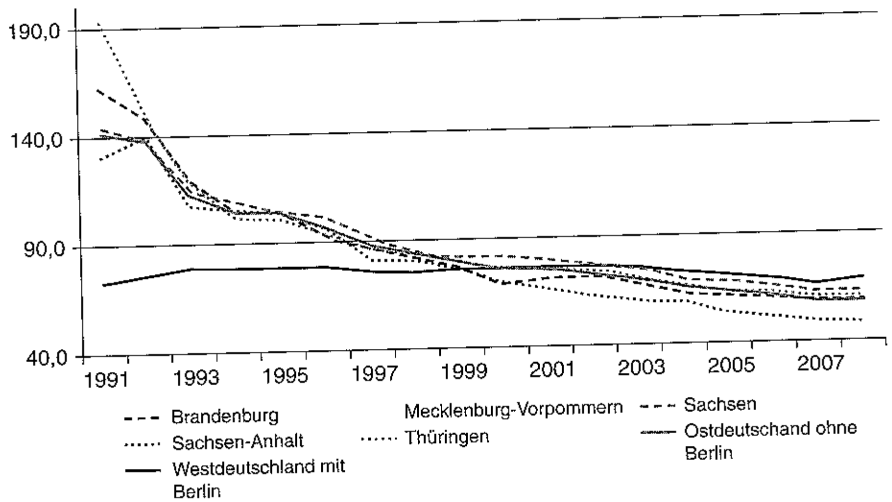

Figure 8. Unit Labor Costs (total wage compensation in manufacturing per employed worker in current prices relative to union coverage and pay) Western Germany and Eastern German States, 1991–2007. *Note:* Unit labor costs in manufacturing measured as index of gross pay per worker divided by index of nominal value of output added per worker × 100. Berlin is counted as part of western Germany. *Source:* IWH (2009). Reproduced with permission.

outcomes are path dependent and history matters.[31] This would rather speak for the national park outcome for Eastern Germany rather than *blühende Landschaften.* As long as people of working age continue to leave Eastern Germany, the long-run physical and human capital resources needed for sustainable development will also diminish commensurately.

The implications of this analysis for economic policy are strikingly anti-*laissez-faire.* A significant positive policy move that led 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 investment in the region and increases the rate of return, attracting more investment, and so forth. 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. As the preceding analysis suggests, too much investment occurred in residential construction at the expense of productive workplaces for Eastern Germans.

[31] See, e.g., Burda, "Factor Reallocation"; Sebastian Böhm, "Stabilität und Eindeutigkeit von Gleichgewichten in Modellen der räumlichen Faktormobilität in diskreter Zeit" (diploma thesis, Humboldt-Universität zu Berlin, 2009).

Yet there is more reason to question the Panglossian critique of economic 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 its output. The reasons for agglomeration are manifold, but a convincing case for them has been around at least since Alfred Marshall in the late nineteenth century. Marshall argued that large markets can support more product diversity and more efficiency in connecting input producers and users of intermediate inputs, where "support" means the payment of fixed costs. Areas in economic decline face the opposite effect, with smaller communities in Eastern Germany facing ever-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 led to more out-migration, aggravating the process. This logic can be extended to many phenomena in the private domain, including labor market "thickness," which can lead to a vicious cycle of slow but inexorable regional decline.

After almost two decades, the force of agglomeration has begun to show up in an increasingly latticelike development of Eastern Germany. Figure 9 displays net population changes in 2007 at the level of *Landkreis* (comparable to counties) that appeared in a recent review of the East German economy.[32] Although the mechanism of endogenous decline clearly appears to be operative, there are many recognizable points of light in the figure – at least ten light-colored nodes of population growth in this year, 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 Jennifer Hunt and Michael Burda,[33] 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 that ended up in poorly chosen infrastructure projects. Arguably, a

[32] IWH, "Ostdeutschland Transformation."

[33] Jennifer Hunt, "Staunching Emigration from East Germany: Age and the Determinants of Migration," *Journal of the European Economic Association* 4 (2006): 1014–37; Michael C. Burda and Jennifer Hunt, "From Reunification to Economic Integration: Productivity and the Labor Market in East Germany," *Brookings Papers on Economic Activity* 2 (2001): 1–71.

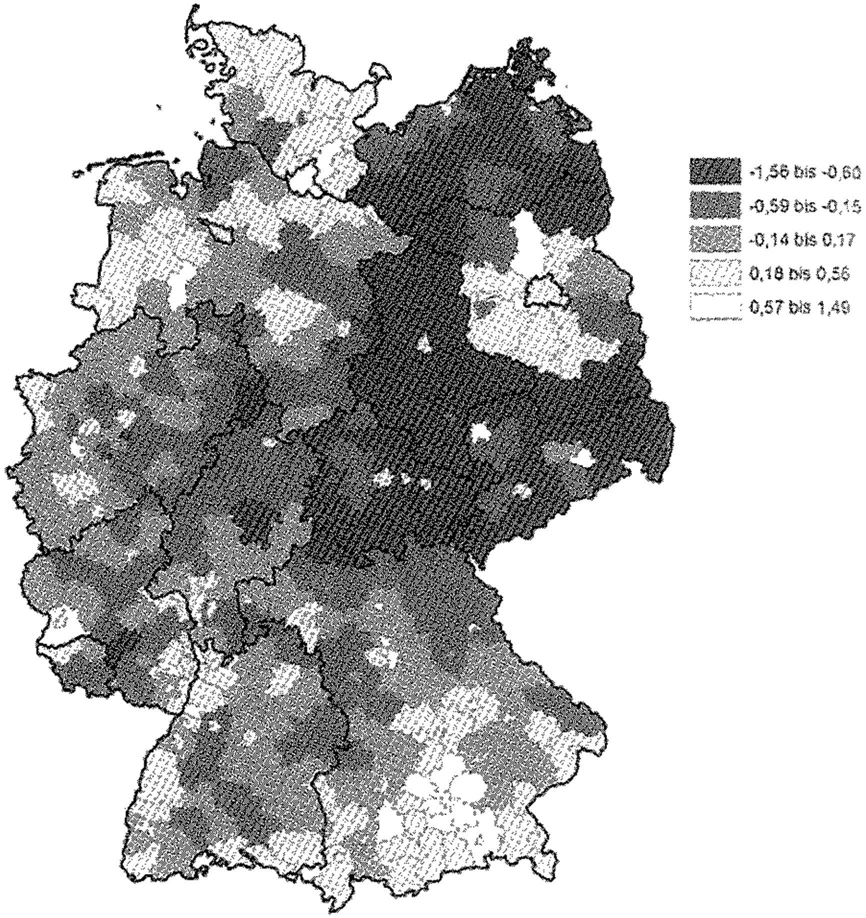

Figure 9. Population Change in Germany by Landkreis, 2007. *Source:* IWH (2009). Reproduced with permission.

tough triage policy might have saved more of East Germany from economic decline.

A little-considered advantage of Eastern Germany that will interact with the effects just described is related to the region's proximity to growth markets of the next two to three 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 in 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 inward foreign investment by Polish and Czech firms and real estate acquisition by wealthy Polish and Czech families.

CONCLUSION

Eastern Germany, with approximately the land mass of Tennessee yet with 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 sense 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 policy makers. 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 fifteen years has been so significant that one can really speak of a common representative household.[34] It is 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, more prolonged phase.

At the outset of the postunification period, Eastern Germany was isolated from world trade and was burdened with an outdated capital stock and uncompetitive structure of output.[35] The lack of brands, corporate

[34] Recent research suggests a convergence in the behaviour of Eastern and Western Germans over time. See Burda and Hunt, "From Reunification to Economic Integration"; Nicola Fuchs-Schuendeln, "Adjustment to a Large Shock – Do Households Smooth Low Frequency Consumption?" mimeo, Harvard University, 2005; and Thomas Dohmen, Armin Falk, David Huffman, Jürgen Schupp, Uwe Sunde, and Gert Wagner, "Individual Risk Attitudes: New Evidence from a Large, Representative, Experimentally-Validated Survey" DIW Discussion Paper 511, September 2005.

[35] Akerlof et al., "East Germany in from the Cold."

headquarters, and R&D centers also hampers the achievement of West German levels of total factor productivity. Yet in the absence of market 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 (such as *Bleibeprämien*, "premiums for staying") or subject to massive problems of political economic capture ex-post (e.g., wage subsidies and 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 the recent collapse in demand for high-end investment and durable goods is likely to induce further patterns of structural change in the West, which the East has already experienced. Although 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 twenty-first century will be a lattice of growth poles alternating with areas of chronic outmigration, transfer dependency, and local economic decline. Given that East Germany comprises the land mass of the equivalent of the state of Tennessee (108,333 km^2 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/km^2 compared with 265 and 58 in Western Germany and Tennessee, respectively.

For these reasons, I conclude a much more nuanced and optimistic view of the Eastern German states than my colleagues Sinn or Harald Uhlig.[36] A slow bleeding of population is inevitable, but will ultimately be dominated by a North-South divide in which old locational advantages and traditional agglomeration patterns in the southern Eastern states are reasserted and reinforced. Radical structural change in product and labor markets in the past two decades has steeled East Germany for the challenges of globalization and made it particularly poised to profit from the continuing

[36] Sinn, "EU Enlargement"; Harald Uhlig, "Regional Labor Markets, Network Externalities and Migration: The Case of German Reunification," *American Economic Review* 96 (2006): 383–5.

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 a half-century of dormancy – as a new growth pole for the European economic area.