Combining risk and shock factors augments the level approach. High debt affects future operations and investment if firms are hit by a shock. Whether highly leveraged firms are at risk depends also on the macroeconomic environment in which they operate. Three sources of macroeconomic shocks and their potential impact on the balance sheets of firms are explored: a decline in GDP, a decline in exports, and a rise in exchange rates (which affects unhedged firms with foreign currency loans).

The main conclusion is that financial distress owing to these risk–shock combinations is limited in emerging Europe. Figure 3.19 plots the outcome of all three economic shocks.[39] The figure helps to identify endangered countries that face high risks (due to a large proportion of relatively highly leveraged firms or a large proportion of foreign currency loans) and suffer large macroshocks:

• The top-left panel shows the share of firms with moderate to high leverage ratios (the risk factor) and declines in real GDP in 2009 (the shock factor). The risk region is the upper left corner of the panel: countries that have a large share of overleveraged firms and face a sharp decline in real GDP. By this measure, only firms in the three Baltic states are likely to face financial distress. Firms in Croatia and Slovenia might face financial distress as well, though the income shock they experienced was not as large. As a counterexample, FYR Macedonia is a high-risk country on account of its high leverage levels, but financial distress is unlikely because this economy did not suffer a sharp GDP contraction.

• The top-right panel plots the share of unhedged foreign currency loans (the risk factor) against the depreciation (the shock factor) experienced by each country: the cumulative exchange rate change in 2007–09.[40] The debt overhang zone is at the upper-center and upper-right corner of the panel, showing countries that have a large share of unhedged firms and face a sharp depreciation. Albania seems to be the country most at risk, with a depreciation of more than 15 percent and more than 30 percent of all loans unhedged. Firms in Ukraine, which experienced the sharpest depreciation during the crisis (55 percent), are less likely to be affected due to the low shares of unhedged foreign currency loans.

• The bottom left panel shows the share of exporting firms with moderate to high leverage ratios (the risk factor) and declines in exports (the shock factor). The countries in the upper left corner of the panel are those most at risk, with a large share of overleveraged firms and a sharp decline in exports. Firms in Estonia, FYR Macedonia, Latvia, Lithuania, and Slovenia are the most likely to be experiencing financial distress. In each of these countries about a third of the exporting firms are moderately to highly leveraged, and the decline in exports is pronounced. But financial distress in the tradable sector affects a broader set of countries. For example, Croatia, the Czech Republic, Serbia, the Slovak Republic, and Turkey had a quarter of their export-oriented firms moderately to highly leveraged and faced export declines of about 20 percent of GDP. The speed with which export markets recover will be critical in determining the impact of these trade shocks. Developments in 2010 and 2011 (at least until July) are, in terms of export recovery, encouraging (figure 3.19, bottom right panel).

Households—few indebted and often wealthy

The 2010 EBRD-World Bank Life in Transition survey (LITS), which provides information on 23,525 households for the 21 emerging European countries examined in this chapter, is used to assess the extent of debt overhang among households.[41] This survey includes information on expenditures, household composition, current and past economic activity of respondents, and the incidence and type of bank debt held. Households that own the dwelling they inhabit are asked whether they have a mortgage and, if so, whether it is denominated in local or foreign currency. Households are also asked whether any member has a debit or credit card, and how they responded to the crisis, whether through cuts in consumption and investment or the sale of assets.

As with firms, debt incidence among households is limited. Just 6 percent of households living in a dwelling they own have a mortgage (table 3.5), and only a third of all mortgages are in foreign currency—that is, just 2 percent of the owner-occupied dwellings in the region have a foreign currency mortgage. By contrast, credit cards are used by a quarter of the population. This contrasts with around 40 percent of households in France, Germany, Italy, Sweden, and

Figure 3.19: A few firms in a few countries are at risk in emerging Europe
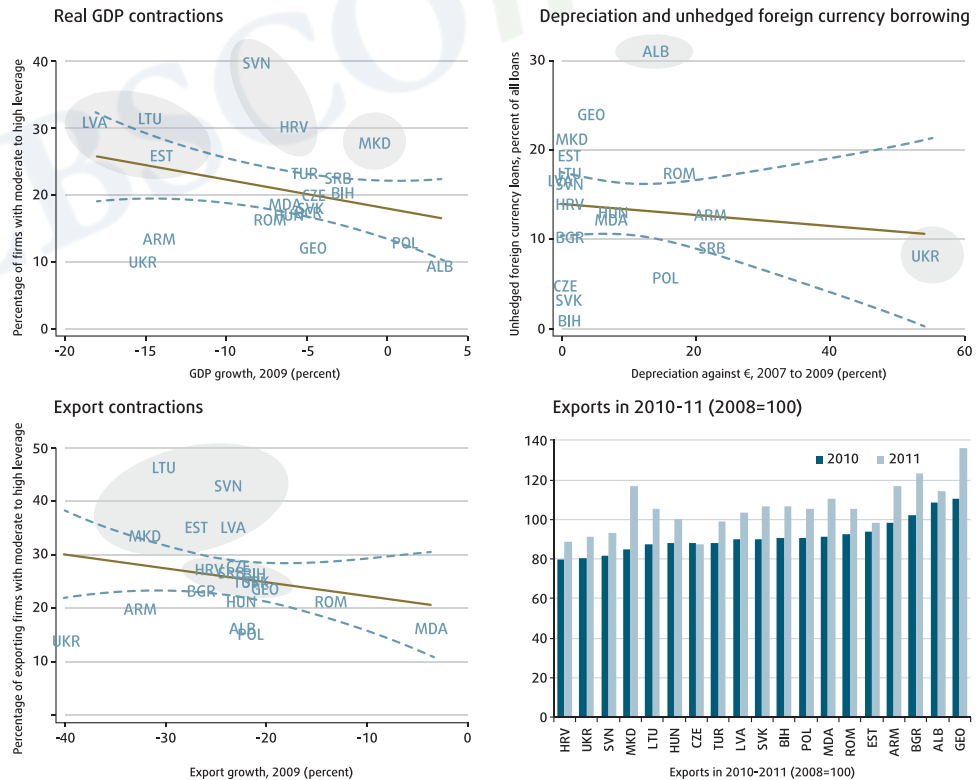
Note: Error bands (95 percent confidence intervals) are depicted with dashed lines. The shaded countries denote varying degrees of risk. Also, in Estonia's case, the adoption of the euro eliminates the exchange rate risk in euro-denominated loans.
Source: Brown and Lane 2011; and IMF WEO.

166

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Account: s4245486

the United Kingdom who have a mortgage, and 53 percent who have a credit card.

The countries naturally have differences. In the EU12 countries, 9 percent of all households have a mortgage compared with 4 percent in EU candidate and 2 percent in EU eastern partnership countries. Credit card use is less frequent in EU eastern partnership countries (10 percent) than in either the EU12 (31 percent) or EU candidate countries (30 percent). Even the EU12 countries reveal large differences in household use of credit. In Hungary, for example, 16 percent of households in owner-occupied dwellings have a mortgage and 55 percent of all households have a credit card. In Lithuania, the corresponding shares are 6 percent and 12 percent.[42]

Although household debt is limited to few households, it is still useful to ask how much they have been affected by the crisis. To answer this, two aspects of household vulnerability can be examined: how debt affects a household's consumption and investment (the level approach), and whether household debt is more prevalent in countries severely hit by the crisis (the risk-shock approach).

The 2010 LITS survey allows an assessment of household vulnerability by examining the impact of household debt on consumption and investment during the crisis (the level approach). The results of the econometric work carried out (Brown and Lane 2011) suggest that households with mortgage debt are more likely to reduce consumption and investment than households without mortgages. Specifically, households with mortgage debt were 3 percent more likely to reduce their consumption, 8 percent more likely to cut the use of services, and 2 percent more likely to sell assets. Interestingly, the impact of mortgage debt is comparable to a loss of income (job loss). Thus the impact of mortgage debt is economically relevant. But, as already noted, the incidence of debt is limited. By contrast, there is no impact of credit card use on consumption or investment, suggesting that credit cards are not used extensively for financing.[43]

When the risk-shock approach presented earlier for firms is applied to households with mortgage debts, the first conclusion is that mortgage debt does not appear to be much of a risk for economic activity (figure 3.20, left panel). Estonia is the only country that experienced a sharp contraction in GDP and has a high incidence of mortgages. But, at 17 percent of all households, even Estonia's debt incidence is low and unlikely to become a drag on aggregate household consumption and investment. Another endangered country is Hungary, but here too mortgage debt is limited (16 percent of all households), and the income shock has not been as sharp. Latvia, the Czech Republic, and the Slovak Republic are also moderately at risk.

The second conclusion is that for countries that experienced exchange rate depreciation, the use of foreign currency mortgages is limited (figure 3.20, right panel).[44] Countries that face a large depreciation and have a large share of households with foreign currency loans are at risk. This includes Ukraine, Hungary, Poland, Romania, and Serbia, although only Hungary has a large share of households with foreign currency mortgages (9 percent).

These conclusions hold even when a broader range of household debt (that is, not only mortgage debt) and economic shocks are considered. As in previous World Bank reports (for example, Mitra, Selowsky, and Zalduendo 2010; Sugawara and Zalduendo 2009; Tiongson and others 2010), the vulnerability of indebted households is assessed by stress-testing individual household balance sheets using economic shocks similar to the worst shocks that these countries experienced from 2007 to 2010. Using household budget surveys, households are tagged as vulnerable if they have to spend more than 30 percent of disposable income on debt service. This is done before subjecting these households to economic shocks. Specifically, the darker shaded areas in the columns represent households that are vulnerable in each income quintile

Table 3.5: Few households in emerging Europe have debt

	Percentage of Households with		o/w FX Mortgage-Holder (percent)
	Credit Card	Mortgage	
Bulgaria	14.9	3.7	30
Czech Republic	41.4	11.1	0
Estonia	31.0	16.9	50
Hungary	55.4	16.3	56
Latvia	33.6	9.2	80
Lithuania	12.4	5.6	41
Poland	19.0	4.5	37
Romania	12.9	4.8	73
Slovak Republic	40.5	12.8	0
Slovenia	46.9	3.9	19
EU12	30.8	8.9	39
Albania	17.8	2.4	39
Bosnia and Herzegovina	14.9	3.9	16
Croatia	37.5	7.0	85
Macedonia, FYR	33.1	1.7	11
Serbia	21.2	3.5	75
Turkey	57.6	3.2	6
EU candidates	30.3	3.6	39
Armenia	8.6	3.8	23
Georgia	6.7	1.7	58
Moldova	2.4	0.5	0
Ukraine	20.9	1.1	47
Eastern partnership	9.6	1.8	32
Average	26.4	5.9	37

Note: Observations are weighted to account for the varying size of the sampling units within countries. A household is said to have a mortgage if the household owns the dwelling in which it lives.
Source: World Bank staff calculations, based on Brown and Lane 2011.

Real GDP contractions

Foreign currency depreciation and mortgages
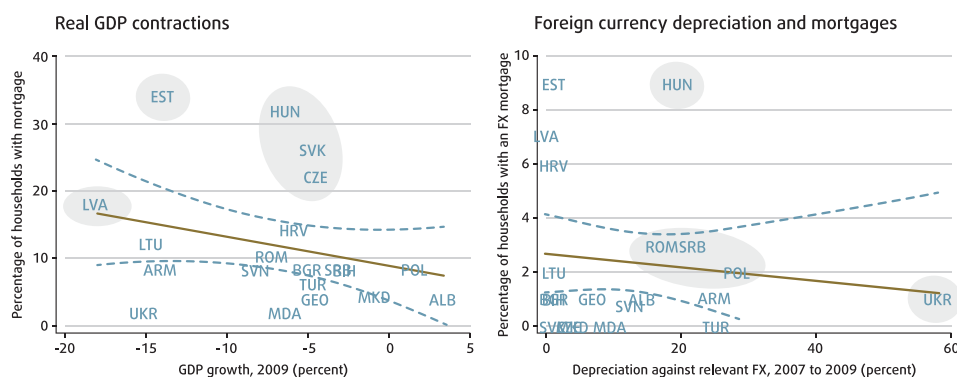
Figure 3.20: Only few households in few emerging European countries are excessively indebted

Note: Error bands (95 percent confidence intervals) are depicted with dashed lines. Relevant foreign currency refers to the dominant currency in which household debt seems to be denominated. For all countries it is the euro, except the Swiss franc for Hungary, Poland, and Slovenia; and the U.S. dollar for Armenia, Belarus, Georgia, Moldova, and Ukraine. Also, in Estonia's case, the adoption of the euro eliminates the risk in all euro-denominated loans.
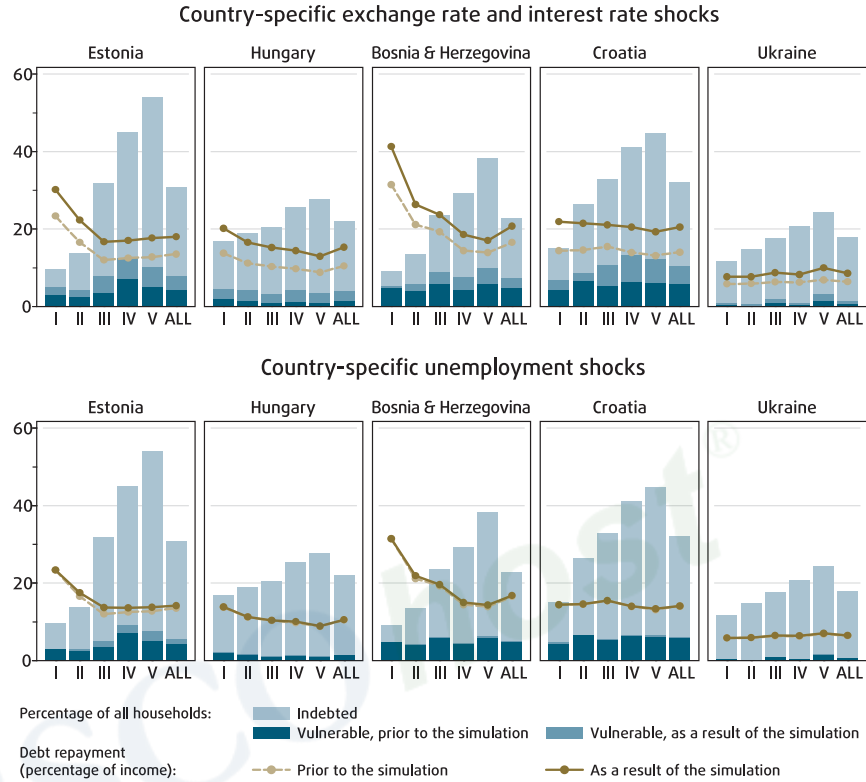Source: World Bank staff calculations, based on Brown and Lane 2011.

before a household is subjected to an economic shock simulation (figure 3.21).[45] The median debt service is the lower dotted line in the figure. Across all indebted Estonian households, for example, median debt service is 17 percent of income and only 4 percent of all households (or about 15 percent of households with debt) are vulnerable before an economic shock takes place.

Two findings stand out. First, debt service is concentrated in upper-income households. Second, few households have debt. In Estonia, for instance, about 30 percent of all households have some type of debt (the last column in figure 3.21). In other words, debt is not as widespread as it is in Western Europe and the United States.

Next, two shock combinations are introduced.[46] First, the effects of a simultaneous increase in interest rates and a depreciation of the local currency are examined (figure 3.21, top panel). The size of these shocks is based on the highest increase in interest rates together with the largest depreciation in each country over the four-year period from January 2007 through December 2010. Implicitly, countries with fixed exchange rates would not have such a shock (and, in addition, in Estonia's case the adoption of the euro eliminates this risk in euro-denominated loans). Second, the implications of unemployment are estimated by randomly selecting household members who become unemployed (figure 3.21, bottom panel).

The conclusion from these stress-testing scenarios is that households are affected by the shocks, but that debt burden remains manageable. For example, while 4 percent of all households were vulnerable in Estonia before an economic shock is applied, this increases to about 8 percent of all households after the shock. This represents 20–25 percent of all loans to households. Although this is not a figure to be dismissed lightly, the shocks affect only one in every 13 households. In short, this low frequency suggests that household debt is unlikely to become a drag on aggregate economic activity in emerging

Figure 3.21: Households in emerging Europe can withstand economic shocks

Country-specific exchange rate and interest rate shocks

Country-specific unemployment shocks

Percentage of all households: Indebted / Vulnerable, prior to the simulation / Vulnerable, as a result of the simulation

Debt repayment (percentage of income): Prior to the simulation / As a result of the simulation

Note: A country-specific shock means the magnitude of the shock varies by country and depends on the historical development in each country. For example, the unemployment shock in Estonia amounts to a 12 percentage point increase in the unemployment rate while, in Hungary, the increase is only 3 percentage points. The roman numerals refer to income quintiles in each country with "I" referring to households in the poorest quintile.
Source: World Bank staff calculation, based on household budget surveys of respective countries.

Europe. And the number of additional households at risk as a result of economic shocks does not appear to be particularly high, suggesting households are quite resilient to the economic shocks being modeled.

Banks—some troubled, most of them foreign

Even though the previous analysis concludes that debt distress affects only a small proportion of firms and households, for some banks even this fraction can represent a sizable share of their loan portfolio. Nonperforming loans (NPLs) have increased throughout emerging Europe. Thus there may be a temporary drag on credit to the private sector as banks repair their balance sheets.[47]

The health of banks' balance sheets reflects how well they can cope with the credit losses they accumulated during the crisis, an ability that depends on their profit potential. NPLs climbed sharply during 2008–09, rising by over 40 percentage points in Ukraine, for example, and 20 percentage points in Georgia, Latvia, Lithuania, and Moldova (figure 3.22, left panel).[48] In Georgia, Lithuania,

Change in nonperforming loans and returns on assets

Returns on assets, 2005-07 (average)
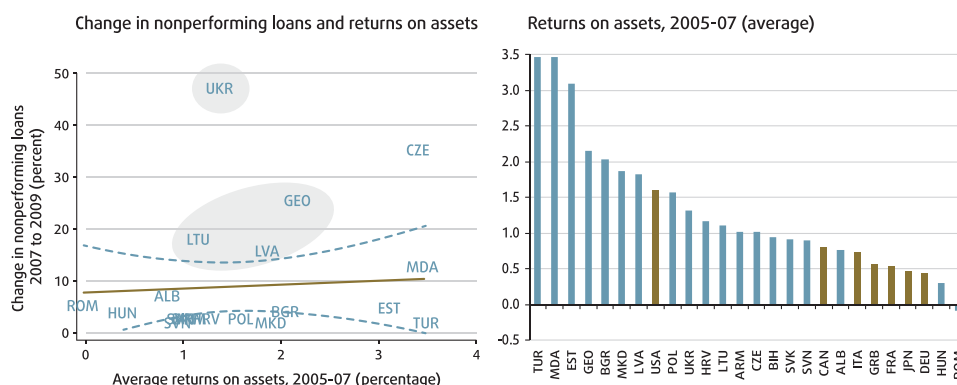
Figure 3.22: Some banks in some emerging European countries are at risk

(nonperforming loans and profitability)

Note: Error bands (95 percent confidence intervals) are depicted with dashed lines.
Source: World Bank staff calculations, based on Brown and Lane 2011; and Beck, Demirgüç-Kunt, and Levine 2000 and 2010.

Latvia, and Ukraine the increases in NPLs to precrisis (2005–07) average returns on assets were 1–2 percent—not high, but higher than in most advanced economies (about 1.5 percent in the United States, and 0.5 percent in the United Kingdom and Germany; figure 3.22, right panel).

The ratio of change in NPLs during a crisis relative to precrisis returns on assets provides an indication of a debt overhang affecting postcrisis credit growth.[49] This indicator exceeds 30 for Ukraine, is between 10 and 20 for Lithuania, Hungary, and Georgia, and is just below 10 for Albania and Latvia. In other words, banks in Ukraine will require more than 30 years of precrisis profits to cover the loan losses incurred during the crisis. By contrast, banks in Estonia or Turkey could cover the increase in NPLs with 1 or 2 years of precrisis profits. These calculations do not include recovery rates on NPLs, which are likely to be high; indeed, real estate is the most common collateral used in emerging Europe and such collateral has high rates of recovery (Sveriges Riksbank 2009; Piątkowski and Zalduendo 2010).[50] Sugawara and Zalduendo (2011) describe the case of economic shocks on household debt and the impact of financial stability; while it is not negligible, emerging Europe's well-capitalized banks provide some comfort.

So will banks' problems become a drag on economic activity? Repairing their balance sheets might lead to a slowdown in credit growth. Such a deceleration is needed to a degree, given the unsustainably high credit growth rates seen before the crisis. Because many firms and households have no debt, there is at least the potential for further expansion in banking activities. Therefore, if existing banks have difficulties in mending their balance sheets (for example, Greek banks involved in the Balkans), then it is possible that new banks might enter these markets, helping to lessen credit constraints. This depends on the ability and willingness of new investors to exploit these market opportunities. In the end, the economic outlook for Europe as a whole is likely to be the key determinant of the rate at which bank lending in emerging Europe recovers—and, as noted throughout this chapter, current downside risks are particularly high.

Moral suasion instead of public resources

Even though the evidence presented so far suggests that aggregate debt distress risks are manageable, and governments, firms, and households are for the most part not facing financial distress, those that are could potentially impact the balance sheets of the banking system. Therefore, avoiding the emergence of "zombie banks" remains the challenge going forward. To ensure this does not hamper economic recovery, countries should remove impediments for banks to clean up their balance sheets themselves and continue to use moral suasion to lower NPL stocks (box 3.6).

So far official bailouts in emerging Europe have been limited to domestically owned banks (as in Latvia and Ukraine). The large share of foreign ownership of the banking system has meant that parent institutions (for which emerging Europe still represents a small share of their asset portfolio) have carried out recapitalizations when needed—and as opposed to Western Europe, many banks in emerging Europe are already well-capitalized. Moral suasion may have played a role in parent banks' willingness to support their subsidiaries. But these foreign-owned banks seem also to have recognized the long-term nature of their investments in the region and its importance as a profit center. In sum, foreign ownership has been a blessing so far, and banking flows in the emerging Europe region are more stable (see figure 3.9, and Ghosh, Sugawara, and Zalduendo 2011a).

If a debt overhang is unlikely, what explains the slow recovery of domestic demand and credit in emerging Europe? First, uncertainty regarding sovereign debts in the EU cohesion countries acts as a disincentive for investment across Europe. Second, the health of parent banks' balance sheets is unknown as developments in Western Europe's sovereign debt crises evolve, leading to more cautious credit decisions and a rebalancing of balance sheets. Third, exchange rate regime choices might have contributed to a lower reduction in cross-border flows than in earlier crises in other emerging market regions—an overshooting of the exchange rate has not taken place. But these regimes have also resulted in sharper output adjustment and corresponding income shocks on individual economic actors. Fourth, the recovery of the global economy remains challenged. Fifth, unemployment remains high and remittance flows are still lower than before the crisis, further limiting the recovery of regional domestic demand.

In conclusion, some deleveraging of balance sheets in emerging Europe is to be expected. For the most part, the decline in outstanding credit envisaged in some sectors is unlikely to become a stumbling block to economic recovery. (One exception is the possible retrenchment of the real estate sector in some countries.) Therefore, it follows that the case for debt relief interventions with public financial support is not compelling as fiscal space is limited; the social considerations for such interventions, funded with scarce public resources, are not obvious; and the moral hazard risks are significant and likely to have large distortionary effects. For instance, countries like Hungary—as well as Albania and Poland—already have high public debt ratios, and other countries have entered high-risk zones (public debt ratios of at least 40 percent of GDP). However, a more permanent solution to Western Europe's public debt problems through sensible write-downs and comprehensive structural reforms is essential for the growth outlook of Europe—and thus emerging Europe—to improve.

Box 3.6: Facilitating private debt resolution without public resources

Public involvement in resolving debt overhangs should be limited to regulatory measures that facilitate debt restructuring and ensure that an effective institutional framework for debt resolution is in place. Although countries typically have insolvency frameworks capable of dealing with reorganization, bankruptcy, and liquidation, judicial systems can become overwhelmed when, for example, NPLs are high. In such cases, out-of-court voluntary workouts have been effective. And there might be strong disincentives in the regulatory regime for pursuing debt-restructuring efforts. Action on both the regulatory and institutional fronts is needed.

Regulatory action includes:

Eliminating tax impediments to debt restructuring. Tax laws are designed to curb tax evasion, frequently leading to undue impediments to debt workouts. Whereas appropriate provisions created for NPLs are generally tax deductible, the deductions may have to be reversed, generating a tax cost after certain actions associated with problem loan resolution. Examples include debt forgiveness that is not tax deductible (particularly when it is not part of a court-supervised restructuring); losses in debt-to-equity swaps that might not be tax deductible when the face value of the debt exceeds the value of the equity; and losses when selling a loan below its face value (for example, to a company specializing in distressed asset management) that are not tax deductible. Changes to tax treatment might thus be necessary to expedite debt resolution.

Ensuring loss recognition by lenders through supervision and fair regulatory treatment of restructured loans. Problem loans may be provisioned inadequately, in particular at weakly capitalized banks fearing regulatory actions, and in these instances supervisory vigilance on asset classification is essential. Otherwise, lenders will avoid debt resolution, which would force them to recognize their losses. Regulations will rightly require provisioning against restructured loans, given that such loans are riskier than normal loans, though unduly strict post-restructuring classifications may impede debt resolution.

Two areas of action may be considered for institutional arrangements:

Out-of-court corporate restructuring. The out-of-court "London approach," which was developed in the 1970s, has led to what is known as the INSOL (International Association of Restructuring, Insolvency and Bankruptcy Professionals) principles as guidance for multi-creditor workouts. Three of these principles are at the center of these restructuring efforts: minimizing losses to creditors from unavoidable company failures; avoiding unnecessary liquidation through the preservation of employment and productive capacity while the firm is restructured; and seeking ways to provide financial support to companies deemed viable as the workout is concluded. These out-of-court efforts are not a substitute for a well-functioning in-court system; they are a necessary complement. The threat of a court-imposed loss under a country's insolvency laws is needed to create the incentive for debtors to agree to measures such as asset sales, the dilution of equity, and reduction of management control (Laryea 2010). As examples, authorities in Latvia and Romania have recently introduced reforms to remove obstacles to out-of-court corporate restructuring, allowing "prepackaged" recovery and settlement agreements between debtors and creditors, and introducing flexibility to insolvency proceedings.

Out-of-court mortgage restructuring. A similar set of principles can be developed for mortgage debt. The aim is to establish trust between the lender and the borrower and facilitate loan restructuring, rather than foreclosure. A model applied in many advanced economies is the United Kingdom's preforeclosure protocol. Its goal is to encourage negotiations between creditors and debtors by setting options on how to restructure loans, such as extending the term of the mortgage, changing the type of mortgage, deferring payment on interest, or capitalizing arrears. Banks are better suited to judge the loan's long-term viability, and this decision should remain their responsibility, with an independent authority ensuring that proper and fair steps are followed. A particular concern with mortgage restructurings is that they might not involve enough of a reduction in net present value terms. Thus the protocol should set out minimum requirements for restructuring loans, define which restructuring methods should not be pursued (such as long grace periods for insolvent borrowers), and provide guidelines for the regulatory treatment of restructured mortgage loans. Latvia has recently developed guidelines for restructuring mortgage loans (see Erbenova, Liu, and Saxegaard 2011, for a discussion of current developments in Latvia's mortgage debt restructuring efforts), and Romania has developed consumer debt restructuring guidelines.

Do these out-of-court frameworks work? As already suggested, the success of an out-of-court system of voluntary workouts depends on the ability of creditors to impose losses on debtors. Without the threat of a court-imposed loss under a country's insolvency laws, debtors have little incentive to agree to asset sales, dilution of equity, and reduction of management control. Indeed, a requirement for an out-of-court process is a credible threat of seizure of assets and liquidation under a normal insolvency or bankruptcy regime. Creditors cannot otherwise force debtors to take part in good faith.

Box contributed by Steen Byskov.

An enviable development opportunity with tail risks

In the late 1990s, emerging Europe embraced economic integration with Western Europe through the flow of capital, labor, and goods and services. Integration also had a deeper dimension: full membership of the European Union and then entry into a common currency area. Financial integration took place through all types of capital. FDI played a more important role than in other parts of the world, as did banking flows. Abundant global liquidity aided financial deepening as emerging Europe received large financial flows from

richer countries. Given their dependence on Western European capital, it is unsurprising that these economies were hurt by the crisis. As external finance dried up, the resulting income declines and job losses were bigger than in other developing regions. Financial integration contributed to the transmission of a crisis that did not originate in local economic conditions.

So it is sensible to ask: Has financial integration in Europe happened too fast, and has it made economies in emerging Europe more vulnerable instead of vibrant? There is no doubt that gains in incomes and jobs over the two or three years prior to 2008–09 were rapidly lost during the crisis in countries such as Latvia and Ukraine. But a longer view provides a more encouraging assessment. Indeed, even after taking into account the impact of the crisis in the region, convergence in per capita incomes (in purchasing power parity terms) remains impressive. Latvia's real GDP at end-2010 was 22 percent below the peak level reached in 2007, but this country still ranks 24th of 184 countries in terms of convergence to EU15 average incomes since 2000. So, although financial integration led to easy access to foreign funding and overborrowing by firms and households in some countries, it also supported income convergence. In short, Western European savings helped Eastern European growth.

Why is emerging Europe different from other regions such as East Asia and Latin America? The evidence presented in this chapter points to institutional anchoring as the unique strength of the European model of finance for countries that begin their entry into this club. This is related to the European Union. The expectation that institutions will converge to the structures that can already be seen in Western Europe appears to be enough to spur growth. This link between foreign savings and growth has been found to be weak in other parts of the world—it has been difficult to prosper with someone else's money. But emerging Europe is for the most part different. Foreign savings have made possible the pursuit of investment opportunities.

What helped some European economies get more out of such large international financial flows than other countries in the region? The crisis shows that this convergence is an opportunity, not a guarantee. As noted throughout this chapter, excesses and resource misallocation also took place. Thus, to benefit from the institutional-anchoring aspects of EU membership, structural reforms are needed to persuade markets that the vision will become a reality.

The right balance between growth and vulnerability has to be found, and bankers and bureaucrats need to show less complacency toward large external imbalances. The first area of action relates to the need to boom-proof public finances. When economic growth leads to government coffers overflowing, this money should be saved, not spent. In some cases, countercyclical fiscal policies have to offset the vulnerabilities that the closeness to big capital markets inevitably implies. The second area of action concerns the need to crisis-proof private finance. Nationally, this requires greater reliance on macroprudential policies. As seen in the experiences of central bankers and bank supervisors in eight countries of emerging Europe, the effectiveness of such policies may at times be transitory, and regulators have to constantly play catch-up with the eagerness of financial intermediaries to find loopholes in existing prudential

regulations. Also, to be fair, this policy toolkit was not always deployed; for instance, policies to improve credit quality had not been applied until recently.

A final question: In the countries that did not manage capital inflows as well, or where these could be viewed as excessive, is there a debt overhang—a level of indebtedness that risks becoming a drag on investment and economic activity? At a macroeconomic level, the evidence for much of emerging Europe suggests not. Although countries in the region have negative foreign asset positions, their liability structure points to reliance on equity financing that has useful burden-sharing features. Net debt liabilities are in most cases manageable, and some have burden-sharing features given their links to ownership structures. Foreign exchange liquidity also remains, with few exceptions, comfortable. Where this is not the case, the dependence on one Western European economy for funding—for example, Sweden for the Baltic countries—helps to facilitate policy coordination between debtors and creditors. Among emerging Europe's peers, however, some EU cohesion countries look particularly vulnerable, and this could have spillover effects on emerging Europe.

At a microeconomic level, few firms and few households have high debt. This limits the risk of a debt overhang. Most firms and households with debt appear able to withstand severe negative shocks. Government balance sheets are quite healthy. Still, fiscal space is limited. Therefore, at least for now, there is no good justification for using scarce public money to reduce the debt of firms and households.

Nor is there a need to bail out banks at this time. Emerging Europe has many well-capitalized banks that could once again become profit centers for Western European parents. Foreign ownership of the banking system isolated emerging Europe's governments from the financial sector bailouts that were necessary in Western Europe and the United States during the crisis. In fact, foreign banks in emerging Europe took upon themselves the recapitalization of banks that were needed. This is a virtue that should be preserved.

In conclusion, *whether* European finance is unique should not be debated. Nor should it be deplored, and the attributes that make it unique should be preserved. Capital in Europe flows downhill—from richer to poorer countries. It also flows to higher-growth countries. Financial integration is a principal component of Europe's economic convergence engine. Capital inflows have contributed to economic growth and made the host countries in emerging Europe richer—a conclusion that remains valid even after the recent recession. In and near the European Union, investment projects have been financed that would not have been otherwise.

Why Europe is different can be debated, but financial development is not the reason. More likely, the expectations of improvements in institutional quality are the crucial element in the foreign savings–growth link—and EU membership serves as an anchor for these expectations. But this positive assessment should not distract from the risks faced by countries at different stages of development and integration. Indeed, there are lessons to be drawn from the diverse experiences of emerging Europe and the EU cohesion countries: excesses are possible and countries must remain vigilant to avoid a buildup of

vulnerabilities. To keep up with the speed of income convergence facilitated by the extraordinary trade and financial integration, and to avoid Southern Europe's current challenges, new and future members of the European Union should pay more attention to the policies and institutions that govern enterprise, innovation, work, and public service. These are the issues examined in the rest of the report.

Answers to questions on page 131

> The prospect of membership in the European Union exerts a powerful policy and institutional pull, making Europe unique and strengthening the link between foreign savings and economic growth.

> European economies that managed to "boom-proof" public finances and "crisis-proof" private financing without resorting to the costly self-insurance seen in Asia benefited from foreign financial flows.

> In emerging Europe, treasuries, enterprises, and households do not face a debt overhang, but in the eurozone's periphery this problem is acute, posing a danger for banks everywhere.

Chapter 3: Annexes

Table A3.1: Foreign savings and growth—EU12 and EU candidate countries are different

(testing the role of EU proximity and investment-driven versus savings-substitutions effects)

Dependent variable is growth in GDP per capita (PPP terms)	EU proximity		Is it investment or savings substitution? Mostly investment!	
	3 emerging Europe groups	2 emerging Europe groups	3 emerging Europe groups	2 emerging Europe groups
Current account balance (CAB)	0.044	0.047	0.079	-0.107
	0.053	0.053	0.061	0.071
EU12 x CAB	-0.245**			
	0.101			
EU candidates x CAB	-0.124**			
	0.062			
EU 12 and EU candidates x CAB		-0.165**	-0.085	-0.141**
		0.077	0.059	0.062
EU eastern partnership x CAB	0.485***	0.471***	0.495***	0.445***
	0.135	0.130	0.178	0.129
Investment			0.318***	
			0.068	
Savings				0.228***
				0.066
Observations	584	584	584	584
Number of countries	88	88	88	88
p value of Hansen statistic	0.204	0.204	0.188	0.062
Number of instruments	45	40	49	49

Note: Other growth determinants included (but not reported) are population growth, educational attainment, trade openness, and the relative price of investment goods. Robust standard errors are reported below each point estimate. ***, **, * denote significance at the 1, 5, and 10 percent levels, respectively.

Source: Stojkov and Zalduendo 2011, table 5.

Table A3.2: EU membership as an anchor for institutional development

(testing the role of EU proximity and investment-driven versus savings-substitutions effects)

Dependent variable is growth in GDP per capita (PPP terms)	Financial development			Financial frictions (institutional development)		
Current account balance (CAB)	0.032	0.028	0.029	0.019	0.031	0.016
	0.034	0.039	0.040	0.038	0.057	0.041
EU 12 and EU candidates x CAB	-0.164***	-0.169***	-0.169***	-0.674**	-0.735***	-0.505*
	0.051	0.057	0.060	0.255	0.260	0.264
EU eastern partnership x CAB	0.488***	0.477***	0.476***	0.498***	0.429***	0.499***
	0.082	0.101	0.107	0.086	0.095	0.074
CAB x dummy for financial development		0.006				
in top two quartiles		0.049				
CAB x dummy for financial development			-0.025			
in top quartile			0.077			
CAB x dummy for institutional					0.027	
development in top two quartiles					0.075	
CAB x dummy for institutional						-0.037
development in top quartile						0.055
Observations	329	329	329	208	208	208
Number of countries	88	88	88	59	59	59
p value of Hansen statistic	0.305	0.567	0.269	0.511	0.598	0.720
Number of instruments	37	46	46	37	46	46

Note: Other growth determinants included (but not reported) are population growth, educational attainment, trade openness, and the relative price of investment goods. Robust standard errors are reported below each point estimate. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

Source: Stojkov and Zalduendo 2011, table 6.

Notes

1 Emerging Europe includes all the countries integrating into the European Union, politically or economically: the 2004 and 2007 entrants to the EU (the "new" member states or the EU12), the EU candidate countries, and the EU eastern partnership countries in the former Soviet Union. The EU12 comprises Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, the Slovak Republic, and Slovenia; data for Cyprus and Malta are not always available. The candidates are the Balkans (Albania, Bosnia and Herzegovina, Croatia, Kosovo, FYR Macedonia, Montenegro, and Serbia) plus Turkey. The EU eastern partnership covers Armenia, Azerbaijan, Belarus, Georgia, Moldova, and Ukraine. This chapter refers to Greece, Ireland, Portugal, and Spain as the "old" EU cohesion countries, and the EU15 comprise Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

2 There are differences within each country group. Estonia and Latvia, for example, relied heavily on Nordic banks, but at the peak of the crisis in Latvia these banks accounted for a smaller share of banking system assets: 90 percent in Estonia and 60 percent in Latvia. While Nordic banks have maintained their exposures, banks in Latvia that relied on wholesale funding sources (delinked from parent-bank ownership structures) and on nonresident deposits were more vulnerable during the crisis. See Mitra, Selowsky, and Zalduendo (2010) for a full discussion.

3 Private capital might flow downhill, but it is redirected to the accumulation of foreign exchange reserves, which in effect is equivalent to capital flowing uphill; it is not absorbed. Absorption would take place only if imports expand or the domestic resources devoted to producing exports are reduced, in other words, if net capital flows match current account deficits.

4 This is known as the allocation puzzle, posed by Gourinchas and Jeanne (2007).

5 The country acronyms for figure 3.4 and all subsequent figures and tables are: ALB, Albania; ARM, Armenia; AZE, Azerbaijan; BGR, Bulgaria; BIH, Bosnia and Herzegovina; BLR, Belarus; CAN, Canada; CZE, Czech Republic; DEU, Germany; ESP, Spain; EST, Estonia; GBR, Great Britain; GEO, Georgia; GRC, Greece; HRV, Croatia; HUN, Hungary; IRL, Ireland; ITA, Italy; JPN, Japan; KSV, Kosovo; LTU, Lithuania; LVA, Latvia; MDA, Moldova; MKD, FYR Macedonia; MNE, Montenegro; POL, Poland; PRT, Portugal; ROM, Romania; SRB, Serbia; SVK, Slovak Republic; SVN, Slovenia; TUR, Turkey; UKR, Ukraine; and USA, United States.

6 A similar argument is made by Prasad, Rajan, and Subramanian (2007a and 2007b), Abiad, Leigh, and Mody (2009), and EBRD (2009) for all transition countries.

7 A few caveats before outlining the findings. The countries of emerging Europe have a limited economic history as market economies since central planning. In addition, transformational recessions dominated the early years of transition. As a result, empirical work on these countries is difficult, and for the growth analysis reported here, emerging Europe covers only three four-year periods between 1997 and 2008. Moreover, the global crisis interrupted the progress of these countries over the past decade and this needs to be captured in the analysis. Finally, the verdict on financial integration would be less sanguine in relation to the EU cohesion countries, in particular countries such as Greece, where structural and fiscal weaknesses were papered over with foreign borrowing in the aftermath of the euro's introduction. These qualifications notwithstanding, the evidence provides an encouraging story on the merits of Europe's financial integration, but provides a warning that its tail risks are ignored only at considerable peril. The empirical work for this section can be found in Stojkov and Zalduendo (2011).

8 For most emerging markets the usual explanation is that the absorptive capacity of these countries remains limited despite the availability of financing and, as a result, foreign savings trigger a real overvaluation of the currency. In turn, this weakens the profitability of investment and results in consumption booms.

9 See Stojkov and Zalduendo (2011).

10 In the fictional television saga *Star Trek*, smaller spaceships cede control to large spaceships or space stations upon approach, and are pulled into docking stations by a powerful "tractor beam."

11 Two approaches yield similar results. The first excludes countries with growth rates that are one standard deviation above the precrisis average in each of the three four-year periods in our sample. This excludes one or two periods for countries that experienced sharp reversals in real GDP in 2009 and eliminates (somewhat mechanically) what could be referred to as the unsustainable effects of foreign savings on growth. The countries excluded are Albania, Estonia, Latvia, Lithuania, Montenegro, and Romania. The second approach excludes countries that have external imbalances that are one standard deviation above the average; many of the same countries are excluded.

12 See Mitra, Selowsky, and Zalduendo (2010) for a discussion of the challenges faced by the monobank systems of transition countries in the 1990s.

13 The IMF's AREAER (IMF 2010) is aggregated into three groups of countries: group 1 (flexible or independent floating): Albania, Armenia, the Czech Republic, Moldova, Poland, and Turkey; group 2 (intermediate, including basket, peg within bands, crawling peg, crawling band, and managed floating): Azerbaijan, Belarus, Croatia, Georgia, Hungary, FYR Macedonia, Romania, Serbia, the Slovak Republic, and Ukraine; and group 3 (fixed, which includes countries with no legal tender, currency boards, and conventional pegs): Bosnia and Herzegovina, Bulgaria, Estonia, Latvia, Lithuania, Montenegro, and Slovenia. Both de jure and de facto classifications of these choices are used, but the conclusions are similar. To make the presentation simpler, only the de jure classification results are discussed. Following Tsangarides (2010), alternative definitions of periods of interest are used. The regime in place at end-2007 is assumed to remain valid in the two years reported in the figures.

14 This arises from faster productivity growth in the tradable goods sector than in nontradables. Wages are determined in the tradable goods sector in line with productivity, and hence unit labor costs in the economy as a whole increase, causing a real appreciation.

15 The literature on the impact on credit is more mixed; De Haas and others (2011) find that foreign banks constrained credit more than domestic banks while Barba Navaretti and others (2010) find the opposite. The distinction between supply and demand factors remains a challenge and, as suggested by figure 3.9, heterogeneity across emerging European countries will likely complicate a definitive assessment.

179

16 In early 2009, several international organizations and the European Commission created what became known as the Vienna process: a forum for countries with IMF-supported programs to exchange views on economic conditions with the primary banking groups involved in their countries as well as with banking supervision authorities of both the host and home countries. This process included legally nonbinding agreements in which banks committed to maintain their exposures in the countries involved. While it can be argued that banks already had strong incentives to remain in the countries concerned as a result of the long-term nature of their investments in the region, the forum facilitated exchange of views and instilled confidence in the economic programs being implemented with international financial support.

17 Allen and others (2011) highlight this feature—what Mitra, Selowsky, and Zalduendo (2010) refer to as golden handcuffs.

18 A similar argument is put forward by Lane (2010).

19 Purfield and Rosenberg (2010) put forward a similar argument for the Baltic states.

20 Some countries have experimented with dynamic provisioning rules. Spain, for example, requires a buildup of capital buffers when credit growth exceeds certain thresholds. Note, however, that these policies succeed in increasing buffers but appear to have a less clear impact in containing credit growth itself.

21 The use of high rates of reserve requirements is not discussed because, although quite common in some Balkan countries, it represents a monetary policy tool.

22 It is difficult to estimate the impact of these measures on the health of the financial system and the degree to which they mitigated the negative impacts of the subsequent financial collapse. One attempt in this direction is a recent paper by Polgár and Zdzienicka (2010) where the authors attempt to assess the impact of different macroprudential policies on subsequent credit growth or lending in foreign exchange.

23 This subsection draws on Schinasi (2011).

24 Similarly, euro area and EU leaders have introduced reforms to establish permanent sovereign debt crisis-resolution and financing mechanisms, as well as a pact aimed at improving European macroeconomic performance, competitiveness, and governance. In the meantime, the sovereign debt crises are being managed with temporary EU and euro area financing facilities and the resources of the IMF.

25 See Tait, Masters, and Braithwaite (2011).

26 Creditors might, for example, have no incentive to take part in debt-restructuring efforts because they would prefer to be repaid on existing lending terms; in doing so, however, they negatively impact the region's recovery.

27 Recent government interventions—in Ireland most prominently—have greatly raised public debt, burdening economic activity.

28 The section draws on Brown and Lane (2011), which provides a framework for assessing debt overhang, and Sugawara and Zalduendo (2009 and 2011), which examines the stress-testing of household balance sheets.

29 In this section East Asia comprises Indonesia; the Republic of Korea, Malaysia; the Philippines; Taiwan, China; and Thailand. The LAC region comprises Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay.

30 No doubt this positive aspect has its own risks, and what will happen as a result of ongoing developments in the eurozone is a concern (such as risks of added deleveraging). But so far the behavior of parent institutions has been a plus.

31 The bulk of external debt liabilities in euro area countries is denominated in euro, and these countries have access to ECB liquidity facilities. Thus, high gross debt and low foreign exchange reserves are more viable options than in countries outside a monetary union.

32 Historical comparisons have limitations. For instance, financial innovation might enable agents to carry greater debt burdens. This is why we complement the analysis by stress-testing the balance sheets of households in emerging Europe.

33 Chapter 5 reports the results of a benchmarking exercise similar to Cottarelli, Dell'Ariccia, and Vladkova-Hollar (2005). It also carries out such benchmarking for the level of stock market development. The main conclusion is that in a few emerging European countries (after controlling for structural features), private sector credit is above the levels of other countries at similar stages of development. By contrast, stock markets are extremely underdeveloped. The extent to which this might simply be a reflection of differences in the importance of relationship-based financing is a subject for further research.

34 As noted in Mitra, Selowsky, and Zalduendo (2010), concerns that the survey might be contaminated by the early effects of the crisis are not supported by the data. Although the average complaint level across all dimensions of the business environment rises in 2008 relative to 2005, it is close to the 1999–2005 average and to the level observed in nontransition economies. By contrast, the 2008 complaint level for problems related to finance remains similar to that in the 2002 and 2005 BEEPS surveys. This evidence would suggest that the responses from the last BEEPS survey should be interpreted as on the eve of the crisis rather than in its early stages.

35 The BEEPS survey does not include sampling weights, but as the surveyed sample size across countries accounts for country size, and industry and size quotas were set so as to get a representative sample within countries.

36 Some perception surveys highlight that respondents say they have more difficulties servicing their debts, but this does not really mean that they are facing a debt overhang that would require debt restructuring or debt-relief interventions.

37 Roughly 9,000 firms are covered in the BEEPS 2008–09 round. Of these, 4,667 firms report that they have a loan (roughly 50 percent). Among these firms, 3,364 report positive leverage due to 2007 investment and 1,303 do not. Thus at most an additional 1,303 of the 9,000 firms in the sample could also be overleveraged.

180

38 More detailed information for the 24 countries in emerging Europe examined in this section is simply not available—thus the reliance on survey information. However, the analysis is consistent with earlier World Bank work (Mitra, Selowsky, and Zalduendo 2010) using data from both Datastream and Bloomberg on nonfinancial corporate leverage and on debt service coverage ratios. Specifically, debt and debt service ratios among nonfinancial corporates are not high when compared with the levels observed in past capital account crises events (see tables 3.3 through 3.6 in the referenced report). The drawback of such data is that they only cover large, listed firms (and in a handful of countries) in the emerging Europe region.

39 The regression lines and corresponding confidence bands only depict the relationship between the indicators on each axis. Identifying endangered countries requires matching high-risk and high-shock countries.

40 Of course, some countries have experienced no adverse depreciation shock given their choice of exchange rate regime. This is a potential source of risk in some countries. For the case of households, Sugawara and Zalduendo (2009 and 2011) carry out stress-testing exercises that assume sharp changes in exchange rates even in countries that have fixed exchange rate regimes. Even in such cases the impact remains for the most part manageable.

41 The LITS dataset includes sampling weights to account for differences in the ratio of sample to population size across countries and for sampling biases within countries. The data enable a representative analysis of debt incidence.

42 The table suggests very low levels of debt among households in the region. But how good are these surveys? We explored central bank information and three different sources of household budget surveys: official household budget surveys, the European Union Statistics on Income and Living Conditions, and the LITS. Overall, the data seem to be consistent though some indicators are unclear. For instance, what is understood by a foreign currency mortgage now that Slovenia and the Slovak Republic have adopted the euro remains an open question. We also carried out some back-of-the-envelope calculations. For example, private sector credit to households in Ukraine amounts to some $40 billion (or 25 percent of GDP), of which mortgage debt amounts to 14 percent of GDP. Because only about 250,000 of 13 million households have mortgage debt (2 percent of all households living in a dwelling that they own), this would imply an average mortgage loan size of about $90,000 at most. These surveys do not include consumer credits. In sum, even though there are some discrepancies between different household budget surveys and the LITS, they do not appear to be large enough to eliminate the conclusions presented in this chapter.

43 Respondents are asked whether during the crisis they reduced consumption of goods (food, luxury goods, alcoholic beverages), cut the use of services (phone, utilities, health insurance), or sold assets. Such behavior is then linked to the household's use of bank debt (credit card, mortgage debt) after controlling for other household characteristics (income, education level, employment type) and a range of economic shocks (job loss, income reduction, closing of a family business, reduction in remittance flows).

44 Unlike Brown and Lane (2011), we use the depreciation relative to the foreign currency that is most common in each country.

45 Given the concentration of debt in upper-income quintiles, this vulnerability threshold overestimates households at risk. Another metric, used in Sugawara and Zalduendo (2011), is known in the literature as the financial margin (are households unable to maintain subsistence consumption levels?). It also suggests that household over-indebtedness is not widespread.

46 A detailed discussion of the shocks methodology can be found in Sugawara and Zalduendo (2011) for the case of Croatia. This paper also includes an assessment of arbitrary exchange rate shocks.

47 The analysis depends crucially on the quality of the official NPL statistics. For example, one concern could be that Albania has seen only a small increase in NPLs despite having about a third of foreign currency loans and experiencing a sharp depreciation.

48 Excesses have occurred, as noted. Thus the sectors to which resources are channeled will be quite important in the strength and sustainability of the recovery.

49 This is the approach followed by Brown and Lane (2011).

50 Although real estate prices have declined, recovery rates are higher than for movable collateral.

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183

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Enterprise and Innovation

The chapters on trade and finance analyzed how the 26 countries in emerging Europe have balanced the demands and dividends of integrating economically with advanced Europe. Chapters 4 and 5 now widen the analysis to include developed Europe. What binds these two chapters is productivity, a favorite subject of economists interested in economic growth. The chapters show that some parts of Europe are doing as well as North America, while others are falling behind.

Much is expected of Europe's enterprises. Workers look to them for jobs. Owners expect them to create value and generate profits. Governments want them to become export "champions." Chapter 4 documents that between 1995 and 2008, remarkably, European enterprises delivered all three—jobs, value added, and exports. But over the last decade, Europe's southern periphery has been falling behind Continental and Northern Europe, while Eastern Europe has been catching up. The timing—100 million people in the new member states became part of the European Union as another 100 million living in Greece, southern Italy, Portugal, and Spain reached high income levels—may not be a coincidence. The chapter discusses whether the industrial structures in Eastern Europe—despite the communist past—are better suited for an integrated continent than those in the south, and suggests that they are. These differences are manifest in productivity growth differentials between countries in six internationally contestable sectors (manufacturing, construction, transport and telecommunications, wholesale and retail trade, hotels and restaurants, and real estate and professional services).

Two gaps in productivity motivate chapter 5—the widening gap between Southern and Northern Europe, and a persistent gap between advanced Europe and the United States. Europe's "innovation deficit" is assessed, trying not to fixate on shortfalls in research and development (R&D) spending but seeing them instead as the most readily available measures of innovation performance. The chapter also tries to assess demand shortfalls and the weaknesses in linkages between demand and supply in European innovation systems. A big part of Europe's R&D deficit is due to the lack of "young and large" companies such as Amazon, Apple, Google, and Microsoft. This in turn may be due to regulations that inhibit labor turnover and mechanisms for funding research, and that discourage profitable collaboration between business and research institutes.

Because the information needed to carry out serious study of productivity growth is mostly available for the European Union, the 27 member states are the focus of chapters 4 and 5. Wherever possible, the analysis is extended to the other 18 countries in Europe: the four countries of the European Free Trade Association, the eight EU candidate and potential candidate countries, and the six eastern partners.

Chapter 4

Enterprise

Mr. Rossi (not his real name) owns a small mechanical firm in Northern Italy. The company repairs valves and other components for manufacturing plants, serving mostly the agro-processing businesses in the region. Mr. Rossi's father started the company more than 40 years ago and it remains a family-run enterprise with five or six employees and some family workers.

The business is profitable. But it has not grown since its first few years. When asked why, Mr. Rossi answers: "Do you know what I would have to deal with if my business employs 40 people? To start with, my workforce would be unionized by law. I would have to employ 'a socially useful worker.' The tax police and other government agencies like the labor safety agency would enforce stricter controls. I pay most of my taxes and I try to be current with the health and safety norms, but how much would this additional scrutiny cost? I would have to spend days running after the inspectors and I am sure that they would find something wrong. And to be frank, in family-run companies like mine, it is common to pay overtime in cash. We are happy because this costs 50 percent less than paying through the official payroll, and our workers are happy to get some extra cash."

In Italy one out of two workers is employed by a company with fewer than 10 employees. In Greece the number is six out of ten. When the cost of dealing with the government is high, many businesses choose to stay small. Firms tend to be small in countries such as Sweden too but, as this chapter shows, for different reasons and with starkly different economic consequences.

> What does Europe expect from its enterprises?

> How have European firms done in an enlarged Europe?

> Why did some parts of Europe do better than others?

> Which government policies help enterprises do better?

This chapter assesses the performance of European enterprises over the past decade, asking and answering four questions:

- **What does Europe expect from its enterprises and do they fulfill these expectations?** Enterprises in Europe are expected to generate new employment, make jobs more productive, and export a large share of their output. European enterprises have generally delivered on these expectations, though recently there have been signs that in some parts of Europe—notably the south—enterprises are failing to deliver two or more of these three goals.

- **How have European firms done in an enlarged Europe?** While regional discrepancies exist, European firms benefit from a bigger and more diversified market. Enterprises in the new member states have become part of the pan-European supply chain, helping them restructure their production systems and increase their exports. Many Western European enterprises responded well to the growing competition in global markets (especially from East Asia) by investing in emerging countries in Europe and moving parts of their business eastward. However, Southern Europe has neither attracted investment nor taken advantage of the offshoring opportunities presented by cheaper eastern economies.

- **Why did some parts of Europe do better than others?** This question is answered along two perspectives: geographic (a three-speed Europe); and the benefits and drawbacks of foreign direct investment (FDI), offshoring, and lower quality of regulations. Countries with more efficient regulatory systems did best in increasing productivity. This helped them become internationally competitive, raise exports, and sustain job creation. These countries had entrepreneurial profiles that were better suited for ever more integrated European markets. In particular, they had a critical mass of large enterprises. Regulatory arrangements that made complying with laws easy and did not penalize enterprises that grew, as well as supporting policies that attracted foreign investors, were most important in helping enterprises balance social responsibility at home and competitiveness abroad.

- **What is the relationship between business regulation and enterprise growth?** The answer is a little different looking east (emerging Europe) or west (Continental and Northern Europe, and Southern Europe). In advanced Europe, reducing the regulatory burden on firms increases their productivity and brings about a size and sector distribution of enterprises that is most conducive for a single European market. An efficient—not necessarily lighter—regulatory framework is needed for firms to reach the minimum size required to operate internationally, especially to attract FDI. In emerging Europe governments can also support enterprise through improved infrastructure and better access to credit to finance investments, which are common features of the best-performing countries.

In short, an economic model that requires enterprises to be socially responsible can be compatible with a vibrant private sector if it is supported by a simple and efficient regulatory framework. Not all countries in Europe have managed to strike this balance. Regulations still impede enterprises in some countries, preventing businesses from taking advantage of a more integrated Europe. Nevertheless, this chapter concludes that outside the EU15 southern states,

Europe's enterprises have largely delivered what was expected of them by their workers, owners, and governments.

What does Europe expect from enterprise? Jobs, value added, and exports

Firms may be more integrated with the social fabric in Europe than in any other part of the world. Private enterprises are not only held accountable by shareholders for profits, but also held responsible by society for the social and environmental consequences of their actions. This is reflected in regulations that stress such consequences more than in other regions: labor regulations that protect the rights of workers;[1] a taxation system that supports generous welfare policies;[2] and licensing and permitting regimes that control access to specific activities and verify adherence to strict codes and norms.

In sum, firms are expected by societies to create jobs and protect the environment, by shareholders to generate profits, and by governments to pay taxes and—if they are sizable—to generate exports. Accordingly, this chapter assesses the performance of European enterprises using three criteria:

- **Jobs.** Enterprises contribute to economic growth by generating employment. About three of four jobs in Europe are created by enterprises,[3] and firms are given a specific social role: reducing unemployment.

- **Productivity (value added).** Enterprises contribute to growth by adding value. An enterprise's contribution to aggregate growth is most easily measured by labor productivity growth: increases in value added per employee. Productivity is not a bad proxy of profitability.[4]

- **Exports.** The third performance indicator of an enterprise is its export propensity (the likelihood a firm will export), which proxies its capacity to identify foreign markets where it can successfully place its products. Export propensity measures a firm's ability to compete on an international scale and, taken in aggregate, measures the competitiveness of an open economy.

While pursuing these objectives, firms in Europe must comply with regulations that, while reflecting society's expectations, affect their performance by generating direct costs—for example, through tax or labor contributions and payments for licenses and permits. Regulations also affect performance by influencing investment decisions. Similar regulations can have different impacts, depending on the way they are enforced. Many well-designed regulations have a negative impact due to poor implementation.

The quality of the design and implementation of regulations across Europe can be assessed with the World Bank Doing Business indicators as proxies. These indicators measure the quality of regulations (such as the burden of tax systems, rigidity of labor laws, regulations affecting entry and exit, ease of access to finance, and enforcement of contracts), based on the experience of users. They allow comparisons across countries and over time. In particular, the "time and motion" indicators measure the steps that enterprises must take to comply with business regulations—in number of procedures, time, and money spent.[5]

189

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Europe overall has heavier regulations than other regions, but intercountry variance is considerable. Northern and Continental European countries have better regulatory frameworks than Southern or Eastern European countries. Sweden, Finland, and Norway do better than the rest of Europe in balancing the quantity and quality of business regulations and are in line with the most advanced countries in the world thanks to the efficiency of their administrative systems, which makes compliance less burdensome.

This chapter assesses the likely impact of the regulatory framework on how enterprises perform, measured by employment, productivity, and exports. It looks deeper than the aggregate indicators of an economy's performance, employment growth, productivity growth, and total share of exports in GDP and looks into more disaggregate elements of successful firm performance, such as firm size and ownership.

The investigation finds that performance depends on the characteristics of a firm such as its size, ownership structure, and age, as well as country-specific factors related to the environment in which it operates. It focuses on the regulatory framework among the country factors, but also considers the amount of credit available to the private sector, the quality of infrastructure, workforce skills, and FDI inflows and outflows.[6]

When one disentangles the impact of firm and country characteristics, the question arises whether seemingly similar companies perform equally well in different countries. If companies with similar characteristics do equally well in different countries, differences in "types" of companies would explain the difference in country aggregates. By contrast, if the performance of companies with similar characteristics is different, the differences can be explained by factors that vary across countries.

Figure 4.1: European enterprises did well in 1995–2009

Note: "Periphery" includes Greece, Ireland, Portugal, and Spain.
Source: World Bank staff calculations, based on ILO 2010; and WDI.
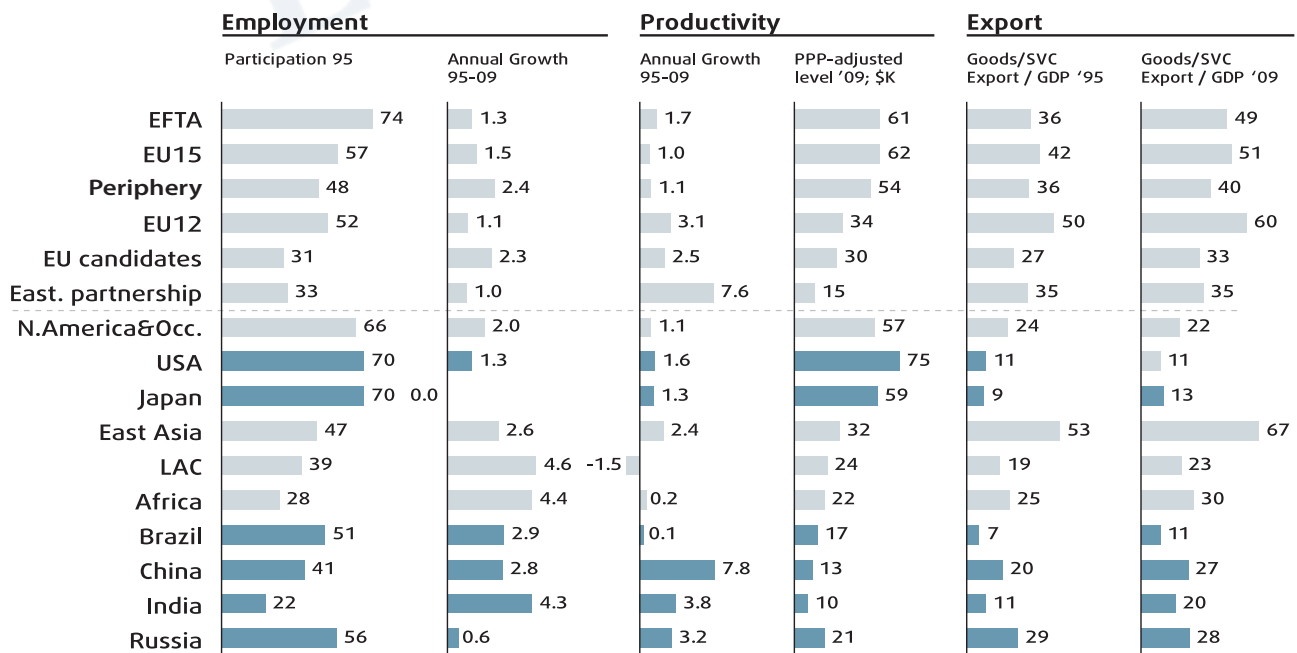
	Employment		Productivity		Export	
	Participation 95	Annual Growth 95-09	Annual Growth 95-09	PPP-adjusted level '09; $K	Goods/SVC Export / GDP '95	Goods/SVC Export / GDP '09
EFTA	74	1.3	1.7	61	36	49
EU15	57	1.5	1.0	62	42	51
Periphery	48	2.4	1.1	54	36	40
EU12	52	1.1	3.1	34	50	60
EU candidates	31	2.3	2.5	30	27	33
East. partnership	33	1.0	7.6	15	35	35
N.America&Occ.	66	2.0	1.1	57	24	22
USA	70	1.3	1.6	75	11	11
Japan	70	0.0	1.3	59	9	13
East Asia	47	2.6	2.4	32	53	67
LAC	39	4.6 -1.5		24	19	23
Africa	28	4.4	0.2	22	25	30
Brazil	51	2.9	0.1	17	7	11
China	41	2.8	7.8	13	20	27
India	22	4.3	3.8	10	11	20
Russia	56	0.6	3.2	21	29	28

This distinction has policy implications. Government policies and regulations, and the institutions that enforce them, affect firm performance by influencing the enterprise's cost structure. If firm performance differs across countries, measuring the effect of policies on performance would be illuminating. The impact of regulations on firm performance could be viewed as the "static" impact of regulations.

Government policies might also affect market dynamics by influencing firms' entry and exit decisions and growth patterns. The type of firms that survive and succeed in different environments depends on the policies in different countries. If the mix of enterprises operating in each country differs, the link between market structure and the regulatory framework must be understood. The impact of regulations on enterprise growth—the "dynamic" impact of regulations—is as important in explaining how firms produce jobs, value added, and exports. Both firm- and country-specific elements affect performance, but their relative importance differs in ways relevant to policy reforms.

How have enterprises done? Quite well

Over the past two decades, the competitive landscape for European enterprises has changed. The globalization of markets and enlargement of the European Union have altered the way European firms do business. European firms have generally coped well with these changes: during 1995–2009, they managed to deliver against the three objectives set out above and remained globally competitive (figure 4.1 and table 4.1).[7]

A comparison of the performance of European subregions shows the following:

- In 1995, enterprises in Europe employed a larger share of the working-age population than in the rest of world, but lower than other most advanced economies. Since then, Europe has produced jobs faster than the United States but more slowly than the rest of the world. In fact, emerging market countries, notably China, saw a massive reallocation of labor from agriculture to industry, which Europe experienced soon after World War II.

- Value added per worker has increased in much of Europe. While European productivity[8] grew in line with its competitors (but from a higher base), Europe did not close the productivity gap with the United States. However, the EU15 grew at a rate comparable with Japan, the United States, Canada, Australia, and New Zealand taken together, while many European countries performed as well as the United States.

- European enterprises have maintained a favorable position in global trade. In 1995, Europe exported goods and services worth more than 40 percent of its GDP, a much higher share than the Organisation for Economic Co-operation and Development (OECD) average. Since then, Europe has increased exports in value terms, although less quickly than emerging countries.

Average trends mask differences in performance among countries and firms in Europe. Disparities are evident not only between advanced and emerging Europe, but also between countries in each group.

Table 4.1: European enterprises, benchmarked quantitatively and globally

(GDP, labor participation (industry and services), productivity, and exports, 1995–2009)

	Real GDP growth, percent, CAGR	GDP per capita, PPP, '000, current int'l$, Latest	Employment participation, percentage of working-age population			Productivity, '000, constant 2005 US$		Exports of goods and services, BOP, percentage of GDP	
			Level		Growth, percent, CAGR	Level	Growth, percent, CAGR	Level	
			Initial	Latest		Latest		Initial	Latest
Norway	2.4	55.7	68.4	75.5	0.7	111.9	0.4	37.6	40.9
Switzerland	1.7	45,1	76.4	72.7	-0.4	96.9	1.2	39.0	57.0
Iceland	3.6	36.7	73.9	79.9	0.6	84.7	2.5	35.5	52.8
Liechtenstein	3.7	-			-	-	-	-	-
Ireland	5.3	39.6	48.6	60.3	1.6	98.1	2.1	73.7	90.9
Denmark	1.3	37.7	70.7	74.4	0.4	78.9	0.7	36.1	47.7
Sweden	2.3	37.2	68.7	72.1	0.3	74.1	1.4	37.7	47.9
Finland	2.8	35.3	57.2	65.7	1.0	71.8	1.4	36.7	38.2
United Kingdom	2.1	35.1	67.5	69.3	0.2	71.8	1.4	27.8	27.4
Luxembourg	4.1	84.8	53.4	58.1	0.6	188.2	2.0	132.7	142.0
Netherlands	2.3	40.8	59.8	69.2	1.0	76.5	0.9	57.6	65.2
Austria	2.0	38.8	65.1	68.0	0.3	73.7	1.4	37.7	49.9
Germany	1.1	36.3	62.0	70.3	0.9	67.0	0.5	23.8	41.8
Belgium	1.8	36.3	54.6	60.7	0.8	80.2	0.7	67.1	70.8
France	1.7	33.3	53.6	59.2	0.7	77.2	0.4	23.1	23.6
Italy	0.8	32.4	48.0	56.0	1.1	68.2	-0.5	26.3	23.8
Spain	2.9	32.3	42.5	57.7	2.2	56.9	-0.5	22.4	24.0
Greece	3.3	29.3	42.1	52.5	1.6	56.4	1.4	11.8	18.1
Portugal	1.9	25.1	57.9	62.9	0.6	36.7	1.0	27.7	28.8
Slovenia	3.4	27.6	57.2	63.0	0.7	40.2	3.5	49.9	58.2
Czech Republic	2.6	25.6	65.9	64.9	-0.1	27.1	3.0	51.0	67.2
Slovak Republic	4.4	22.9	54.8	57.9	0.4	26.7	2.8	43.5	70.5
Hungary	2.7	20.3	48.4	53.6	0.8	25.7	2.8	44.3	77.8
Poland	4.4	18.9	44.9	50.4	0.8	22.7	3.0	25.7	39.7
Estonia	4.8	19.7	60.2	69.2	1.1	21.7	5.7	59.1	71.2
Lithuania	4.6	17.1	49.9	55.8	0.8	18.1	4.3	40.4	54.8
Latvia	4.7	16.2	48.3	57.7	1.3	15.3	4.2	39.9	43.4
Cyprus	3.3	30.7	58.1	65.7	0.9	34.0	0.5	49.8	48.3
Malta	2.6	24.8	50.1	56.3	1.0	33.1	0.1	83.8	79.0
Romania	2.5	14.2	43.4	43.6	0.0	15.6	3.4	26.5	31.3
Bulgaria	3.0	13.8	44.0	57.7	2.1	8.8	2.5	51.9	47.9
Croatia	3.2	20.0	47.7	51.9	0.7	25.2	2.8	31.6	35.7
Turkey	3.6	14.2	30.9	33.9	0.7	24.8	1.2	21.6	23.3
Montenegro	2.6	12.9	31.9	36.2	1.8	13.3	3.8	-	-
Serbia	3.6	11.5	44.6	42.5	-1.2	10.9	8.4	30.1	28.4
Macedonia, FYR	2.5	11.1	30.9	34.0	1.6	10.3	1.9	29.4	38.2
Albania	5.4	8.6	16.4	21.6	2.8	12.5	4.2	12.5	29.3
Bosnia and Herzegovina	12.2	8.5	49.4	52.7	0.8	6.5	3.4	27.3	32.4
Kosovo	6.4	-	-	-	-	-	-	-	-

192

	Real GDP growth, percent, CAGR	GDP per capita, PPP, '000, current int'l$, Latest	Employment participation, percentage of working-age population			Productivity, '000, constant 2005 US$		Exports of goods and services, BOP, percentage of GDP	
			Level		Growth, percent, CAGR	Level	Growth, percent, CAGR	Level	
			Initial	Latest		Latest		Initial	Latest
Belarus	7.1	13.0	52.8	61.3	1.1	7.8	6.9	37.7	50.5
Azerbaijan	12.8	9.4	32.2	40.1	1.7	8.7	9.2	25.7	53.1
Ukraine	2.0	6.3	29.3	54.5	4.9	4.7	-1.2	35.4	46.3
Armenia	7.3	5.3	46.4	29.1	-3.3	6.3	10.6	20.4	15.7
Georgia	6.1	4.7	34.1	31.1	-1.0	6.6	9.5	16.4	29.8
Moldova	2.3	2.9	38.3	37.6	-0.1	2.7	4.4	50.4	36.7
United States	2.5	45.7	69.6	70.1	0.1	84.6	1.6	10.8	11.2
Australia	3.5	39.4	65.0	71.4	0.7	64.1	1.5	18.8	21.2
Canada	2.6	37.8	64.2	71.0	0.9	66.2	1.1	37.2	28.8
New Zealand	2.7	29.3	63.7	70.3	0.9	50.7	0.9	28.5	26.2
Singapore	5.1	50.7	67.4	67.3	0.0	58.1	2.4	183.2	200.6
Japan	0.6	32.0	69.5	72.8	0.4	76.3	1.2	9.4	13.4
Taiwan, China	4.3	31.0	-	-	-	-	-	-	-
Korea, Rep.	4.1	27.1	55.8	62.4	0.9	38.1	2.9	28.8	51.8
Malaysia	4.5	13.7	48.7	52.2	0.5	15.3	1.9	93.8	96.5
Thailand	2.7	7.8	39.1	46.3	1.2	7.8	0.1	41.8	68.5
China	9.8	6.8	40.7	49.2	1.5	6.1	7.8	20.2	26.7
Indonesia	3.5	4.0	36.2	39.7	0.7	4.7	0.8	26.2	24.6
Philippines	4.1	3.7	36.3	40.9	0.8	4.7	0.9	36.2	28.9
Vietnam	7.2	3.0	24.6	40.4	5.1	2.0	0.1	38.5	64.7
Argentina	3.4	14.5	54.0	67.9	1.7	11.1	0.3	9.7	21.7
Chile	3.8	14.3	46.1	50.5	0.6	20.0	1.1	27.1	38.9
Mexico	2.8	13.8	45.1	52.2	1.1	21.5	-0.1	31.2	27.8
Uruguay	2.7	13.1	61.9	63.2	0.2	11.5	0.4	18.2	27.3
Venezuela, RB	2.5	12.3	50.2	56.7	1.2	13.4	-3.2	27.7	18.3
Brazil	2.7	10.3	50.8	59.1	1.1	10.6	0.0	6.8	11.3
Columbia	3.0	9.0	50.9	45.5	-0.8	11.0	1.9	13.3	16.2
Peru	4.3	8.7	62.8	62.7	0.0	7.7	2.7	12.3	24.1
South Africa	3.3	10.2	37.1	39.0	0.6	18.5	1.0	22.8	27.8
Tunisia	5.0	8.2	35.2	36.1	0.6	12.1	2.8	44.3	45.8
Algeria	3.5	8.1	34.1	39.4	5.0	10.1	-2.5	47.7	34.3
Egypt, Arab Rep.	5.1	6.0	31.1	32.1	0.3	5.7	2.4	22.0	23.6
Morocco	4.6	4.5	47.6	30.2	-3.4	8.5	5.9	27.4	28.9
Russian Federation	3.7	18.9	56.5	59.0	0.3	11.8	3.3	23.5	28.2
India	6.9	3.3	24.0	26.2	1.7	3.5	4.2	10.7	18.9

Note: CAGR refers to compound annual growth rate. Although for most countries the initial and latest years are 1995 and 2009, the period varies by country and data series: for real GDP growth, Kosovo (2000 -09) and Montenegro (1997 -2009); for GDP per capita, Taiwan, China (2008); for exports, Luxembourg (2002 -09), Bosnia and Herzegovina (1998 -2009), Macedonia, FYR (1996 -2009), Serbia (2007 -09), Georgia (1997 -2009), Vietnam (1996 -2009), and Algeria (2005 -09). Selected Indicators table A4 (Enterprise) at the end of the report gives the periods for productivity data.
Source: World Bank staff calculations, based on ILO 2010; WDI; UNdata; and data from country sources.

193

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In the EU15, different development patterns can be discerned by geography, according to the three criteria. Performance differs among Northern Europe (Denmark, Finland, Ireland, Norway, Sweden, and the United Kingdom), Continental Europe (Austria, Belgium, France, Germany, Luxembourg, and the Netherlands), and Southern Europe (Greece, Italy, Portugal, and Spain):

- **Job creation.** Southern countries have done better than others though they started with a lower participation rate. Spain generated 6.8 million jobs in 1995–2009. Northern, particularly Continental, Europe has lagged in employment generation, but has increased employment, and the average share of the working-age population employed remains higher overall. Ireland is the best performer in the EU15, increasing its workforce by 3.4 percent a year. (The global economic and financial crisis, however, highlighted that employment resilience is as critical as employment generation. In some countries, the crisis reversed some of the earlier gains: from end-2008 to the second quarter of 2011, Spain lost 1.5 million jobs, Ireland 200,000.)

- **Productivity.** Northern European countries have outperformed the rest, with productivity growing by 1.4 percent a year. However, productivity declines from north to south. Italy and Spain show a fall in productivity, while Greece and Portugal narrowed the gap dividing them from the rest of the EU15.

- **Exports.** Trade performance reveals a "winners-take-all" pattern. Continental Europe, already more outward-oriented than the rest of Europe, became even more open, while Southern Europe shows only a modest increase of its export share. In Continental Europe, France's stagnant exports resemble those of its southern neighbors.

Emerging Europe (the EU12)[9] can be categorized in three groups: Central Europe (the Czech Republic, Hungary, Poland, the Slovak Republic, and Slovenia); the Baltic countries (Estonia, Latvia, and Lithuania); and the south (Bulgaria and Romania). The EU12 demonstrates a pattern similar to the EU15, with two groups (the Baltic countries and Central Europe) dominating exports and the south lagging behind:

- **Job creation.** The economies that proceeded fastest in enterprise restructuring generated new jobs. Romania appears to be the only country still grappling with its restructuring.

- **Productivity.** With an average annual growth in value added above 5 percent—realized mainly through vigorous restructuring starting from low productivity levels—the Baltic economies outperformed the rest of the EU12. Central and Southern Europe also did well, with intercountry variations.

- **Exports.** Emerging Europe maintained a high share of exports in GDP. Central Europe responded to European integration by increasing its share of exports, while the Baltic countries remained highly open economies. Bulgaria and Romania benefited less from close relationships with the rest of Europe, but have maintained their export shares.

The EU candidates and eastern partnership countries are different from EU member states:

- **Job creation.** The share of the working-age population employed in industry and services is about 60–70 percent of the share in the European Union, reflecting lower participation rates in the labor force following transition and greater reliance on traditional sectors (such as agriculture) and on the government. However, employment growth in enterprises is consistently higher than in the European Union.

- **Productivity.** Countries outside the European Union recovered from the transition with high growth rates, but the development patterns remain different. While some EU candidate countries show productivity in line with or higher than that of the EU12, the gap between Europe and the eastern partnership countries remains, as productivity in the latter is about one-tenth that in Western Europe. Catch-up accounts for a large share of productivity improvements.

- **Exports.** The EU eastern partnership countries' exports/GDP ratio is close to Europe's and more than double that of the EU candidate countries. The ratio is increasing, testifying to increased integration with Europe and global markets.

Why did some parts of Europe do better than others? A three-speed union

Prato was one of the most famous Italian industrial districts. Its specialization in textile production dates to the seventh century, when clothes production was regulated by the Arte della Lana craft guild. By the 1980s Prato had the biggest concentration of textile firms in Europe specializing in yarns for weaving and knitwear, woven and knitted fabrics for the apparel industry, and special fabrics. Changes in global textile production patterns altered Prato's fortunes. From 1991 to 2010 about 1,600 of the 7,600 textile firms in Prato closed or relocated. Between 2002 and 2009 Prato's total textile exports fell from $2.2 billion to $1.5 billion.[10] The loss of market share is not the only result of globalization. Prato's surviving clothing industry now has a different business model. More than half of Prato textile businesses are reportedly owned by the Chinese, who import fabric from China and produce cheap "fast fashion" clothes for sale in the single market.

Siemens, the electronics and engineering conglomerate, is increasingly less German and more global. Founded in 1847 by the inventor of the pointer telegraph, Siemens was already operating in countries such as Estonia, Turkey, and Ukraine in its first 10 years. Its introduction of the first direct transatlantic telegraph cable in 1874 signaled the company's global goals. After World War II, Siemens maintained a global presence through foreign investments, acquisitions, and partnerships. With the fall of the Berlin Wall, the company started to operate again in Eastern European countries. Between 1996 and 2008 Siemens' overall employment increased from 380,000 to 430,000 and the company became more international. More than 20,000 jobs were created in production and service facilities in the Czech Republic, Poland, the Slovak Republic, Hungary, and Romania while Germany's employment share decreased from 54 to 31 percent. Siemens reached new product markets and by 2008, just 17 percent of its revenues were generated in Germany, compared to 39 percent in 1996. A German economist described Siemens as "a global value chain with its R&D and engineering activities located in Europe and the United States, procurement and logistics located in south

east Asia, its assembly activities located in eastern Europe, and its marketing activity organised at local level or via the Internet."[11]

Škoda Auto, the automaker from the former Czechoslovakia discussed in chapter 2, began as a bicycle manufacturer. The collapse of communism left Škoda in a difficult position. Its products were based on obsolete Soviet-era technologies and faced a wide technological, design, and quality gap with Western competitors. Lada-AutoVaz, an automaker in the Russian Federation, was in a similar state. Škoda was acquired by the Volkswagen Group, which revamped its product range. Škoda is now the entry brand of a global group. It produces five times as many cars as in 1990, generating profits for its parent, and employs nearly 25,000 workers. Lada, on the other hand, still produces cars that are not competitive in the bigger European market.

These three examples—Prato, Siemens, and Škoda—come from the south, north, and east, respectively. They illustrate three different responses to a new economic landscape (box 4.1). This section analyzes these differences, the changes in the European economy, and their consequences for jobs, productivity, and exports.

A period of structural change

In the early 2000s, economists in Europe debated which pressures the European model would face as the European Union enlarged. Enterprises in the EU12 were emerging from a decade of restructuring and had large productivity gaps with older EU member states. The prognosis was unclear:

> The accession of 10 more countries also adds a dimension of complexity and heterogeneity that was not present in the previous round. ... Because of the gap in income, convergence between the new member states and the current EU members is more than ever the key to successful enlargement. Neither theory nor the experience of earlier enlargement convincingly supports a hypothesis of automatic convergence. ... On the one hand the new member states have relatively high levels of human capital. On the other hand, they have a legacy of old industrial investment, environmental damage and poor public administration to remedy (Sapir and others 2004, pp. 4-5).

Policymakers sought to integrate these diverse entities into a single market without creating imbalances and compromising competitiveness.

In hindsight, European firms mostly did well. The 2004 and 2007 enlargements—along with integration efforts since the mid-1990s—appear successful so far. Enterprises in the new member states experienced vigorous productivity improvements and generated new jobs, contributing to economic growth in all parts of Europe. European enterprises fought off the increasing competition from emerging markets and maintained a significant share of global trade. In 2002–08, in aggregate, enterprises in the European Union increased value added by 16 percent. In 2008, the European Union exported the equivalent of 40 percent of its GDP.[12]

Discontinuity in Europe's competitive landscape challenged the way firms did business and created winners and losers. Winners captured the opportunities to expand sales and production into new markets. Siemens and Volkswagen-

196

Škoda expanded networks in the bigger European market to grow outside Europe as well. Firms with traditional business models whose markets were disrupted by the competition from emerging economies were the losers. Italian industrial districts like Prato are among the entities that depended on the flexibility offered by local networks of small companies and are struggling in a world where a minimum scale is critical to success.

As a result of these and other changes (box 4.1), and despite decent performance overall, the expanded single European market did not benefit incumbents equally. A decomposition of overall performance depicts a European Union[13] where convergence of emerging Europe toward advanced Europe coexists with a divergence within advanced Europe. The result is a Europe growing at different speeds (figure 4.2):

- **The leaders.** Continental and Northern Europe saw value added grow in 2002–08 at an average of 3 percent a year, due in equal part to productivity gains and employment creation. The average export share in GDP in these countries was more than 40 percent.

- **The chasers.** Emerging Europe reduced part of the gap with the rest of the European Union, generating value added at more than twice the rate of the EU15, mostly because of increased productivity. These economies became increasingly connected to the rest of Europe and the world: on average, exports now stand at more than 50 percent of their GDP.

- **The laggards.** Southern Europe (EU15 South) shows the slowest value-added growth (1.3 percent) in the same period, coming exclusively from employment generation. Southern countries did not register productivity improvements and showed little growth in export intensity (the share of foreign sales in total turnover) which, at 28 percent of GDP, is well below the EU average.

	EU27	Subregions					
		EU15 North	EU15 Continental	EU15 South	EU12 Continental	EU12 South	EU12 North
Employment growth (annual percent, 2002-08)	1.7	1.1	1.5	1.9	1.7	3.0	4.4
Productivity growth (annual percent, 2002-08)	0.9	1.9	1.0	-0.6	5.2	6.5	5.8
Exports over GDP (percent, 2008)	40	35	46	28	59	37	58
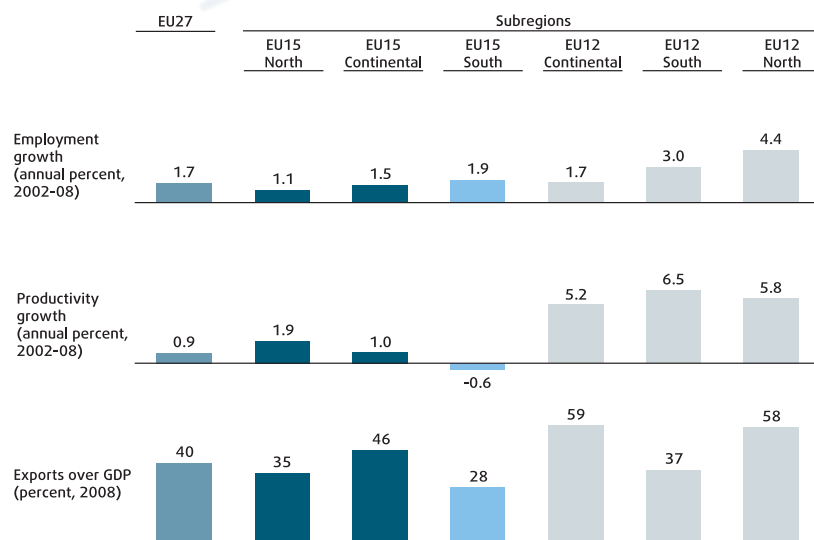
Figure 4.2: The east giving chase, the south falling behind

(employment, productivity, and exports, 2002–08)

Source: World Bank staff calculations, based on Eurostat and WDI.

197

These changes also had implications for product and factor markets in Europe. In the product market, the reduction in the cost of accessing foreign and other European markets implies that the competition in the local market increases. This effect can be offset by the opportunity to compete in other product markets. In factor markets, the forces at play are less obvious: while access to international markets opens new opportunities for companies to reduce their cost base, the impact on the local market can be negative or positive, depending on local conditions.[14]

A strategy to protect a market niche can only be pursued in the short term: over time most markets open, so the best strategy for a firm is to be prepared. For firms to fully benefit from the single market, they need to engage in foreign operations in the form of sales, sourcing, or both. Companies that do not can find themselves in a "lose-lose" world in which competition increases in the local product markets, but there are no benefits in international markets.

Not all firms can access international markets—the costs are often simply too high to justify the investment. In particular, the costs of entry—especially access to information and management of subsidiaries abroad or a decentralized sales network—are often too high for small firms. Hence minimum scale is becoming more important. In other words, although falling barriers to entry to new markets imply that the minimum scale for international operations is now lower, reaching that scale becomes critical to success (box 4.2).

To address current imbalances and learn lessons to make future EU enlargement even more effective, it is necessary to understand the determinants of Europe's varied performance. More immediately, policymakers need to understand

Box 4.1: Is staying local now riskier?

When measuring the performance of European enterprises, one should keep in mind some structural changes:

- **Transition in emerging Europe.** For emerging Europe, the transition from the socialist to market system involved privatizing on a large scale, restructuring production and distribution systems, and shedding surplus labor. Transition affected small and medium enterprises, with slower and still incomplete privatization and restructuring of larger state-owned enterprises. At the macro level, the biggest challenge was an efficient reallocation of the enterprise workforce that was made redundant during rationalization. For firms, the changes went beyond the pure shift in the ownership structure and encompassed technological and managerial modernization to align production and commercial processes with those in the rest of the world. FDI inflows were essential to the transition's success: in 1990–2009, $814 billion was invested in emerging Europe, according to UNCTAD (at current prices and exchange rates). It brought

new technologies, managerial know-how, and cooperative links with firms from advanced Europe and other mature market economies. It also presented a unique opportunity for thousands of start-ups and spin-offs to emerge, bringing the diversity of Western Europe to the broader group of countries.

- **Globalization of markets.** Trade and production became more globalized, with developed and emerging economies around the world becoming more integrated. This is evidenced by the growth in trade volumes, which almost tripled in 2000–10. (Trade also improved timing and reliability of shipments, allowing firms to better control the decentralized supply chain, since, along with costs, they are key factors in firms' outsourcing decisions.) European enterprises, operating in one of the largest markets in the world with about 500 million high- and middle-income consumers, were increasingly exposed to international competition. On the cost side, the reduction of transaction costs introduced additional opportunities to maximize profits as firms attempted to move labor-intensive activities

offshore. This fragmented the production process and supply chain, rewarding firms that could better manage the complex structures involved.

- **EU enlargement and the creation of the single market.** EU enlargement—built on the principle of a common market for goods, services, capital, and labor—strengthened a global trend. In Europe, due in part to the macroeconomic stability provided by (prospective) membership, geographic and market borders became thinner, allowing increased mobility for products and factors of production. The EU expansion process opened new markets to enterprises in advanced Europe. It also expanded opportunities for offshoring parts of the production process, while providing an opportunity for firms in emerging Europe to enter niche markets and take over parts of the value chains. For example, the Slovak Republic, with virtually no tradition of car manufacturing, became one of Europe's largest car manufacturers, and many Polish enterprises are becoming suppliers to German companies.

how to help lagging countries catch up or at least to ensure that the gaps grow no wider. Enterprise productivity growth in the south is needed most of all. Policymakers will also need to ensure that the countries now catching up will continue to grow in an enlarged Europe, where new entrants will vie for potential investors. Finally, internal sources have driven enterprise growth in Europe to date. The sources of growth once the EU12 catches up remain unclear (chapter 5).

Jobs—some are more durable than others

Contrary to common perceptions, enterprises created employment across Europe in 2002–08: enterprises outside financial and extractive sectors, for example, created more than 12 million jobs.[15] Of these, 25 percent were made in the new member states, 31 percent in Southern Europe, and 44 percent in the rest of the European Union.

Employment generation in emerging Europe was almost double that in the EU15. Following the large reallocation of labor resulting from the transition, private enterprises became net job creators. The domestic service sector, which is underdeveloped in emerging Europe relative to advanced Europe, drives employment growth across all countries (figure 4.3). Construction, fueled by the precrisis real estate boom in the Baltic states, but also in Bulgaria and Romania, explained much of the difference between Central European countries and the rest of New Europe. Manufacturing jobs fell slightly in emerging Europe overall,

Box 4.2: Firms in Europe are becoming more similar—in size

Regional integration and globalization are making firms increasingly similar. As barriers to entry to new markets have fallen, so have differences among firms operating across countries. A critical and observable firm characteristic is size, where European firms appear to be increasingly similar. This is in line with economic theory: thanks to reduced barriers to entry, markets become more competitive and industries converge toward

their minimum efficient scale. According to the theory of contestable markets, in an industry with no fixed costs, extra profits would be eliminated through entry and firms should converge to the efficient minimum scale. In this way, dispersion of firm sizes is explained by barriers to entry in the form of fixed costs.

When observing the evolution in size of the European firms in sectors most exposed to

international competition– manufacturing, transport and telecoms, real estate, and other services—both trends are visible, especially in transport and telecommunications (box figure 1). The forces described above affect the day-to-day operations of companies in Europe and around the globe. Some companies have managed to successfully adapt and benefit— but not all.

Box figure 1: Average firm size by sector in EU countries: 2002 and 2007
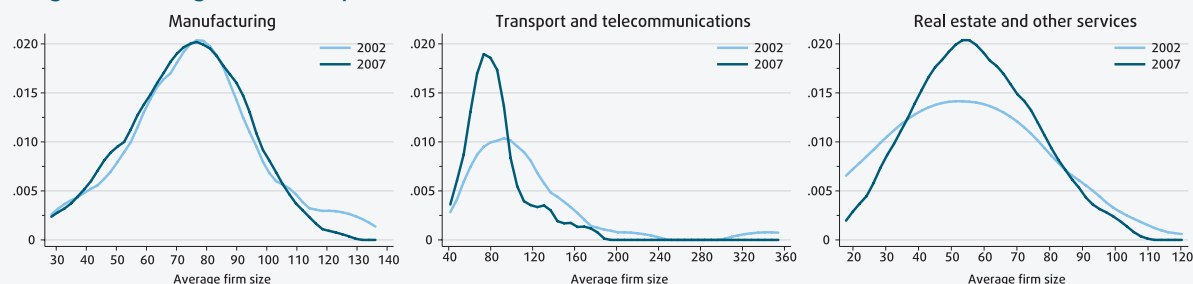
Note: Nonparametric estimations of the density function of EU average firm size (10 employees and above) for 2002 and 2007. Empirical densities were estimated using Epanechnikov kernel techniques.
Source: World Bank staff calculations, based on Eurostat.

199

Figure 4.3: In the EU12, most jobs created were in services and construction
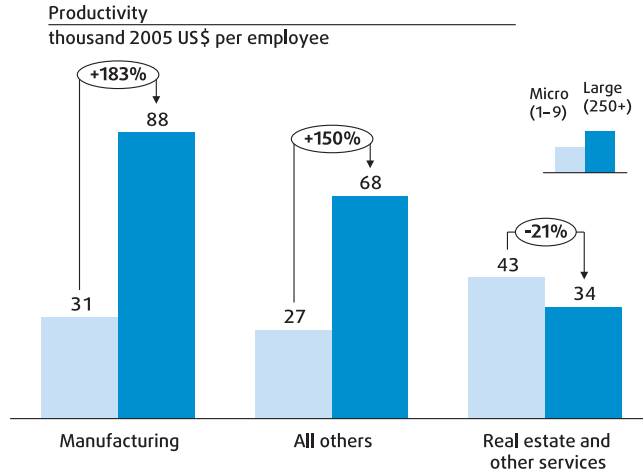
(employment growth, by size of firms and sector, 2002–07)
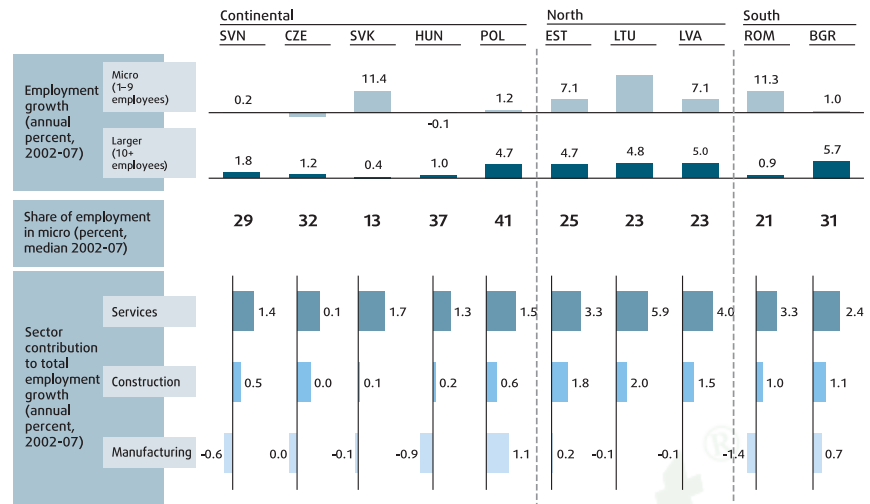
Note: Data for 2008 are not included as sector classification changed from 2007 to 2008. The period of time considered varies by country: Estonia and Lithuania (2004–07), Latvia and Poland (2003–07), and the Slovak Republic (2002–05).
Source: World Bank staff calculations, based on Eurostat.

reflecting two opposite forces: growth in some parts due to delocalization of labor-intensive tasks from advanced to emerging Europe to leverage the lower labor costs of the skilled workforce; and decline in the EU entrants' larger enterprises, especially the Baltic economies, as they restructured their industries from the legacy of the Soviet system.

In advanced Europe, the southern countries outperformed the rest in job creation, with an average yearly growth of 1.9 percent in 2002–08 (compared with 1.5 percent and 1.1 percent in Continental and Northern Europe, respectively). The sector distribution of employment creation followed a path similar to emerging Europe's. Manufacturing declined overall, emphasizing the shift toward services (figure 4.4). The type of companies generating service jobs varied. In Southern Europe, microenterprises (mostly family-owned firms with fewer than 10 employees) and small and medium enterprises generated most jobs. Construction contributed to employment in the south, accounting for a large share of the growth: in Spain alone, it accounted for one out of five jobs in 2007.

Yet a simple comparison of growth rates misses the fact that jobs do not all contribute equally to growth. Decomposing job creation by sector and size brings out two main trends:

- Some jobs are more stable than others. Domestic, consumer-driven retail services[16] accounted for the largest share of the difference in job-growth rates across countries. More than half the growth in the EU15 South (1.8 percent of 2.9 percent) was concentrated in these sectors, which are cyclical and credit-dependent: in Southern Europe alone more than 1.4 million jobs created in 2000–08 (about half the total) disappeared by end-2010. Similarly, jobs created in microfirms (those with fewer than 10 employees)

are less resilient than those in larger companies, as they are less likely to survive—bad news for the EU15's south, where half the new jobs were in microenterprises.[17]

- Some jobs add more value than others. Jobs in microenterprises often have low productivity. This is evident in Southern Europe where one job in a large firm produces on average the same value added as two jobs in a small family-run business with up to nine employees (figure 4.5). The additional jobs created in microfirms and in labor-intensive nontradable sectors in the EU15 South have only a small impact on value addition. The size of enterprises generating jobs in Southern Europe—mostly smaller firms with fewer than 10 employees—is also relevant to explain the high unemployment rates, especially among young people, despite reasonably rapid job creation. This could signal a mismatch between what is demanded by such firms—essentially unskilled labor—and the skilled labor available in the market. A worker in a microfirm generates output valued at about $40,000 annually, including the gross salary, gross profits, and depreciation. With this low value added per worker, microfirms cannot afford to hire educated Europeans, who form a sizable fraction of job seekers. Besides, they may only require unskilled or semiskilled workers.

When the durability and value added of the new jobs is taken into account, the gap between the apparently sluggish north and faster south in creating jobs narrows.

Value added—closing one productivity gap, opening another

Intercountry differences are most telling in productivity indicators (figure 4.6). These differences are instrumental in understanding firm performance. Over time, in a single integrated market like Europe, firms in low-productivity countries are expected to upgrade their technology, adopt new management
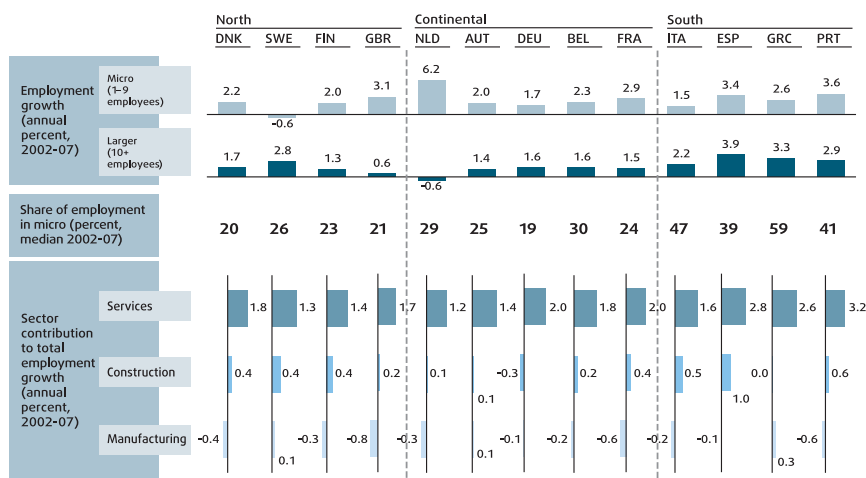
Figure 4.4: In the EU15, a loss of manufacturing jobs, replaced by small service enterprises

(employment growth, by size of firms and sector, 2002–07)

Note: Data for 2008 are not included as sector classification changed from 2007 to 2008. For Belgium, France, and Greece, the period considered is 2003–07.
Source: World Bank staff calculations, based on Eurostat.

201

Figure 4.5: Microenterprises in the EU15 South cannot pay for skilled workers

(productivity level, by firm size and sector, 2007)

Productivity
thousand 2005 US$ per employee

Micro (1–9)   Large (250+)

Manufacturing: 31, 88 (+183%)
All others: 27, 68 (+150%)
Real estate and other services: 43, 34 (-21%)

Source: World Bank staff calculations, based on Eurostat.

Figure 4.6: Productivity levels were lower in the south and lower still in the east

(average productivity in 2002, thousand 2005 US$)

EU15 North				EU15 Continental					EU15 South				EU12 Continental					EU12 South		EU12 North		
GBR	SWE	DNK	FIN	DEU	FRA	NLD	BEL	AUT	ITA	ESP	GRC	PRT	POL	CZE	HUN	SVK	SVN	ROM	BGR	LTU	LVA	EST
63	60	71	66	61	60	61	71	63	49	45	35	26	15	16	16	16	22	7	5	9	10	14
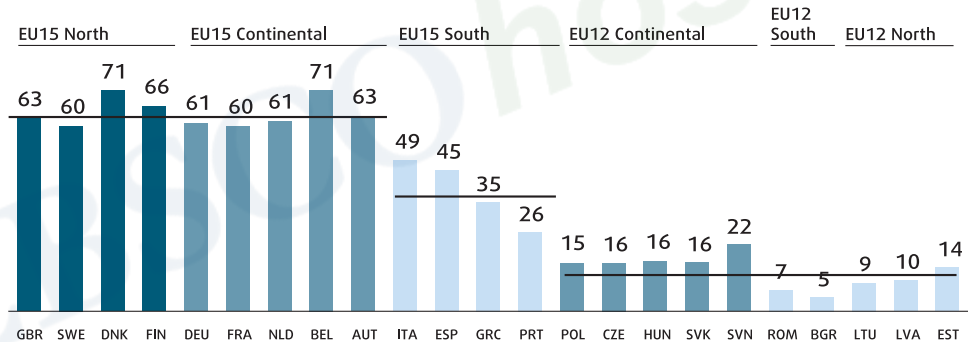
Note: For Belgium and Greece, productivity levels refer to 2003.
Source: World Bank staff calculations, based on Eurostat.

Figure 4.7: The east has been catching up, the south has been falling behind

(average productivity growth in EU27, annual percentage rates, 2002–08)

EU15 North				EU15 Continental					EU15 South				EU12 Continental					EU12 South		EU12 North		
GBR	SWE	DNK	FIN	DEU	FRA	NLD	BEL	AUT	ITA	ESP	GRC	PRT	POL	CZE	HUN	SVK	SVN	ROM	BGR	LTU	LVA	EST
2.5	2.3	0.6	1.4	0.8	1.9	-0.1	0.9	1.3	-0.6	-0.5	-2.0	-0.1	4.8	7.6	4.7	3.6	7.5	6.4	10.4	5.9	8.9	4.2
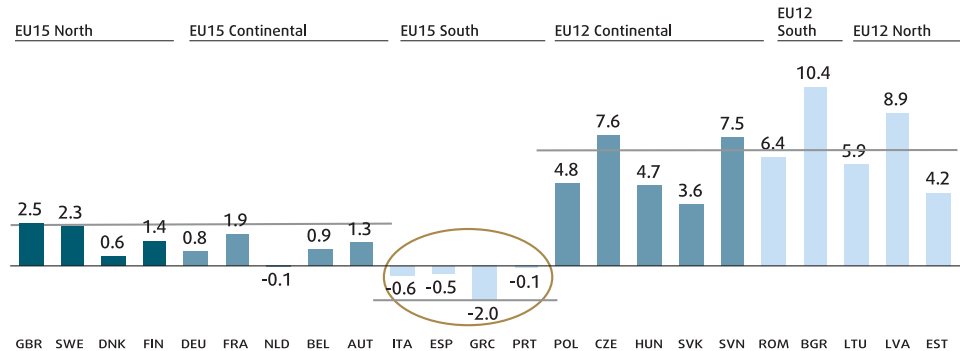
Note: The period of time considered varies by country: Belgium (2003–08), Greece (2003–07), and Great Britain, France, Czech Republic, Latvia, and Romania (2002–07).
Source: World Bank staff calculations, based on Eurostat.
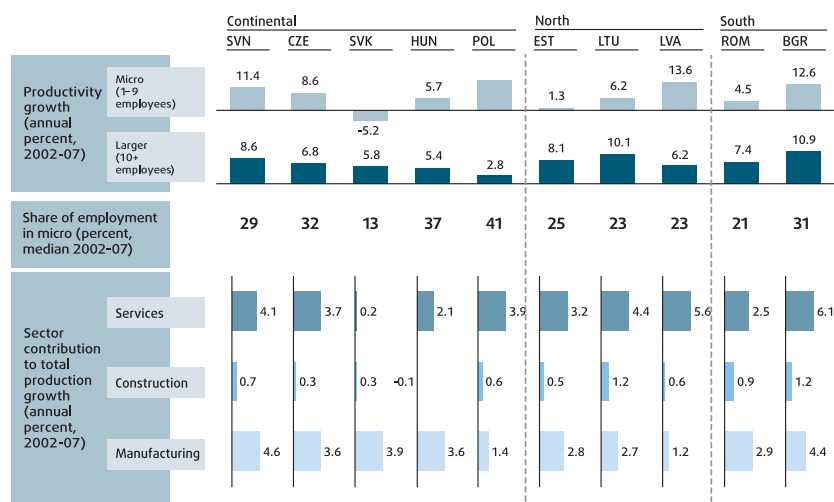
Figure 4.8: In the EU12, manufacturing and services are more productive, construction less

(productivity growth, by size of firms and sector, 2002–07)

		Continental					North			South	
		SVN	CZE	SVK	HUN	POL	EST	LTU	LVA	ROM	BGR
Productivity growth (annual percent, 2002-07)	Micro (1-9 employees)	11.4	8.6	-5.2	5.7		1.3	6.2	13.6	4.5	12.6
	Larger (10+ employees)	8.6	6.8	5.8	5.4	2.8	8.1	10.1	6.2	7.4	10.9
Share of employment in micro (percent, median 2002-07)		29	32	13	37	41	25	23	23	21	31
Sector contribution to total production growth (annual percent, 2002-07)	Services	4.1	3.7	0.2	2.1	3.9	3.2	4.4	5.6	2.5	6.1
	Construction	0.7	0.3	0.3	-0.1	0.6	0.5	1.2	0.6	0.9	1.2
	Manufacturing	4.6	3.6	3.9	3.6	1.4	2.8	2.7	1.2	2.9	4.4

Note: Data for 2008 are not included as sector classification changed from 2007 to 2008.
For Estonia and Lithuania, the period considered is 2004–07; for Poland and Latvia, 2003–07.
Source: World Bank staff calculations, based on Eurostat.

processes, and learn from the more productive ones through the flow of knowledge, capital, labor, and goods, moving toward the efficiency frontier (Acemoglu, Zilibotti, and Aghion 2006). Productivity growth should be inversely correlated with initial productivity levels.

The data for Europe show a different story.[18] As expected given the low initial level, from 2002 to 2008 EU12 productivity growth was strong, three to four times as high as in the average EU15 country. However, while the productivity divide between advanced and emerging Europe was closing, another gap was growing—that between the EU15 South and the rest of Western Europe (figure 4.7). North and Continental Europe improved productivity, while the EU15 South showed a decline.

A breakdown of the productivity contribution from 2002 to 2007 according to the different mix of sectors and size of enterprises helps explain in particular why Southern Europe was lagging.

The catch-up of productivity in emerging Europe was vigorous, with annualized growth rates above 6 percent for almost all countries, from all types of firms (figure 4.8). The sectors more exposed to foreign trade (manufacturing and other services) accounted for a similar productivity gain across countries, while differential productivity growth in the remaining sectors (construction, wholesale and retail trade, hotel and restaurants, and transport and telecommunications) accounted for most of the difference, particularly the higher growth in the Baltic economies and the EU12 South (Bulgaria and Romania). In Central Europe, where larger enterprises shed excess labor, and drove productivity levels close to Portugal's, smaller enterprises have increased productivity. In Romania and Bulgaria, firms of different sizes show similar growth patterns, although in Bulgaria—where the average firm size is larger—the productivity gains by large enterprises account for half of overall growth.

Figure 4.9: Manufacturing drives productivity growth in the EU15 center, services in the north

(productivity growth, by size of firms and sector, 2002–07)
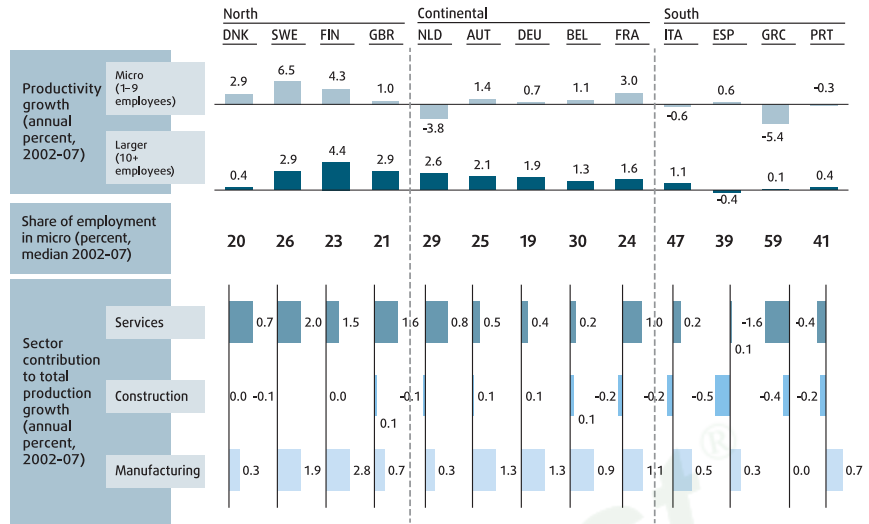
		North				Continental					South			
		DNK	SWE	FIN	GBR	NLD	AUT	DEU	BEL	FRA	ITA	ESP	GRC	PRT
Productivity growth (annual percent, 2002-07)	Micro (1–9 employees)	2.9	6.5	4.3	1.0	-3.8	1.4	0.7	1.1	3.0	-0.6	0.6	-5.4	-0.3
	Larger (10+ employees)	0.4	2.9	4.4	2.9	2.6	2.1	1.9	1.3	1.6	1.1	-0.4	0.1	0.4
Share of employment in micro (percent, median 2002-07)		20	26	23	21	29	25	19	30	24	47	39	59	41
Sector contribution to total production growth (annual percent, 2002-07)	Services	0.7	2.0	1.5	1.6	0.8	0.5	0.4	0.2	1.0	0.2	-1.6	-0.4	0.1
	Construction	0.0	-0.1	0.0	-0.1	0.1	0.1	0.1	-0.2	-0.2	-0.5	-0.4	-0.2	
	Manufacturing	0.3	1.9	2.8	0.7	0.3	1.3	1.3	0.9	1.1	0.5	0.3	0.0	0.7

Note: Data for 2008 are not included as sector classification changed from 2007 to 2008. For Belgium, France, and Greece, the period considered is 2003–07.
Source: World Bank staff calculations, based on Eurostat.

In the EU15, the construction sector shows limited or no productivity growth. Excluding construction, the gap between the EU15 South and the other countries is seen in all type of enterprises and sectors. On average, productivity growth for micro, small and medium, and large enterprises in all sectors is 0.5–1 percent lower than in the rest of Europe, pointing to a structural issue rather than firm-specific patterns. The mix of firms may also explain part of the gap. Productivity growth in Southern Europe particularly lagged in services and in microenterprises. Microenterprises showed less productivity growth than larger enterprises across the continent and revealed a productivity decline in some southern countries. Given the relative importance of the microenterprises in these economies, this has a clear implication for overall growth. Likewise, while services increased productivity over the period in Northern Europe, the South (and to some extent Continental Europe) showed a different pattern. In Portugal and Greece, services made a negative contribution to productivity growth (figure 4.9).

The combined effect of these two patterns explains why the gap in productivity growth between Southern Europe and the rest is concentrated in real estate and other services, where microfirms have the largest productivity gap versus their peers elsewhere.

Exports—a winner-take-all reality?

Generally speaking, European countries with higher export shares are pulling ahead and countries that are less open to trade are losing ground. Continental Europe and the new member states in the center are the export winners. Not only are they more export-oriented than the rest of Europe, their performance over the period is superior, with exports equivalent to more than half GDP. These export results are a function of the pan-European value chains
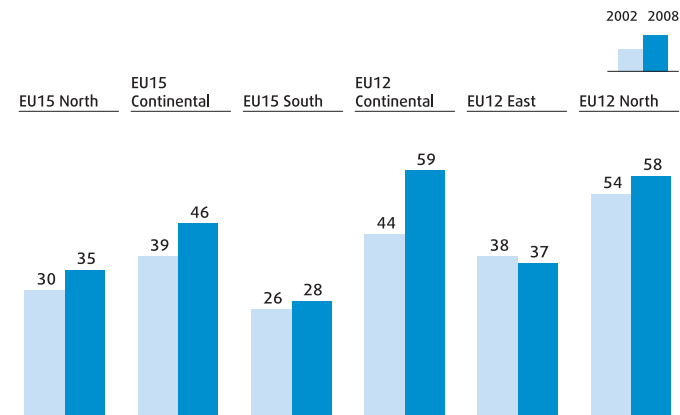
Figure 4.10: Exporting—Central Europe's specialty

(exports as share of GDP, 2002 and 2008)

Source: WDI.

developed by firms across countries. Although overall exports relative to GDP increased across Europe, level and growth remain consistently lower in EU15 South (figure 4.10).

The presence of exporters in an economy is not only relevant from a macroeconomic perspective, but also at firm level. Research shows that although the number of firms that export is small, these firms make a big contribution to economic growth and welfare. Higher-productivity firms tend to export more.[19] When looking at the EU15 and EU12 countries separately to account for differences in initial conditions, one finds a strong correlation between country productivity and export performance (figure 4.11). A recent study of manufacturing in six major European countries shows that exporting firms in Europe tend to be larger, more productive, more innovative, and faster-growing than nonexporters in the same industry (box 4.3).

Why did some parts of Europe do better than others? —FDI, offshoring, and heavy regulation

Volkswagen, on the edge of bankruptcy in 1993 with €1 billion in losses, achieved a turnaround by consolidating platforms among its brands (Volkswagen, Škoda, Audi, and Seat); cutting development time and cost; and relocating production to Hungary, the Slovak Republic, and elsewhere. Škoda's Mlada Boleslav plant became Volkswagen's leader for supplier integration, offering jobs in several on-site suppliers to deliver carpets, seats, exhaust systems, rear axles, dashboards, and instrument panels. By 2010, Volkswagen Group had increased non-German employment from 41 percent in 1993 to 53 percent (Kubes and Radler 2002) and had 22 percent of the car markets in Central and Eastern Europe.[20] The reconfiguration of the value chain transformed both the parent and the subsidiary.

Benetton Group, an apparel manufacturer and retailer, has around 6,000 stores in 120 countries and annual sales of about €2 billion. Distinct from its smaller peers in Prato, Benetton is an Italian "globalizer." Its supply and distribution chains are characterized by the combination of upstream vertical integration, outsourcing of labor-intensive downstream production, and retail outlets

205

Figure 4.11: The size and productivity of firms influence a country's exports, late 2000s

(export share as a function of aggregate size and productivity)

EU15 : Corr = 0.49
EU12 : Corr = 0.40

EU15 : Corr = 0.64
EU12 : Corr = 0.73
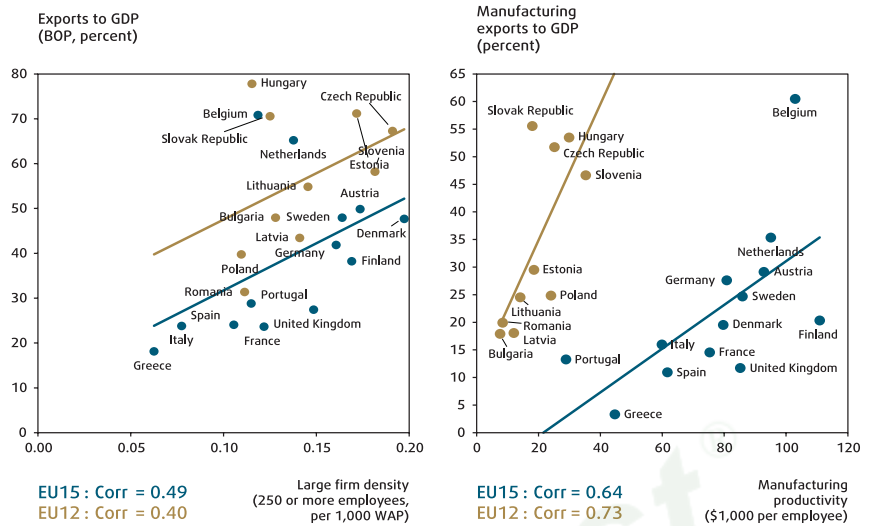
Note: The variables on the y-axis in each panel are for 2009, while those on the x-axis are for 2007. For the Slovak Republic, data refer to 2005. WAP is working age population.
Source: World Bank staff calculations, based on Eurostat, UNCOMTRADE, and WDI.

managed by third parties—balancing quality control, cost competitiveness, and responsiveness to market shifts (Camuffo, Romano, and Vinelli 2001). Benetton has production facilities in Croatia, the Czech Republic, Hungary, Poland, Romania, Serbia, and Ukraine.

Škoda and Benetton exemplify the successful companies in Europe: those that attracted investors, expanded, and accessed new markets, often by setting up foreign subsidiaries. The success of a country in generating jobs, value, and exports depends on its enterprises. Over the past decade in Europe, this meant having export-oriented, sizable companies. But not all European firms like to grow. Mr. Rossi's firm in Northern Italy, referred to in the opening paragraphs of this chapter, remains a family-run enterprise and has not grown in size since its early years. Mr. Rossi's experience is unfortunately all too common in Italy, Greece, and some other countries. When the cost of dealing with the government is high, many businesses prefer to stay small.

Together, these examples help answer three questions:

• Why did countries in emerging Europe manage to successfully start catching up to the EU15? Being open to foreign investments, like Škoda was, helped countries begin to catch up. Lada, which until 2008 was owned by the Russian government, did not perform nearly as well. Investment flows from advanced to catch-up economies benefited host countries by generating employment, transferring technological and managerial knowledge that raised productivity, and linking the companies to global networks, which increased exports.

• How did EU15 North and Continental countries manage to keep doing well? These countries had the right type of firms to take advantage of enlargement. These firms could offshore and enter new markets. Volkswagen is just one of many companies that decentralized its production chain in Eastern Europe.

- What makes the EU15 South a laggard? Southern Europe had few global companies. If the south had more Benettons, or attracted more foreign investment, it would have been a different story. Mr. Rossi's company is typical of many in the south. A complex business environment—especially poor design and enforcement of regulations—stifles enterprises' growth, making them unsuited for increasingly competitive European and global markets.

The northeastern achievement: attracting FDI

In 1990–2009, Poland took in more than $180 billion in FDI,[21] equivalent to 39 percent of its GDP. Estimations based on a representative sample of firms from Eastern Europe show that in 2008, one of six Polish companies with 10 employees or more was foreign-owned. The same foreign companies employ a third of Polish workers and generate close to half its value added. In 2003–08, foreign enterprises were responsible for creating one of four new jobs in Poland.[22]

This trend is not unique to Poland. Since 1990, other countries in Central and Eastern Europe have also received large volumes of FDI—for emerging Europe, equivalent to one-quarter of its GDP (figures 4.12 and 4.13).[23] FDI flows have accelerated since enlargement in the 2000s, when about 20 percent of FDI flows in Europe were directed toward former Soviet bloc countries.

FDI through new subsidiaries and the acquisition of existing enterprises—most often due to privatization of former state-owned enterprises—affects the performance of the economy.

Box 4.3: What do successful exporters look like?

An extensive economic literature analyzes the relationship between firm characteristics and export propensity. Barba Navaretti and others (2011) analyze the export activity of firms in Austria, France, Germany, Hungary, Italy, Spain, and the United Kingdom. Using data collected by the World Bank's Enterprise Surveys in 2009, this report extends the analysis to 20 emerging Europe and eastern partnership/EU candidate countries (Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Georgia, Hungary, Latvia, Lithuania, the former Yugoslav Republic of Macedonia, Moldova, Poland, Romania, Serbia, the Slovak Republic, Slovenia, Turkey, and Ukraine).

Following Barba Navaretti and others (2011), this report uses a cross-country linear probability model for the extensive margins (the share of exporting firms) and a linear regression model for the intensive margins (the share of the export value over total sales, restricting the sample to exporters) to identify the features that characterize exporters and nonexporters. The empirical estimation considers a number of firm characteristics: size (measured in number of full-time employees), labor productivity, domestic versus foreign ownership, and age.

Some common patterns in advanced and emerging Europe emerge, indicating that firm characteristics are what matter more than country conditions.

- **Extensive margin:** larger, foreign, more productive, and more innovative firms are more likely to export; differences in age between exporters and nonexporters do not appear to be significant.

- **Intensive margin:** the share of exports is higher for larger, young, and foreign-owned firms.

Some differences indicate peculiarities of emerging Europe: size and foreign ownership have a much higher impact on exports in emerging Europe than in the EU15 (Hungary is the exception). Age does not appear relevant, confirming that in emerging Europe young firms are often more dynamic. And in emerging Europe, research and development is relevant to explain the propensity of a firm to export, but not its export intensity.

Barba Navaretti and others (2011) show that firm characteristics are more relevant than country characteristics in explaining export behavior. The export performance of Eastern European firms is largely explained by firm-specific characteristics. When trying to measure the extent to which differentials in export behavior in emerging Europe are correlated with business regulations, and particularly trade-related regulations, the results show that:

- **Extensive margin** is positively correlated with business regulation (measured by the principal components analysis indicator of the Business Operations Index). A similar result holds for the specific trade indicator (one component of the Business Operations Index).

- **Intensive margin** appears correlated with the Business Operations Index, but not specifically with trade regulations.

These results indicate that better trade regulations facilitate exports by reducing barriers to new market. For firms that reach new sale destinations and overcome the entry costs, export intensity is affected by the overall regulatory environment rather than by regulations governing foreign trade.

As Poland's example shows, foreign-owned firms in the EU12 are more productive and tend to grow faster than domestic ones. This is the result of parent company investments in plants and people, which materialized in new technology and processes, but also in management skills, access to better inputs, and connection to international markets. This is the case for most countries in the sample (figure 4.14).[24]

FDI does not benefit only the receiving company (Javorick 2004). It has broader sector and economywide benefits, producing spillover effects as productivity improvements and employment effects are captured not only by the receiving firm, but other enterprises in the country. Other members of the value chain, which receive knowledge from international best practices (vertical spillovers, as through quality certification systems), and competitors which learn from the products brought to the market by the foreign-owned firms (horizontal spillovers), also benefit from FDI. FDI was positively correlated with growth in jobs and productivity in the EU12, and contributed to value-added growth (figure 4.15).

The export performance of firms in Eastern Europe confirms that foreign ownership—along with size—is one of the most important explanations for the enterprise's export propensity and export intensity.

Figure 4.12: The south has become less attractive to foreign investors, the east more so

(FDI flows into Europe, all sectors, 1985-2009)
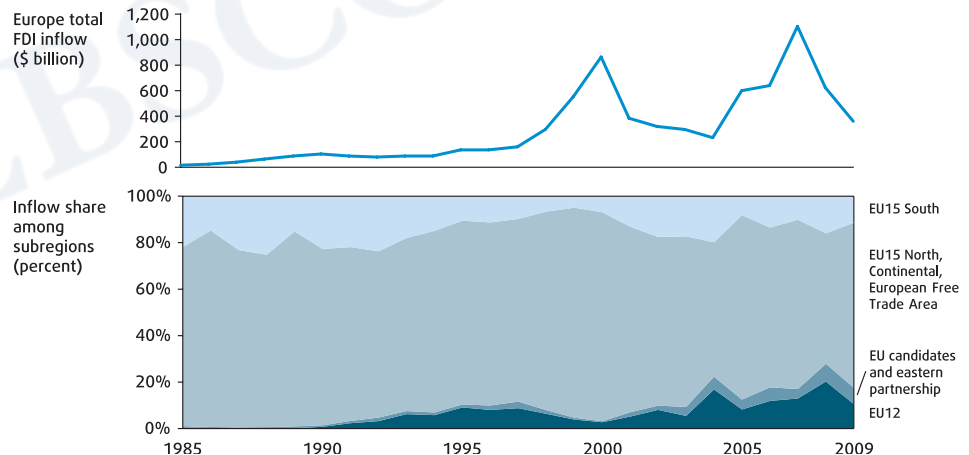
Source: World Bank staff calculations, based on UNCTAD (2010).

Figure 4.13: Not all countries in emerging Europe are equally attractive for foreign investors

(EU12 FDI stock, 2008, percentage of GDP)
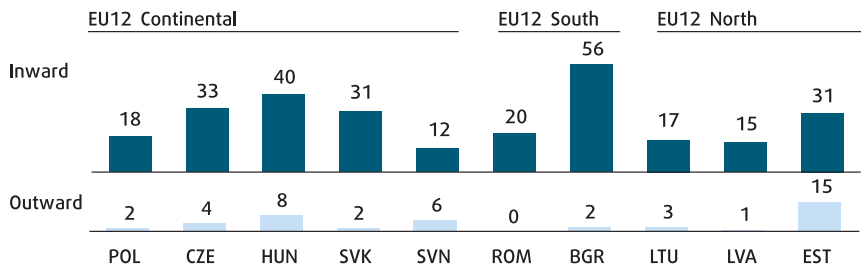
Source: World Bank staff calculations, based on Eurostat.

Beyond FDI, what are the factors behind the productivity performance of the new member states? A panel of surviving firms (with 10 employees or more) from the Amadeus dataset in EU12 countries[25] helps illuminate the drivers of productivity growth in different sectors of the real economy in 2003–08. The analysis disentangles firm-specific characteristics from country-level attributes.

- **Do country characteristics explain enterprise performance in the EU12?**
  Yes. Considering firm productivity growth as a function of the firm's initial productivity level, firm characteristics (size, age, ownership, and sector of activity), and country dummies, country dummies are statistically significant and differ greatly, indicating that similar companies perform differently in different countries (table A4.2).[26, 27] For example, the productivity of a manufacturing

Source: World Bank staff calculations, based on Amadeus.
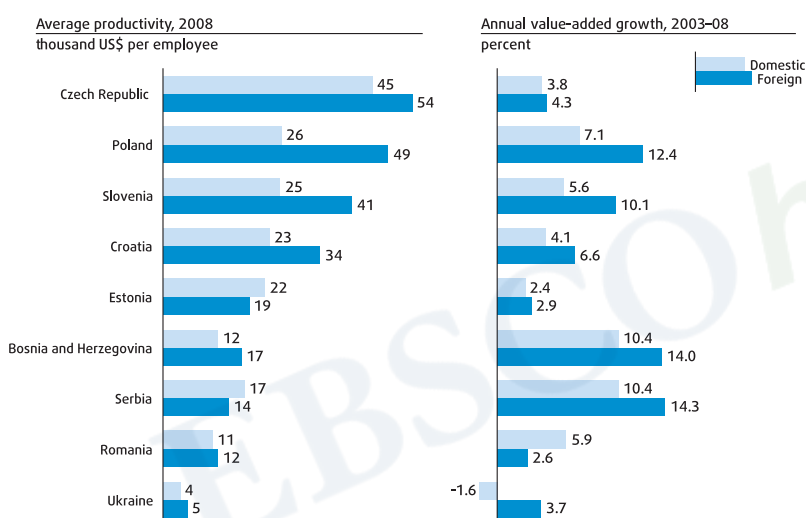
Figure 4.14: Foreign firm are more productive and have faster productivity growth

Note: For the Czech Republic, Latvia, and Romania, data on the y-axis refer to 2002–07.
Source: World Bank staff calculations, based on Eurostat.
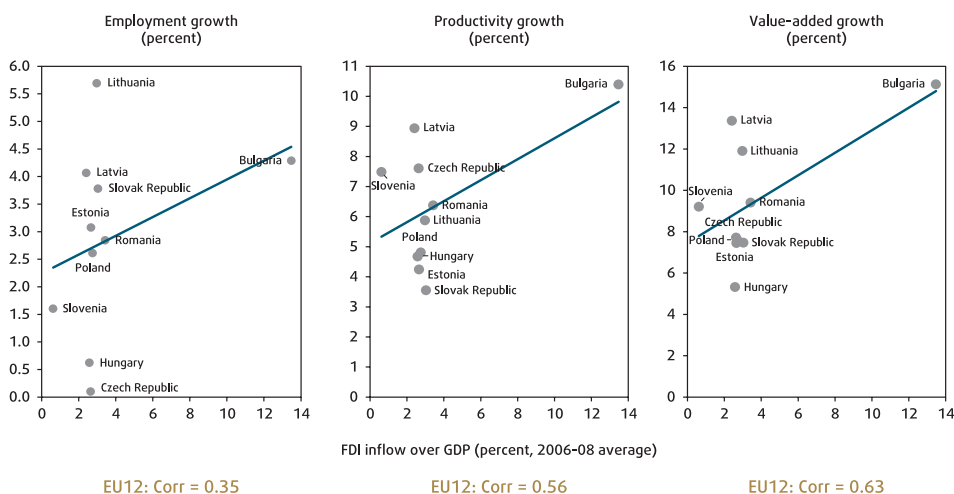
Figure 4.15: In the EU12, FDI is positively associated with productivity and jobs

(growth in employment, productivity, and value added, 2002–08)

company in Poland grows 2.1 percentage points slower than that of a similar manufacturer in Slovenia. The results are similar for manufacturing and services—a country that does well in facilitating business in one sector tends to do well in the other.

- **Are country characteristics more important than firm characteristics in explaining enterprise performance in the EU12?** They appear to be. The exclusion of firm characteristics from the regression of productivity growth for manufacturing firms reduces the explanatory power of the model by 8 percent. However, when country dummies are excluded, the model loses about four times as much of its predictive power, or 33 percent. For services, a similar pattern emerges: the explanatory power of the model is reduced more when dropping country-fixed effects (23 percent) than when excluding variables of firm characteristics (8 percent). The conclusion is that cross-country differences are more relevant for firm performance than firm characteristics in the new member states.

- **What are the most important country characteristics for firm performance in the EU12?** The "fundamentals." This response emerges from a correlation of estimated country dummies with country characteristics such as the regulatory environment, quality of hard infrastructure, skills of the workforce, share of credit to GDP, and FDI inflows and outflows.[28] The quality of infrastructure, FDI inflows, availability of credit, and ease of conducting business operations appear to drive country productivity improvements (figure 4.16). That most variables are similarly correlated with firms' performance in both manufacturing and services points to the importance of fundamentals.

To infer causality, an extended version of the model is used in which firm productivity growth (in 2003–08) is explained by the same firm controls, sector dummies, country fixed effects, and changes of country characteristics in the same period. By including both country characteristics and country dummies, the unobservable country-specific influences are controlled for, allowing a more reliable understanding of what causes what. For both manufacturing and services, productivity gains in the EU12 are indeed linked to increases in inward FDI and, relatedly, to better business regulations, especially for taxes, foreign trade, and employment.[29]

- **What are the most important firm characteristics for explaining firm performance in the EU12?** In one word—ownership. This question was answered in two ways. First, a counterfactual exercise compared how the estimated country dummies change when adding each control (baseline productivity, sector, ownership, size, and age) in the model that explains productivity growth. A Czech manufacturing firm is a good illustration. The average productivity gap between a Slovenian and a Czech firm in manufacturing is 6.7 percent. When considering two firms with the same baseline productivity, this gap falls to 4.7 percent, indicating greater productivity for the average Czech firm. Limiting the observation to two firms with the same sector specialization would not change the result (4.6 percent). Finally, if the two firms had the same ownership, size, and age composition, the gap narrows further, to 3.8 percent, indicating that the Czech Republic
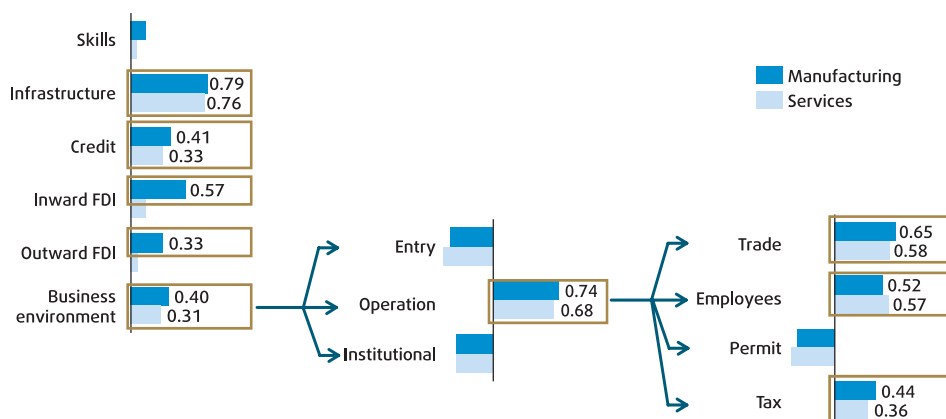
Figure 4.16: In the EU12, infrastructure, credit, FDI, and regulations are correlated with productivity

(correlation between country dummies and policy variables in EU12 countries, 2002–08)

Source: World Bank staff calculations, based on Amadeus, Doing Business, WEF's Global Competitiveness Reports, and WDI .

has a negative mix of firm characteristics (table A4.2).[30] The remaining effect is country-specific.

A complementary way to explore the role of firm features in firm performance is to look at the coefficients of the firms' characteristics in the regression model. Results show that ownership is especially important for productivity growth in the EU12 (table A4.2). Being part of an international group pays: foreign-owned firms grow faster than purely domestic ones, in manufacturing and services. Home-based companies with an international presence[31] also grow faster than domestic-owned companies: by 6.7 percent in manufacturing and by 3.1 percent in services. Size seems to matter less: both in manufacturing and services, size is negatively correlated with productivity growth. Lower productivity growth for larger enterprises can be part of the legacy of the Soviet system; newer, smaller enterprises are more likely to have efficient production processes and less cumbersome employment structures. The age of the firm does not seem to matter for productivity growth in the EU12.

Together, the productivity performance of foreign-owned firms and the positive correlation of inward FDI at the country level with productivity growth at the level of the firm confirm a prominent role for FDI in emerging Europe.[32] Inward FDI can be attracted and stimulated. Good infrastructure and favorable business regulations help the most, even when adjusting for market size and skills of the workforce (box 4.4). Among the business regulations that matter most, three stand out: trade, labor, and taxation (the burden of which is calculated as the total tax rate and compliance costs).

Why Northern Europe thrived: flexibility in offshoring

About 10 percent of Swedish firms belong to Sweden-based enterprise groups with at least one subsidiary in Europe.[33] By contrast, fewer than 3 percent of Italian or Spanish firms are part of a domestic group with an international presence. As a result, more Swedish firms operate on a European scale and have taken advantage of an enlarged Europe. Such offshoring introduces substantial benefits. Domestic companies in Europe with an international presence involved in manufacturing and

211

services are at least 30 percent more productive, and their value added grows much faster, than domestically owned companies (figure 4.17).

Investment in new member states—facilitated by the enlargement process—is not only beneficial for FDI-receiving companies. FDI-providing firms in tradable sectors—largely in manufacturing but also in services—leveraged vertical FDI to establish production facilities in foreign markets, reducing labor costs and maintaining competitive advantage. German Mittelstand companies are the best example of this successful integration (figure 4.18).

Successful countries in Northern and Continental Europe not only nurtured domestic firms that invested abroad, but also attracted foreign firms, as reflected in their FDI. In 2000–09, $4,400 billion came into the EU15 economies, 49 percent of which went to the United Kingdom, Germany, and France (figure 4.19).[34] The result is a widely internationalized enterprise sector.

As with the EU12 above, the drivers of productivity growth in different sectors of the real economy in 2003–08 may be analyzed for the EU15, as follows. Despite similarities, the different stages of enterprise development in advanced and emerging Europe stand out.

- **Do country characteristics explain enterprise performance in the EU15?**
  Yes. Based on the panel of surviving firms from the Amadeus dataset, a regression model is applied to explain firm productivity growth in the EU15 countries as a function of the firms' initial productivity level, characteristics (size, age, ownership, and sector), and country dummies.[35] Country dummies

Box 4.4: What attracts FDI?—Decent infrastructure and good regulations

Regardless of geographic focus, most studies of the drivers of FDI point to market size (and its growth potential) and factor endowments (infrastructure, human capital) as significant factors in attracting FDI.[1]

The policy environment also matters, however. According to Demekas and others (2005 and 2007), even though market size explains a large part of FDI inflows in Central and Eastern Europe, including Southeastern Europe, the investment climate is another determinant. Expropriation risks, lack of contract enforcement, poor provision of public goods, overregulation, and unreasonable costs of doing business are likely to deter private activity. Mukim (2011), using worldwide data, finds that better access to and availability of land information increases the chances of new investment. Also using worldwide data, Waglé (2011) finds a statistically significant relationship between FDI regulations and the value of inward FDI, after controlling for market size and quality of infrastructure logistics.

The Amadeus database can also be used to shed light on the relationship between the business environment and FDI. By considering a list of top-performing manufacturing firms in Europe—the 150 international groups that contributed the most to value added in 2003–08—and analyzing their asset allocation across countries, we can measure the country-specific factors in a location choice. These 150 groups made manufacturing investment (for example, car parts and assembly factories) as well as retail, wholesale (car dealers, for example), and other services (car leasing) subsidiaries.

To calculate the factors, we use the value of the assets of these companies' foreign subsidiaries as proxies for the FDI in a specific country in given sectors. Exogenous factors affecting FDI decisions about where to locate, such as the country's market size, labor skills, infrastructure, and business regulations, we also consider. GDP (in US$ billions) is used as a proxy for the market size of the host country, while the proxy for FDI-relevant institutions comes from the World Bank's Investment
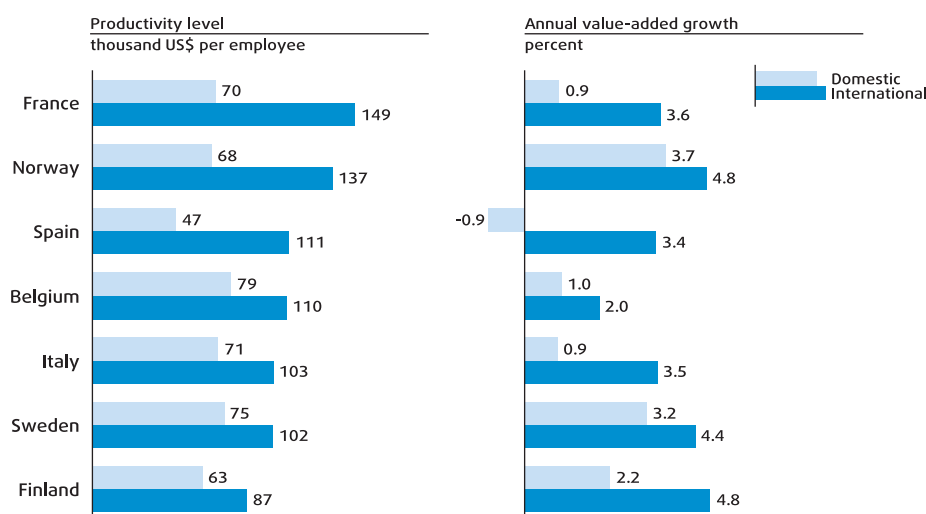
Across Borders database.

The analysis for Europe confirms what Mukim (2011) and Waglé (2011) found for the rest of the world: the quality of FDI-related institutions (measured by the ease of accessing industrial land), regulation of business operations, and infrastructure quality in a specific country are positively associated with the share of total investment made by the top global groups in Europe, even when controlling for market size and workforce skills. A one standard deviation increase in the Doing Business indicator raises the country share by 2.1 percent. For the Investment across Borders index on access to land, a one standard deviation increase would augment the country share by 0.7 percent. And a one standard deviation increase of the infrastructure quality would increase the country share by 2.8 percent.

[1] Mukim and Nunnenkamp 2010 offer an overview of the literature; World Bank 2010b gives a compilation of recent studies on this subject.

are statistically significant and large, indicating that cross-country differences are a relevant correlate of the performances of similar companies across the EU15. Locating in one country or another can mean up to 7 percentage points of productivity variation in manufacturing and 5 percentage points in services (table A4.3).[36] Country performances differ widely among sectors: Norway leads in productivity in services, but is the laggard in manufacturing.

- **Are country characteristics more important than a firm's features in explaining its performance in the EU15?** Generally no. The firm's type matters most. The exclusion of country dummies from the regression of productivity growth in manufacturing reduces the explanatory power of the model by 19 percent. For services, the model loses 11 percent. With the same exercise but excluding firm characteristics—size, ownership, sector of activity,[37] and age—the model loses about 25 percent of its explanatory power, in both manufacturing and services. Overall, these results suggest that the firm size, age, ownership, and sector composition explain a large share of cross-country disparities.

- **What are the most important country characteristics for firm performance in the EU15?** The factors for advanced Europe appear to be different from those for emerging Europe. Different variables explain productivity growth in manufacturing and services, with one element in common: entry and employment regulations are positively correlated with productivity growth. But while manufacturing productivity is largely correlated with FDI inflows and outflows, services appear to be most affected by regulations (figure 4.20). As with emerging Europe, an extended version of the model including variation in country characteristics as explanatory variables was used to understand causes and effects. Results show that for manufacturing in EU15, changes in supply of outward FDI increase productivity growth. Similarly, improvements in business regulation appear to increase productivity growth in both manufacturing and services.

Figure 4.17: In the EU15, firms with a foreign presence are more productive and grow faster

(productivity levels, 2008, and growth of value added, 2002–08)

Source: World Bank staff calculations, based on Amadeus.

Figure 4.18: Investing abroad is related to higher productivity growth

(correlation between economywide productivity and investments abroad)

Corr = 0.66
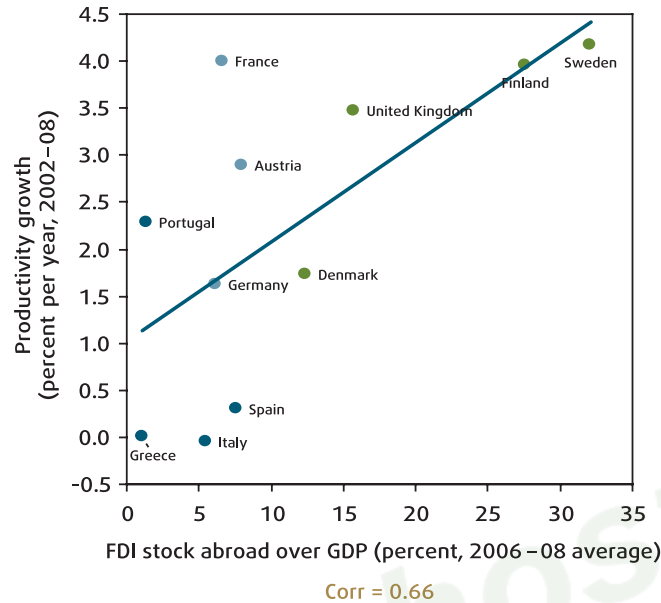
Note: Both productivity and FDI figures refer only to manufacturing industry. For France and United Kingdom, the period of time considered to calculate the productivity growth is 2002–07. For Greece, data over the period of 2003–07 are used to compute the growth rate.
Source: World Bank staff calculations, based on Eurostat.

- **What firm features explain firm performance most in the EU15?** Italian manufacturing is illustrative. The average productivity growth gap between an Italian and a Finnish firm in manufacturing is 2.9 percent. However, considering companies with the same sector specialization, the gap declines to 2.4 percent. If firms in these two countries were similar in size, age, and ownership composition, the gap would be just 1.7 percent (table A4.3).[38] These results suggest that ownership, size, and sector are important.

Estimated coefficients of the firm characteristics in the regression model reveal other points. For EU15, ownership, size, and age are important firm features for productivity growth (table A4.3). Foreign-owned firms and affiliates of an international group grow more. Unlike within the EU12, scale is important in EU15 countries in both manufacturing and services: larger firms' productivity rises faster. Firms that have 50–499 employees grow faster than firms with 10–49 employees. Older firms in services expand faster than the youngest. In manufacturing, however, age does not seem to matter.

In the EU27 as a whole, workforce skills do not appear to be an important country characteristic to explain productivity growth at firm level. Using the Amadeus sample of firms, the correlation between estimated country dummies and workforce skills—measured as the proportion of the workforce with tertiary education—showed a positive but small effect for EU12 firms: 0.16 for manufacturing and 0.07 for services. For the EU15, the estimate was negative (but also small): –0.08 for manufacturing and –0.11 for services.
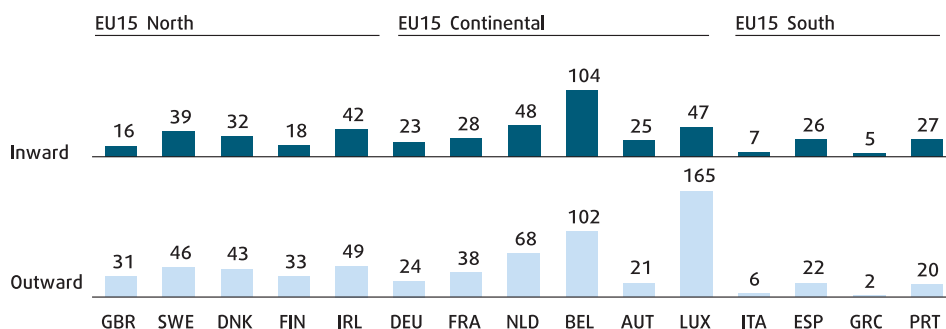
Figure 4.19: Northern and Continental Europe get the bulk of FDI

(EU15 FDI stock, percentage of GDP, 2008)

Source: World Bank staff calculations, based on Eurostat.

The results are somewhat surprising, because much evidence shows that human capital is an essential factor in economic growth. One possible reason for this result might be the indicator used to proxy skills. The outcome of education is composed of quantity and quality of educational capital. While quantity can be measured by the proportion of the workforce with a certain level of instruction, or even by the number of graduates, it is hard to accurately measure the quality of educational capital. Conceptually, quality is reflected in the performance of students and graduates, but it can be also measured by the perceptions about the quality of the educational system.

Using the quality of education systems reported by the World Economic Forum and performing the same exercise with the estimated country dummies provides somewhat different results. The quality of labor force does seem to matter for firm level productivity growth at firm level, particularly in EU12 countries.[39] It appears to matter even more among the non-EU countries of Europe (box 4.5).
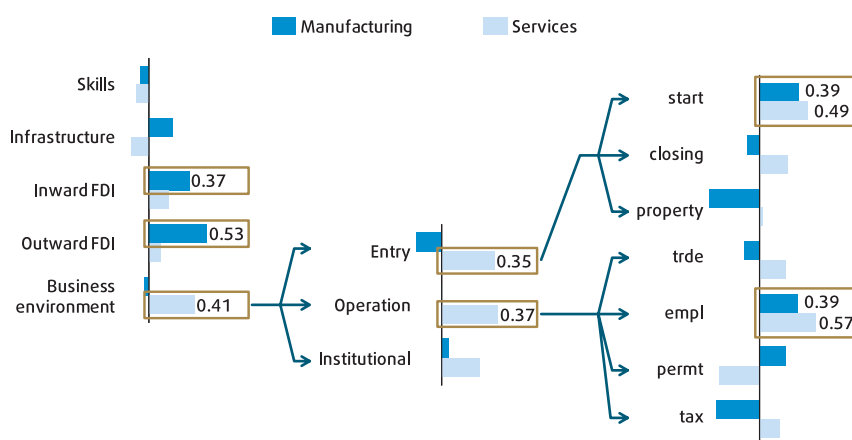
Figure 4.20: In the EU15, FDI and regulations are the closest correlates of productivity

(correlation between country dummies and policy variables)

Source: World Bank staff calculations, based on Amadeus, Doing Business, WEF's Global Competitiveness Reports, and WDI.

Box 4.5: Productivity drivers are similar outside the European Union

Using the sample of surviving firms (with 10 employees or more) from the Amadeus dataset it is possible to study a few non-EU European countries such as Bosnia and Herzegovina, Croatia, Serbia, and Ukraine. By performing exactly the same set of exercises, a picture similar to the one for EU12 countries emerges.

First, country characteristics explain enterprise performance more, indicating that similar companies perform differently in different countries (table A4.4, columns 1 and 6). For example, the productivity of a manufacturing company operating in Croatia grows 8.6 percentage points higher than a similar manufacturer in Bosnia and Herzegovina. The results also show that country characteristics

are more important than firm features, a pattern that is similar for manufacturing and services. The exclusion of country dummies from the regression of productivity growth in manufacturing reduces the explanatory power of the model by 20 percent. For services, the model loses 16 percent. Excluding firm characteristics—size, ownership, sector of activity, and age—the model loses about 10 percent of its explanatory power in manufacturing, and 11 percent in services.

Second, the most important country characteristics are incoming FDI, availability of credit, and ease of conducting business operations (particularly trade and tax regulation). Similar results for manufacturing

and services indicate that for this group of countries, these "fundamentals" are more relevant for enterprise productivity.

Third, ownership is the most important firm-specific variable for productivity growth. Being part of an international group pays off. Foreign-owned firms grow faster than purely domestic ones, both in manufacturing and services. Home-based companies with an international presence grow 8 percent more than domestic-owned companies, but only in manufacturing. Older firms grow less than young companies, both in manufacturing and services, while size does not seem to matter for productivity growth (table A4.4, columns 1 and 6).

Why the south is slow: inappropriate structures and burdensome regulations

Why did the southern countries in the EU15 not experience the productivity improvements that benefited the rest of Europe? The answer lies in both firm and country drivers of productivity. First, the mix of companies nurtured at home—skewed toward microenterprises—and the limited number of firms attracted from abroad explain part of the productivity gap. Second, an unfavorable set of country characteristics, including a more complex regulatory framework, also creates an environment that is not conducive to productivity growth. The two elements are connected: the "mix" of companies is largely driven by a country's environment, and each requires analysis.

A comparison of the EU15 South with the rest of the EU15 shows that business regulations and FDI—the country-level variables positively correlated with firm performance in advanced Europe—consistently lag in Southern Europe (figure 4.21).

But size, too, plays an important role. The average size of firms in Greece, Italy, Portugal, and Spain is a little more than half that of firms in the rest of the European Union (according to Eurostat data). Size is a good proxy for the "type" of company and the sophistication of its operations. Microenterprises are mostly family-owned and have a limited division of tasks. Flexibility in the use of labor and limited overhead costs allow microenterprises to reach a basic level of efficiency. However, limited capital investments constrain microenterprises in scaling up operations, especially in capital-intensive sectors. Microfirms play a role in the economies of Southern Europe, which is uncommon in the other developed economies of Europe. One of two workers in the EU15 South is employed by microenterprises. In addition, about a third of the entire value added of the economy is generated by these firms. These figures are almost double those for the rest of Europe, where large enterprises have a more prominent role. The proportion becomes even higher when small and medium enterprises are added to microfirms: taken together, micro and small and

216

medium enterprises employ four of five workers in Southern Europe (figure 4.22).

Microenterprises are one of the factors behind the productivity gap between the EU15 South and the rest of the EU15. If the south had a size mix similar to that of the other countries in advanced Europe, and its microenterprises had a productivity level equal to that of its comparators, Southern Europe would reduce its productivity gap by 40 percent.

A smaller share of large firms explains not only Southern Europe's gap in productivity, but also the difference in export levels. Medium and large enterprises perform consistently better in exports than smaller enterprises, and Southern Europe is no exception. The export propensity of larger firms in Southern Europe is similar or better—as in Italy—than in the rest of advanced Europe (figure 4.23).
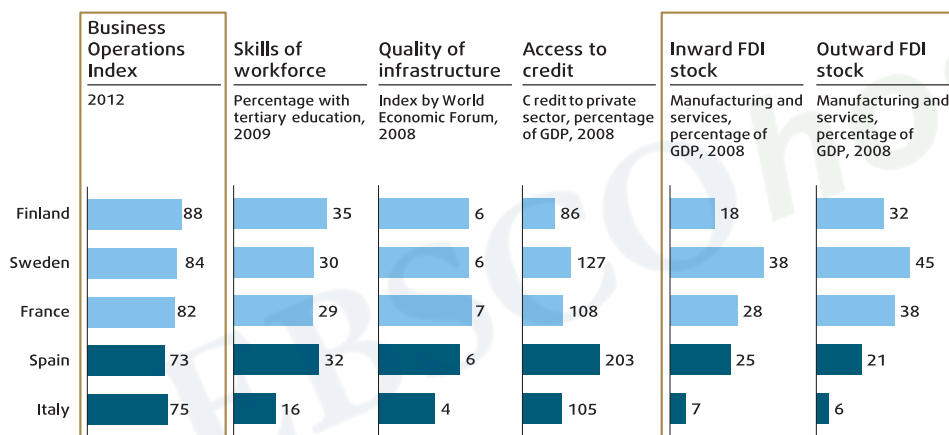
Figure 4.21: Southern Europe underperforms the rest of the EU15 in all aspects but access to credit

(country-level indicators, 2008-12)

Source: World Bank staff calculations, based on Doing Business, WEF's Global Competitiveness Reports, WDI.
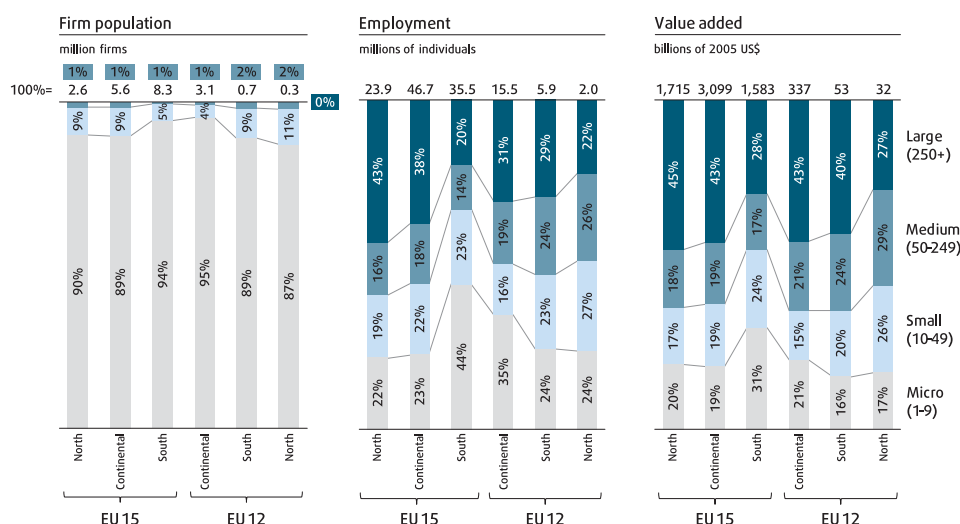
Figure 4.22: Microfirms generate half the employment and a third of the value added in the EU15 South

(distribution of firm population, employment, and value added per firm size structure, 2008)

Source: World Bank staff calculations, based on Eurostat.

217

Box 4.6: The features of a global firm

Firm ownership is an important characteristic in the evolution of firm performance. Companies with international operations (a global headquarters of an international group or one of its domestic affiliates) have higher productivity growth than purely domestic-owned firms in the EU15, both in manufacturing and services.

Size is the most important correlate of internationalization. Firms with more than 1,000 employees are 35 percent more likely to be the global headquarters of a company in the EU15 (box table 1). Age is not important.

But there is country-specific bias. For example, being in Italy and Spain significantly reduces the probability of being a global headquarters, while being in Sweden increases this likelihood. Why? Business regulations and related productivity differences. The probability of internationalizing is correlated with better business regulation (box figure 1). This might reflect the fact that firms in countries with better business regulation have higher productivity growth. "Global sourcing" models (Antràs and Helpman 2004, for example) suggest that as firms increase productivity, they tend to access international markets by producing abroad.

Box table 1: Average estimated marginal effects on the probability of being a global headquarters in EU15

Variable	dy/dx (percent)	P>|z|
Size (50–249)	7.25	0.000
Size (250–499)	18.34	0.000
Size (500–999)	22.92	0.000
Size (1,000 or more)	35.04	0.000
Age	−0.06	0.494

Note: Additional controls considered but not reported are sector (NACE) dummies. The omitted size category is (10–49).
Source: World Bank staff calculations.

Box figure 1: Better business regulations aid successful globalization of enterprises
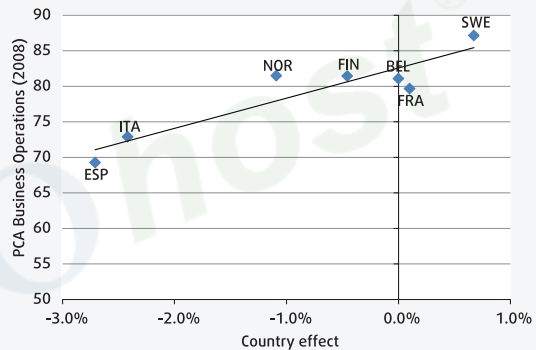
Source: World Bank staff calculations, based on Doing Business 2008.

If Southern Europe had a higher share of larger firms, its export gap could be filled (see Barba Navaretti and others 2011).

Similarly, larger companies are more inclined to invest in foreign markets. Larger firms are most likely to have an international subsidiary and to benefit from offshoring (box 4.6).

The industrial structure is not a given. For instance, the presence of foreign-owned firms is influenced by policy decisions and a country's ability to attract FDI. The business environment is a critical driver in this process (box 4.4). Lagging in regulations, Southern European economies are making themselves less attractive to foreign firms. Additionally, microfirms in Southern Europe prefer to stay small and informal as a coping strategy, to simply bypass a complicated regulatory framework.

Comparing countries in advanced Europe, the correlation between a heavier regulatory framework (measured by a lower quality of regulations) and the share of employment in microenterprises becomes evident. On the one hand, microenterprises face simplified regulations in most countries.[40] On the other, weaker enforcement mechanisms are applied to microfirms,[41] which allow

them to more easily operate semiformally. This is corroborated by the relationship between density of microfirms and the share of the informal sector in the economy.[42] Both elements provide an incentive for firms to stay small (figure 4.24).
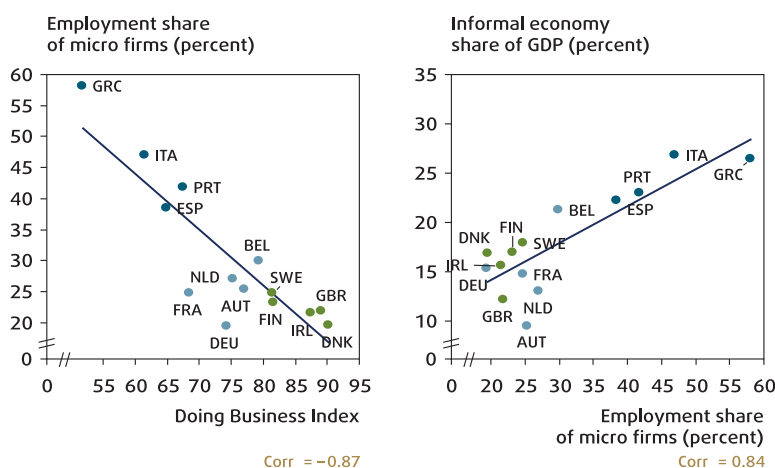
At the same time, faced with more complicated business regulations and competition from microenterprises, small and medium enterprises and larger firms in Southern Europe find it harder to grow. They are likely to survive but shrink in size. A healthy competitive process should select companies so the better ones survive and graduate toward larger classes while inefficient companies exit the market. This is not what happens in Southern Europe. Firms do not grow, they often downsize, but do not exit the market.
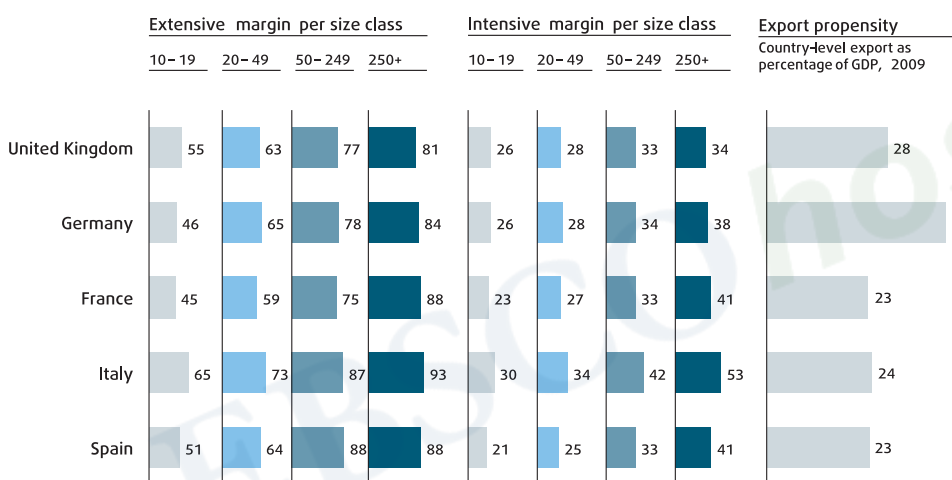
Figure 4.23: In the EU15, size matters more than country for exports

(percentage of exporting firms and share of export per size class, 2008)

	Extensive margin per size class				Intensive margin per size class				Export propensity — Country-level export as percentage of GDP, 2009
	10–19	20–49	50–249	250+	10–19	20–49	50–249	250+	
United Kingdom	55	63	77	81	26	28	33	34	28
Germany	46	65	78	84	26	28	34	38	41
France	45	59	75	88	23	27	33	41	23
Italy	65	73	87	93	30	34	42	53	24
Spain	51	64	88	88	21	25	33	41	23

Source: Barba Navaretti and others 2011; and Eurostat.

Corr = −0.87   Corr = 0.84

Figure 4.24: In a difficult business environment, firms stay small and operate more informally

(business environment, share of informal economy and microenterprises in the EU15)

Note: For Ireland, data refer to 2005.
Source: World Bank staff calculations, based on Eurostat, Doing Business, and Schneider and others (2010).

219

Figure 4.25: Firms in southern and emerging Europe are most likely to survive, but shrink
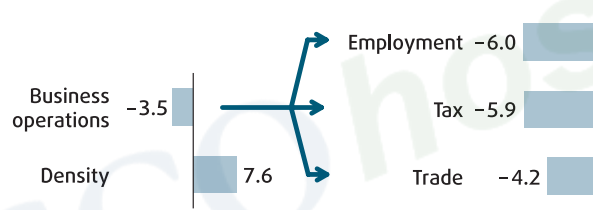
(share of firms that maintained (stay) or modified (down or up) their size between 2003 and 2008)
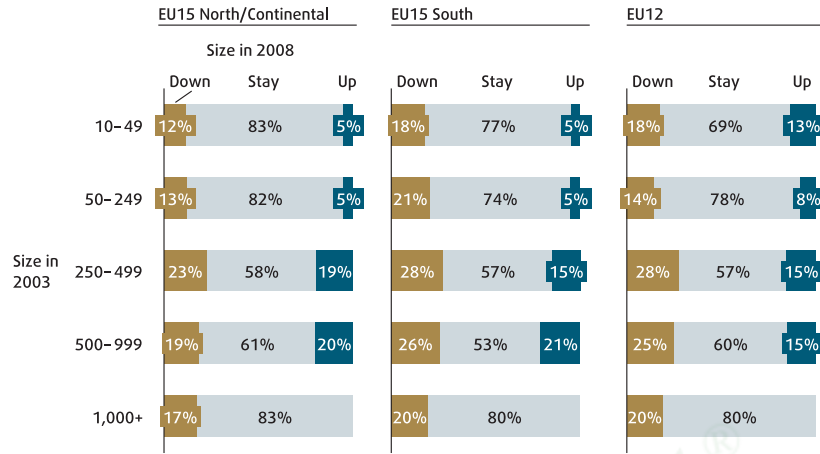
Source: World Bank staff calculations, based on Amadeus data.

Figure 4.26: In a better business environment, firms are less likely to shrink

(marginal effect of a 10-point improvement in business regulations and the density of microfirms)

Note: Data refer to the estimated marginal effects of varying, separately, the key variables used in the multinomial logit model: regulation on business operations and density of microfirms.
Source: World Bank staff calculations, based on Amadeus.

The matrices in figure 4.25 show the distribution of firm size using the initial (2003) and final (2008) size for a given class. For instance, in the EU15 North/Continental, 83 percent of surviving firms with 10–49 employees in 2003 were in the same size category in 2008, while 12.4 percent were smaller (but still in business). In the EU15 South, this latter proportion was higher: 18.5 percent of firms of that size class had transited to a smaller size category by 2008.

By estimating the probabilities of a firm's downsizing, staying in the same size category, or jumping to a higher size class from 2003 to 2008—based on the Amadeus panel of survival firms and relating these probabilities to country characteristics (regulations, industrial structures, and access to credit)—one sees what helps foster competition and creative destruction.[43]

Regulations seem related to this Southern European phenomenon, both directly and through their impact on microfirms. The industrial structure is approximated by the density of microenterprises in the country: the share of microfirms per 1,000 employable people. Credit-to-GDP is used to approximate access to financing.[44] Figure 4.26 presents the marginal effect of both business regulation (measured by each alternative indicator used in the model) and density of microfirms on the probability of decreasing in size class.

The probability that a firm transits to a smaller size class from 2003 to 2008 is negatively related to business regulation in the country where it is located, suggesting that better business regulation reduces the probability

of downsizing. For instance, improving regulation by 10 points decreases the probability of downsizing by 3.5 percent. When regulations are complicated, firms survive, but stay small. The existence of microfirms might even drag down firms that are larger, hampering their growth. An increase of 10 points in the density of microfirms is related to increases of about 8 percent in the probability that a firm will downsize. The effect of credit on the probability of downsizing did not seem to be statistically significant.

What is the relationship between regulations and enterprise growth?

Parmalat, an Italian dairy and food corporation, became famous in 2003 for the biggest bankruptcy in Europe's history.[45] Parmalat was rescued, its business downsized, and the company brought back to market in 2005. In early spring 2011, Lactalis, a large French dairy group, expressed interest in acquiring Parmalat. The announcement spurred heated political discussion in Italy. After three months Lactalis was allowed to take over Parmalat, but not before politicians denounced the acquisition by foreign companies of Italy's "family jewels."

In July 2011, the Italian parliament approved a law regulating book sales, crafted along the lines of similar legislation in force in France since 1981 known as the "anti-Amazon Law." The law regulates the price of books (physical and digital) that can be sold in retail and wholesale outlets and over the Internet, restricting the timing and amount of discounts. The law protects small bookstores against competition from large chains and Internet sellers.

Regulations such as these are a major obstacle to business in Southern Europe. Consider a truck company operating in both the United Kingdom and Italy. The payroll slip of a truck driver in the United Kingdom consists of five lines, and costs about €5 to fill in. The payroll slip for a similar driver in Italy is a page long, requires the services of an accounting expert, and costs about €25–30 to fill in.

This section explores whether European enterprises are overregulated and whether these regulations are an obstacle to economic growth. The short answer is mostly not. Sweden shows how a heavily regulated country can, indeed, perform well (box 4.7).

Country and firm characteristics matter for performance, and business regulations are a significant part of the puzzle. On the one hand, regulations directly affect company performance in producing jobs, value added, and exports, because simplifying payroll filing requirements is likely to reduce costs and improve firms' productivity. On the other, regulations can change the type of businesses that succeed. An unnecessarily complex business environment breaks the virtuous circle encompassing productivity, enterprise growth, and internationalization. Faced with complicated regulations, firms tend to be smaller, less productive, and less inclined to operate in international markets.

The relationship between business regulation and enterprise growth can be disentangled into three (interrelated) threads: regulation for graduating small and medium enterprises; that for increasing productivity; and that for internationalizing firms (either through exports or offshoring) and attracting foreign companies.

Box 4.7: The Swedish model

Sweden has a total corporate tax rate of 50 percent but achieves employment participation rates above 70 percent. Swedish enterprises increased their productivity at 1.4 percent a year over the last 15 years, almost up to the level seen in the United States.

Sweden achieved its productivity growth by keeping regulation compliance requirements to a minimum. According to Doing Business, firms in Sweden are only required to pay taxes twice a year—the fewest in the world. The time required for Swedish firms to fulfill their tax requirements is just 122 hours a year, significantly lower than the OECD average of almost 200 hours. (Italy requires 15 tax payments, taking small and medium enterprises about 285 hours.) A simple tax system also reduces reliance on, for example, tax accountants. By eliminating a burden on firms, a simple tax system partially compensates for a higher tax rate.

Source: World Bank staff calculation, based on Doing Business 2011.

Small firms are beautiful—when they are young

"Small is beautiful" was the industrial development slogan of the 1970s in Italy. Italian family-run enterprises were praised for their dynamism, efficiency, and flexibility, which flowed mainly from their small size. But there is a minimum scale below which size becomes a constraint to growth. Growing is an important part in nurturing productivity growth and internationalizing firms. As seen, larger firms benefit from economies of scale, are more productive, and are likely to engage in international operations (through export and FDI).

Business regulation plays an important role in this process (figure 4.27). A better regulatory framework affects the growth of firm size. Hence policies concerning the operation of firms, such as tax administration and labor regulation, can improve the firms' cost structure. Reforms in these areas can be especially important in graduating small and medium enterprises to larger firms (Shiffer and Weder 2001).

The instruments that help firms grow bigger depend on the stage of development. In emerging Europe, improving access to credit and institutional development, such as greater judicial efficiency, by the late 1990s, moderates financial constraints and contributes to firm growth (Kumar, Rajan, and Zingales 1999).

Reducing costs to increase firm productivity

Enterprise productivity growth is largely associated with country characteristics where firms operate. The analysis of surviving firms showed that similar firms (in size, age, ownership, and sector) perform differently across countries, suggesting that the country and its policy environment are relevant to productivity performance. The same analysis highlighted some of the country characteristics related to productivity performance. Business regulation was important. As highlighted by Crafts (2006), business regulation can result in resources directed toward compliance rather than the creation of productive output, and can impose constraints on the choice of production techniques (such as preventing the use of inputs) or lead to a misallocation of resources.

The earlier empirical analysis shows that the size of the relationship between business regulation and productivity performance differs according to region (EU15 or EU12) and sector (manufacturing or services). In the EU12, business regulation, with infrastructure and credit, positively correlates with productivity
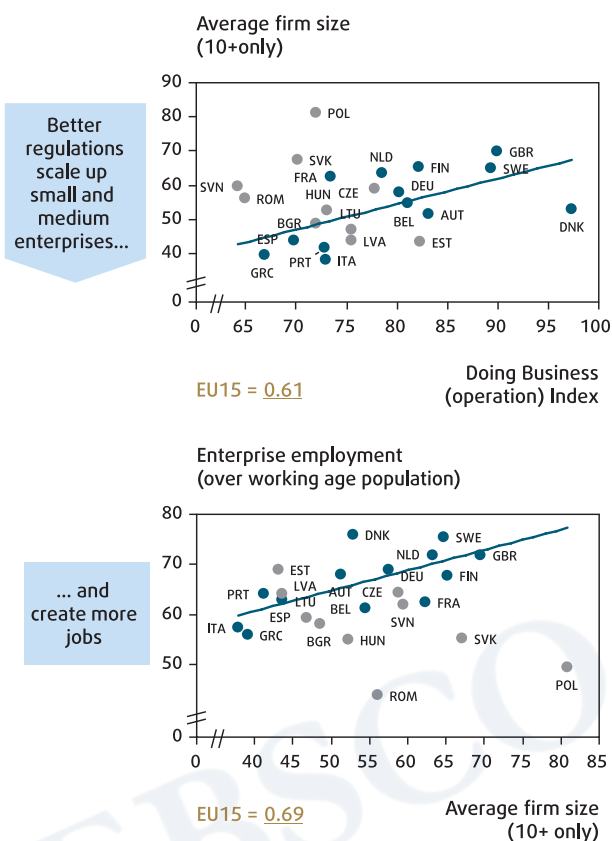
Average firm size
(10+only)

EU15 = 0.61

Doing Business
(operation) Index

Figure 4.27: Better regulations create jobs

(regulatory quality, firm size, and employment ratios, 2007)

Enterprise employment
(over working age population)

EU15 = 0.69

Average firm size
(10+ only)

Note: For the Slovak Republic, data refer to 2005.
Source: World Bank staff calculations, based on Doing Business and Eurostat.

performance (both for manufacturing and services), with the strongest correlation with trade, employment, and taxes. In the EU15, business regulation, especially for services, is an important country factor, particularly through regulations on business start-ups and labor.

Ensuring that business regulation is well designed and targeted is likely to have a positive impact on the productive capacity of an economy and productivity at firm level. These important regulatory areas—trade, employment, taxes, and business start-ups—can be illustrative of how to design regulations to improve productivity performance.

For employment regulation, reducing the costs of hiring and firing workers would increase the incentives to innovate, and hence productivity growth (Scarpetta and Tressel 2002). Reforms that simplify tax regulations and reduce the administrative costs of compliance (which tend to be proportionately higher for smaller firms) will likely have a positive effect on productivity growth as resources are freed to create productive output. Reforms that reduce start-up cost for entrepreneurs, simplify company registration procedures and requirements, eliminate steps to register property, and streamline bankruptcy procedures (which facilitate exit of inefficient enterprises) are likely to increase

competition and contestability of markets. Increased competition will in turn provide an incentive for firms to adopt more advanced technologies, thereby increasing productivity (Klapper, Laeven, and Rajan 2006; Poschke 2010).

Firms beyond borders

A regulatory environment conducive to private sector growth closely relates to international expansion, either through exports or through production abroad.

Reforms that make it easier for firms to export and run their business operations are likely to lift the export performance of an economy and therefore overall economic growth. Recent literature provides evidence that "behind the border" policies matter for trade performance (Hoekman and Nicita 2008) and that trade facilitation measures and the prevailing business environment in the trading countries have a significant effect on trade development. Anderson and Marcouiller (2002) find that weak institutions act as significant barriers to international trade. Francois and Manchin (2007) measure institutional quality through the lens of economic freedom, focusing on the size of government, freedom of trade, protection of property rights, and business regulation. They find that strong institutions are associated with increased trade at both the intensive and extensive margins.

Overall, aggregate data suggest that trade-specific regulation helps firms internationalize, either through exports or production abroad. Policy reforms to facilitate trade can enhance countries' competitiveness, allowing them to trade goods and services on time and with low transaction costs. By the same token, policies that set certain requirements in some sectors for product quality—such as technical standards or safety requirements—can force firms to be internationally competitive and promote exports when such policies are harmonized with international standards.

Building a regulatory environment that is friendly to foreign investors is necessary (box 4.4). Even though enforced legal frameworks may not be the main drivers of foreign investment decisions, they can tip the balance in favor of one economy over another (World Bank 2010). Specifically, expropriation risks, lack of enforcement of contracts, poor provision of public goods, overregulation, and unreasonable costs of doing business are likely to deter private activities, domestic or foreign. Northern Europe is a good example of an environment in which more stringent rules and regulations are compatible with a thriving private sector because they are accompanied by efficient implementation procedures that minimize the burden for enterprises.

Enterprises for a growing Europe

Enterprise is not a weak part of the European growth model. The overall soundness of the European enterprise model is indicated by its performance—European enterprises have largely delivered what they are expected to, with only a few qualifications.

European firms have created jobs at roughly the same pace as other developed economies around the world. The south has been particularly successful in creating jobs, but mostly in cyclical activities such as construction. The northern

and continental countries also increased labor participation rates—already among the highest in the world. In Eastern Europe, enterprises recovered from the transition and in many cases generated employment rapidly. Productivity patterns show that Western Europe has largely succeeded in keeping pace with other advanced economies. Eastern Europe impressively increased in its productivity, while the EU15 North and Continental countries also benefited from eastward outsourcing of labor-intensive activities.

Lately, however, Southern Europe has moved away from such convergence, and its productivity growth has stalled. Northern and Eastern Europe, already more outward-oriented than the south, are expanding productivity and exports faster than the south. This internal divergence will strain the economic union, especially countries using the euro.

What has helped the countries that did better than others? In advanced Europe, northern and continental countries succeeded globally by developing pan-European and global businesses, both in sales and in sourcing. In emerging Europe, the winners are the countries that set aside a "fear of foreigners" and created an environment favorable for FDI. Southern Europe, however, was caught in a no man's land. With an industrial structure dominated by smaller firms—largely because of unfriendly regulations—Southern Europe has fewer firms equipped to benefit from the single market, either in attracting foreign capital from the north or in making use of cheaper labor in the east. These experiences offer three lessons:

- **More Europe, not less.** Countries whose enterprises were ready to operate in the single market seem to be winning the race. When barriers to entry were eliminated and transaction costs cut, countries with industrial structures with larger and more outward-oriented enterprises did better. Enterprises in the former communist countries adjusted to this new European imperative better than those in the EU15 southern states.

- **Regulations can upgrade industrial structures or degrade them.** The type of enterprises operating in each country—particularly their size and ownership—is a function of the design and enforcement of regulations. Good regulations provided the right incentives for firms to grow and reach an optimal size, and were as critical as the quality of the physical infrastructure in attracting FDI. Similar companies performed better when regulations were less burdensome. Of course, other aspects played a role. In countries at an earlier stage of development of the enterprise sector—like those of the former Soviet bloc—hard infrastructure and credit were as important as regulations. In advanced Europe, regulations were a critical competitive factor, especially in services.

- **Better entrepreneurial structures can be built—or imported.** Countries do not necessarily need to create domestic enterprises, especially when entire sectors need to be revamped, as was the case for emerging Europe. Successful countries did not enact protectionist policies, but welcomed FDI. Foreign companies modernized their subsidiaries and affiliates and connected them to international markets, but they also created spillovers among suppliers and competitors. Openness to FDI also helps advanced countries like Germany. Countries that took advantage of these opportunities fared better than those that did not.

If they continue to improve their regulations, financial sectors, and infrastructure, countries in emerging Europe will keep benefiting from the successful European convergence machine. Southern Europe must also deal with its entrepreneurial deficit. Greater openness to the rest of Europe seems to be the solution for the laggards: importing firms, capital, regulations, and institutions from the most advanced countries would help Southern Europe grow in line with its peers. Northern and continental countries should fix their sights on enterprises in North America and East Asia. Maintaining their position at the frontier requires efficiency and an outward orientation. Future growth will require reestablishing the momentum for regulatory reform last seen in the mid-1990s and early 2000s, this time aimed at services. And it will require improving Europe's innovation performance, addressed in chapter 5.

For now, the answer to the main question asked at the beginning—are regulations an obstacle for enterprise in Europe?—is a qualified no. Outside the EU15 southern states, European enterprises have created jobs, added value, and generated exports over the last decade.

Answers to questions on page 187

> Workers expect enterprises in Europe to create jobs, shareholders to generate value added, and governments to bring in sizable export earnings.

> In most parts of Europe, firms have taken advantage of greater regional integration to decentralize production, attract foreign investment, and expand the markets for their products.

> In Western and Eastern Europe, industrial structures were better suited for a single market; Southern European enterprises have been slower to offshore activities and to attract foreign investors.

> In advanced European economies, many governments have to streamline regulations to make doing business easier; in emerging Europe, most have to improve infrastructure and credit as well.

Chapter 4: Annexes

Annex 4.1: Using the Amadeus dataset

Amadeus is a comprehensive, pan-European, firm-level database of financial information for more than 11 million public and private companies throughout Europe, provided by Bureau van Dijk. A 2010 version of the Amadeus database is used for the firm-level analysis in this chapter.

Although rich and detailed in balance sheet information, the Amadeus database does not necessarily reflect the underlying population. In most countries Amadeus did not have a satisfactory coverage of microfirms. For this reason we focused our research on companies with 10 or more employees, small and medium enterprises, and large firms.

Another limitation of the Amadeus database is that firms are not removed from the database unless they fail to report financial information for at least five years. Companies that exit the market or stop reporting their financial statements are represented as "not available/missing" for four years following their last filing. Amadeus does not distinguish firms that close their activities from those that exit the sample because they either fall below a size threshold or were reorganized through a merger, for example. This limitation drove our choice to focus our analysis on a (balanced) sample of surviving firms that were present in the database for the entire period of observation. In addition, firms that were involved in merger and acquisitions operations during 2003–08 were excluded in order to eliminate meaningless growth measures.

To ensure that the sample is representative of the firm population and supports the application of inferences to the broader population, a resampling technique was applied. Population weights were computed using the Eurostat database for the year 2006 for every size, sector, and country stratum.[46] Random draws were taken from each size-sector-country stratum in the sample (targeting firms with 10 employees or more) in order for each stratum to correspond to its population weight. Once the sample was drawn, a two-step procedure was implemented to control for extreme outliers. First, observations for which the employment growth rate was larger than 300 percent (if the firm had fewer than 50 employees) or 50 percent (if the firm had more than 50 employees) were excluded from the analysis. Second, companies with annual productivity growth more than three standard deviations away from the average value in each country were excluded.

The Amadeus dataset was used to collect information on the following:

- **Company characteristics:** The main sector of activity and year of registration and ownership were collected to verify differential performance. For ownership, information on the global ultimate owner contained in the Amadeus database was used to distinguish companies that are purely domestic, part of a domestic group operating on a European or global scale, or foreign-owned.

- **Company performance indicators:** Value-added data[47] and total number of employees included in the company's payroll[48] were collected to perform calculations of productivity and employment growth over time.

Table A4.1 shows the composition of the final sample of surviving firms adopted in the empirical analysis.

Table A4.1: Sample composition

Country	Number of firms per year
Bosnia and Herzegovina	590
Belgium	2,485
Czech Republic	2,410
Estonia	561
Spain	16,850
Finland	1,035
France	15,029
Croatia	1,211
Italy	17,143
Norway	1,523
Poland	3,811
Romania	4,249
Serbia	1,465
Sweden	2,436
Slovenia	526
Ukraine	6,782

Econometric results

To analyze productivity growth in Europe, while disentangling the impact of firm level from country-level characteristics, we start from estimating the following firm-level equation:

$$\Delta\ln(Prod_i)_{03\text{-}08} = \alpha + \beta_1\ln(Prod_i)_{03} + \beta_2 Age_{i,03} + \beta_3 Size_{i,03} + \beta_4 OwnType_{i,03} + \sum\varphi Sector_m + \sum\gamma Country_j + \varepsilon_i,$$

where $\Delta\ln(Prod_i)_{03\text{-}08}$ is the annualized growth rate of productivity (defined as value added per employee) of the i firm from 2003 to 2008.[49] On the right side, besides the error term we include some observable firm characteristics such as size, age, and ownership. *Size*, as in 2003, is expressed in number of employees on the company's payroll, defined by the categories 10–49 total employees, 50–249, 250–499, 500–999, and 1,000 or more. Age (in years), as in 2003, is defined by the categories of 1–5 years old, 6–10, 11–20, 21–30, and older than 30. *Ownership type*, in 2003, is defined by a categorical variable distinguishing whether the firm is: a global headquarter of a group with international presence or one of its local subsidiaries, a foreign-affiliated firm,[50] or a purely domestic-owned firm.[51] As we control for (initial) firm characteristics in 2003, we also include as a right-side variable the (log of) productivity level in baseline as a way to control for the fact that firms that start at a higher level may grow at a slower rate. *Sector_m* is a vector of sector dummy variables defined at NACE 1.1 level and *Country_j* is a vector of country fixed effects.

Estimations are produced using ordinary least squares, and errors are clustered by country to allow for possible correlations in growth rates across firms in the same country. Regressions are run separately for EU15, EU12, and other countries as a way to better search for the sources explaining the differences between the two regions. Besides, in order to explore the sector

heterogeneity—mainly related to different technologies used—we also separate the regressions by manufacturing and services, which highlight the drivers of productivity growth in different sectors of the real economy.[52] Results are then presented separately for EU12 and EU15 as well as for manufacturing and services (except construction) industries separately.

Table A4.2: Firm-level productivity growth, 2003-08, EU12 countries

	Manufacturing				
	All controls	Ownership + sector + baseline prod + country dummies	Sector + baseline prod + country dummies	Baseline prod + country dummies	Only country dummies
	(1)	(2)	(3)	(4)	(5)
Ln(prod) 2003	−0.1237***	−0.1242***	−0.1227***	−0.1167***	
	(0.005)	(0.005)	(0.005)	(0.005)	
Size (50–249)[1]	−0.0156**				
	(0.007)				
Size (250–499)[1]	−0.0530***				
	(0.012)				
Size (500–999)[1]	-0.0229				
	(0.019)				
Size (1,000+)[1]	−0.0582**				
	(0.029)				
Age (6–10)[2]	-0.001				
	(0.009)				
Age (11–20)[2]	-0.0027				
	(0.009)				
Age (21–30)[2]	0.0102				
	(0.021)				
Age (older than 30)[2]	0.0079				
	(0.018)				
Global head.[3]	0.0670**	0.0589*			
	(0.033)	(0.033)			
Foreign aff.[3]	0.0298***	0.0269***			
	(0.010)	(0.009)			
Czech Republic	0.0384***	0.0371***	0.0457***	0.0466***	0.0666***
	(0.010)	(0.010)	(0.009)	(0.009)	(0.010)
Estonia	−0.0371**	−0.0346**	−0.0201	−0.0280*	0.0436***
	(0.017)	(0.017)	(0.015)	(0.015)	(0.017)
Poland	−0.0209***	−0.0242***	−0.0212***	−0.0237***	0.0051
	(0.008)	(0.008)	(0.007)	(0.007)	(0.008)
Romania	−0.1437***	−0.1440***	−0.1408***	−0.1488***	0.0057
	(0.010)	(0.010)	(0.009)	(0.009)	(0.009)
_cons	1.2183***	1.2161***	1.2039***	1.1768***	0.0438***
	(0.049)	(0.048)	(0.048)	(0.049)	(0.006)
NACE dummies	Yes	Yes	Yes	No	No
R-squared	0.2185	0.2153	0.2124	0.2002	0.0128
Number of observations	3,925	3,925	3,925	3,925	3,981

	Services (except construction)				
	All controls	**Ownership + sector + baseline prod + country dummies**	**Sector + baseline prod + country dummies**	**Baseline prod + country dummies**	**Only country dummies**
	(6)	(7)	(8)	(9)	(10)
Ln(prod) 2003	−0.1122***	−0.1120***	-0.1108***	-0.1053***	
	(0.003)	(0.003)	(0.003)	(0.003)	
Size (50–249)[1]	−0.0130***				
	(0.004)				
Size (250–499)[1]	−0.0269***				
	(0.009)				
Size (500–999)[1]	−0.014				
	(0.015)				
Size (1,000+)[1]	−0.0217				
	(0.032)				
Age (6–10)[2]	0.0013				
	(0.005)				
Age (11–20)[2]	−0.0017				
	(0.005)				
Age (21–30)[2]	−0.0132				
	(0.018)				
Age (older than 30)[2]	−0.0036				
	(0.010)				
Global head.[3]	0.0309*	0.0253			
	(0.018)	(0.018)			
Foreign aff.[3]	0.0276***	0.0270***			
	(0.005)	(0.005)			
Czech Republic	0.0344***	0.0349***	0.0437***	0.0475***	0.0893***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Estonia	−0.0384***	−0.0365***	−0.0233**	−0.0258***	0.0457***
	(0.010)	(0.010)	(0.009)	(0.009)	(0.011)
Poland	−0.0152***	−0.0171***	−0.0152***	−0.0110**	0.0241***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Romania	−0.1114***	−0.1105***	−0.1078***	−0.1054***	0.0533***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)
_cons	1.0991***	1.0923***	1.0819***	1.0681***	0.0212***
	(0.029)	(0.029)	(0.028)	(0.028)	(0.005)
NACE dummies	Yes	Yes	Yes	No	No
R-squared	0.2007	0.1998	0.1975	0.1839	0.0122
Number of observations	5,927	5,927	5,927	5,927	5,927

1. 10–49 is the omitted size category.
2. 1–5 is the omitted age category.
3. Domestic-owned is the omitted ownership category; Slovenia is the omitted country.
Significance: *** 1 percent, ** 5 percent, * 10 percent. Standard errors are clustered by country.

Table A4.3: Firm-level productivity growth, 2003-08, EU15 countries

	Manufacturing				
	All controls	**Ownership + sector + baseline prod + country dummies**	**Sector + baseline prod + country dummies**	**Baseline prod + country dummies**	**Only country dummies**
	(1)	(2)	(3)	(4)	(5)
Ln(prod) 2003	−0.0896***	−0.0888***	−0.0860***	−0.0796***	
	(0.004)	(0.004)	(0.004)	(0.004)	
Size (50–249)[1]	0.0059**				
	(0.003)				
Size (250–499)[1]	0.0148*				
	(0.008)				
Size (500–999)[1]	−0.0046				
	(0.013)				
Size (1,000+)[1]	0.0037				
	(0.013)				
Age (6–10)[2]	−0.0018				
	(0.003)				
Age (11–20)[2]	0.0021				
	(0.003)				
Age (21–30)[2]	0.0031				
	(0.003)				
Age (older than 30)[2]	0.0046				
	(0.003)				
Global head.[3]	0.0228***	0.0254***			
	(0.005)	(0.005)			
Foreign aff.[3]	0.0185***	0.0203***			
	(0.004)	(0.004)			
Belgium	−0.0001	0.0005	−0.003	−0.0077	−0.0297***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Spain	−0.0630***	−0.0632***	−0.0694***	−0.0728***	−0.0532***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
France	−0.0224***	−0.0213***	−0.0224***	−0.0236***	−0.0225***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Italy	−0.0167***	−0.0167***	−0.0237***	−0.0291***	−0.0288***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Norway	−0.0723***	−0.0730***	−0.0801***	−0.0857***	−0.1222***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Sweden	−0.0306***	−0.0300***	−0.0343***	−0.0319***	−0.0152**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
_cons	1.0112***	1.0049***	0.9822***	0.9162***	0.0502***
	(0.048)	(0.048)	(0.047)	(0.047)	(0.005)
NACE dummies	Yes	Yes	Yes	No	No
R-squared	0.136	0.1353	0.1318	0.1052	0.0181
Number of observations	16,800	16,800	16,800	16,800	16,800

1. 10–49 is the omitted size category.
2. 1–5 is the omitted age category.
3. Domestic-owned is the omitted ownership category; Finland is the omitted country.
Significance: *** 1 percent, ** 5 percent, * 10 percent. Standard errors are clustered by country.

	Services (except construction)				
	All controls	**Ownership + sector + baseline prod + country dummies**	**Sector + baseline prod + country dummies**	**Baseline prod + country dummies**	**Only country dummies**
	(6)	(7)	(8)	(9)	(10)
Ln(prod) 2003	−0.0850***	−0.0842***	−0.0817***	−0.0743***	
	(0.003)	(0.003)	(0.003)	(0.003)	
Size (50–249)[1]	0.0057***				
	(0.002)				
Size (250–499)[1]	0.0118*				
	(0.006)				
Size (500–999)[1]	−0.0081				
	(0.008)				
Size (1,000+)[1]	0.0256*				
	(0.015)				
Age (6–10)[2]	−0.003				
	(0.002)				
Age (11–20)[2]	0.0016				
	(0.002)				
Age (21–30)[2]	0.0049**				
	(0.002)				
Age (older than 30)[2]	0.0065***				
	(0.002)				
Global head.[3]	0.0287***	0.0307***			
	(0.004)	(0.004)			
Foreign aff.[3]	0.0236***	0.0245***			
	(0.002)	(0.002)			
Belgium	0.0091*	0.0096*	0.0046	0.0031	−0.0218***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Spain	−0.0302***	−0.0308***	−0.0378***	−0.0414***	−0.0244***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
France	−0.006	−0.0038	−0.0058	−0.0067*	−0.0157***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Italy	0.0089**	0.0091**	0.0012	−0.0035	−0.0123***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Norway	0.0161***	0.0149***	0.008	0.0022	0.0044
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
Sweden	−0.0074	−0.007	−0.0124**	−0.0113**	−0.0025
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
_cons	0.9349***	0.9299***	0.9116***	0.8331***	0.0308***
	(0.033)	(0.033)	(0.032)	(0.031)	(0.004)
NACE dummies	Yes	Yes	Yes	No	No
R-squared	0.1115	0.1107	0.1066	0.0851	0.0024
Number of observations	28,366	28,366	28,366	28,366	28,366

1. 10–49 is the omitted size category.
2. 1–5 is the omitted age category.
3. Domestic-owned is the omitted ownership category; Finland is the omitted country.
Significance: *** 1 percent, ** 5 percent, * 10 percent. Standard errors are clustered by country.

Table A4.4: Firm-level productivity growth, 2003-08, non-EU countries

	Manufacturing				
	All controls	**Ownership + sector + baseline prod + country dummies**	**Sector + baseline prod + country dummies**	**Baseline prod + country dummies**	**Only country dummies**
	(1)	(2)	(3)	(4)	(5)
Ln(prod) 2003	−0.1397***	−0.1365***	−0.1352***	−0.1300***	
	(0.007)	(0.007)	(0.007)	(0.006)	
Size (50–249)[1]	0.0043				
	(0.016)				
Size (250–499)[1]	0.0059				
	(0.025)				
Size (500–999)[1]	0.0079				
	(0.045)				
Size (1,000+)[1]	0.0486				
	(0.036)				
Age (6–10)[2]	−0.0277*				
	(0.017)				
Age (11–20)[2]	−0.0205				
	(0.017)				
Age (21–30)[2]	−0.068				
	(0.062)				
Age (older than 30)[2]	−0.0708***				
	(0.019)				
Global head.[3]	0.0810***	0.0884***			
	(0.027)	(0.020)			
Foreign aff.[3]	0.0337**	0.0523***			
	(0.014)	(0.013)			
Croatia	0.0857***	0.0854***	0.0897***	0.0886***	−0.0401
	(0.030)	(0.029)	(0.029)	(0.029)	(0.028)
Serbia	−0.0579**	−0.0609**	−0.0311	−0.0239	−0.0453*
	(0.028)	(0.027)	(0.025)	(0.025)	(0.027)
Ukraine	−0.1749***	−0.2050***	−0.2036***	−0.1985***	−0.0448*
	(0.028)	(0.022)	(0.022)	(0.022)	(0.025)
_cons	1.2556***	1.1993***	1.1917***	1.1720***	0.0571**
	(0.055)	(0.054)	(0.054)	(0.051)	(0.024)
NACE dummies	Yes	Yes	Yes	No	No
R-squared	0.1966	0.1913	0.1881	0.1764	0.0014
Number of observations	3592	3592	3592	3592	3690

1. 10–49 is the omitted size category.
2. 1–5 is the omitted age category.
3. Domestic-owned is the omitted ownership category; Bosnia and Herzegovina is the omitted country.
Significance: *** 1 percent, ** 5 percent, * 10 percent. Standard errors are clustered by country.

	Services (except construction)				
	All controls	**Ownership + sector + baseline prod + country dummies**	**Sector + baseline prod + country dummies**	**Baseline prod + country dummies**	**Only country dummies**
	(6)	(7)	(8)	(9)	(10)
Ln(prod) 2003	−0.1419***	−0.1396***	−0.1391***	−0.1345***	
	(0.004)	(0.004)	(0.004)	(0.004)	
Size (50–249)[1]	0.0123				
	(0.012)				
Size (250–499)[1]	0.0314*				
	(0.019)				
Size (500–999)[1]	0.0194				
	(0.033)				
Size (1,000+)[1]	0.0149				
	(0.034)				
Age (6–10)[2]	−0.0322***				
	(0.010)				
Age (11–20)[2]	−0.0288***				
	(0.010)				
Age (21–30)[2]	−0.0713				
	(0.044)				
Age (older than 30)[2]	−0.0726***				
	(0.011)				
Global head.[3]	0.031	0.0405			
	(0.115)	(0.114)			
Foreign aff.[3]	0.0225***	0.0377***			
	(0.008)	(0.007)			
Croatia	0.0830***	0.0761***	0.0875***	0.0822***	−0.0502***
	(0.014)	(0.013)	(0.013)	(0.013)	(0.013)
Serbia	−0.0103	−0.0134	0.007	0.0188	0.0065
	(0.013)	(0.013)	(0.012)	(0.012)	(0.014)
Ukraine	−0.1760***	−0.2093***	−0.2087***	−0.2000***	−0.0395***
	(0.014)	(0.011)	(0.011)	(0.011)	(0.013)
_cons	1.2687***	1.2222***	1.2197***	1.2379***	0.0741***
	(0.039)	(0.039)	(0.039)	(0.036)	(0.012)
NACE dummies	Yes	Yes	Yes	No	No
R-squared	0.2305	0.2262	0.2248	0.2045	0.0038
Number of observations	4519	4519	4519	4519	4519

1. 10–49 is the omitted size category.
2. 1–5 is the omitted age category.
3. Domestic-owned is the omitted ownership category; Bosnia and Herzegovina is the omitted country.
Significance: *** 1 percent, ** 5 percent, * 10 percent. Standard errors are clustered by country.

Annex 4.2: Measures of business regulation

As a proxy of the quality of the business regulatory framework and its institutions, this chapter uses a set of cross-country Doing Business indicators. Several factors support the choice of the Doing Business data. First, they provide a comprehensive database of regulations for most countries in the world. The Doing Business dataset allows for time and cross-country comparisons because the data in it have been collected in every European country since 2003. Second, a complication in evaluating the regulatory framework is distinguishing between the quality of the underlying legislation and the effectiveness of the government body that is responsible for its implementation. The indicators partly address this issue by measuring the quality of basic regulations across countries, based on the experience of actual users. For example, the so-called Doing Business "time and motion" indicators measure the actual steps taken by local enterprises when complying with the business regulations. They are therefore able to measure the quality of both the regulation and the implementing bodies.

This chapter considers all 10 topics covered by Doing Business: starting a business, dealing with construction permits, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts, employing workers, and closing a business. Each of these indicators is constructed on several subindicators, such as procedures, time, and cost required to open a business. The analysis utilizes a number of indices based on the Doing Business indicators to study the combined effect of these indicators on private sector performance. These indices were created using a principal components analysis for each Doing Business topic. The principal components analysis indices are linear combinations of Doing Business subindicators, where each subindicator is multiplied by an optimal weight. The weights are optimal in the sense that they produce the index that best accounts for the variance of the indicators. For example, the principal components analysis index for the enforcing contracts indicator is calculated through the following equation:

$$\text{Enforcing contracts principal components analysis index} =$$
$$w_0 * \text{Procedures} + w_1 * \text{Time} + w_2 * \text{Cost,}$$

where the weights w_0, w_1, and w_2 are the ones that lead to the greatest variance of the enforcing contracts principal components analysis index. All principal components analysis indices are coded so higher numbers indicate less complex regulation.

Using the principal components analysis methodology, the chapter also constructs a synthetic index including all Doing Business indicators.[53] Finally, to assess the impact of different aspects of the business environment on enterprises development, three combined principal components analysis indices reflecting the following aspects of business regulations are defined:

1. Business Entry includes the indicators for starting a business, closing a business, and registering property. This indicator measures the complexity of a number of procedural aspects related to the entry and exit process. Starting a business measures the bureaucratic and legal obstacles that an

235

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entrepreneur must overcome to incorporate and register a new firm. It examines the procedures, time, and cost involved in launching a commercial or industrial firm with up to 50 employees and start-up capital of 10 times the economy's per capita gross national income. Closing a business identifies weaknesses in existing bankruptcy laws and the main procedural and administrative bottlenecks in the bankruptcy process. It focuses on the time, cost, and outcome of insolvency proceedings involving domestic entities and estimates the recovery rate on the dollar. Registering property examines the steps, time, and cost involved in registering property, assuming a standardized case of an entrepreneur who wants to purchase land and a building that is already registered and free of dispute title.

2. **Business Operations** covers the aspects of paying taxes, trading across borders, employing workers, and obtaining construction permits. This indicator measures the burden of regulations faced by an enterprise in managing recurrent operations. Paying taxes addresses the taxes and mandatory contributions that a medium-size company must pay or withhold, as well as measures of administrative burden in complying with these regulations. Trading across borders looks at the procedural requirements for exporting and importing a standardized cargo of goods. Documents associated with every official procedure are counted—from the contractual agreement between the two parties to the delivery of goods—along with the time necessary for completion. Employing workers measures the regulation of employment, specifically as it affects the rigidity of hiring, the cost of redundancy of workers, and the rigidity of working hours.[54] Last, dealing with construction permits tracks the procedures, time, and costs to build a warehouse, including necessary licenses and permits, completing required notifications and inspections, and obtaining utility connections.

3. **Institutional Environment** covers the rules for protecting investors, getting credit, and enforcing contracts. The indicator measures the quality of the legal and institutional framework. Protecting investors measures the strength of minority shareholder protections against misuse of corporate assets by directors for their personal gain. This indicator covers three dimensions of investor protections: transparency of related-party transactions, liability for self-dealing, and shareholders' ability to sue officers and directors for misconduct. Getting credit explores two sets of issues: credit information registries and the effectiveness of collateral and bankruptcy laws in facilitating lending. The first set of indicators describes how well collateral and bankruptcy laws facilitate lending. The second set measures the coverage, scope, and accessibility of credit information available through public credit registries and private credit bureaus. Last, enforcing contracts looks at the efficiency of contract enforcement by following the evolution of a sale of goods dispute and tracking the time, cost, and number of procedures involved from the moment the plaintiff files the lawsuit until actual payment.

The principal components analysis indexes for the countries considered are normalized to range from 0 to 100, where 100 indicates the country with the best business environment over the observation period. The principal components analysis indices allows not only a ranking of countries according to the Doing Business indicators, but also an objective measurement of
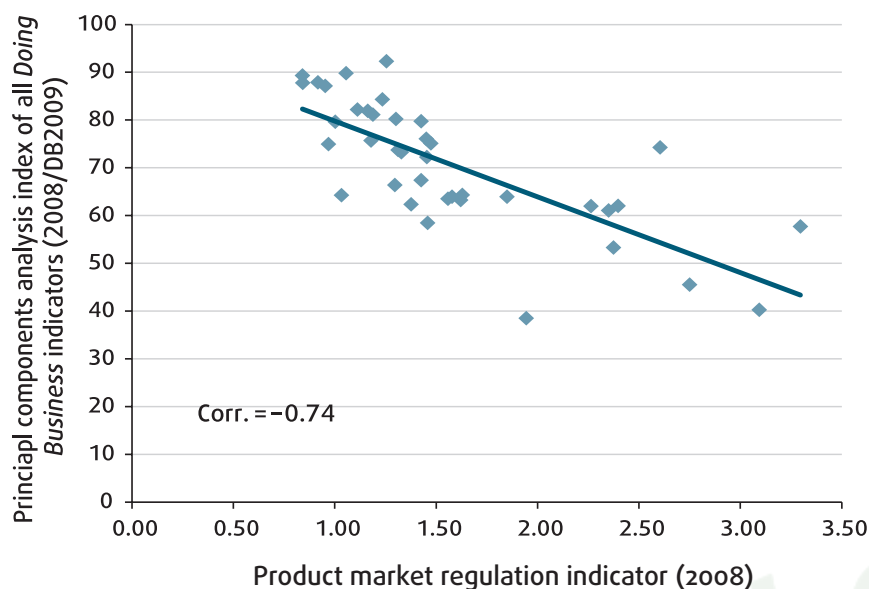
Figure A4.1: Correspondence between product market regulation indicator and principal components analysis index

Source: World Bank staff calculations, based on Doing Business and OECD (2011).

the improvements achieved over the period.[55] The Doing Business principal components analyses are highly correlated with the country ranking provided by Doing Business. For example, the correlation between the comprehensive principal components analysis index and the overall rank in Doing Business 2010 was –0.91, using all 150 countries for which both variables are available.[56]

Given that the principal components analysis is built on the basis of the indicators, they share methodological limitations.[57] To verify the quality of the principal components analysis indicator, we compare it with alternative measures of the quality of business regulation. The chapter utilizes what is considered a well-regarded methodology, the Product Market Regulation indicators constructed by the Organisation for Economic Co-operation and Development (OECD 2011). The analysis indicates that the two indicators are similar proxies of the quality of the business environment: the correlation between the comprehensive principal components analysis index of Doing Business indicators and the economywide Product Market Regulation indicator is very high: –0.74, using Doing Business 2008 data for the 39 countries for which both indicators are available (figure A4.1). But one of the advantages of the Doing Business indicators is their availability for a comprehensive set of countries and on a yearly basis.[58]

When analyzing the effects of business regulation on firm performance based on the Amadeus panel of incumbent firms, the last two principal components analysis indices—on business operations and institutional environment—are used. For these companies that managed to survive over the period, entry and exit regulation tend to matter less. For other types of analysis, especially when using country-level data from Eurostat, the principal components analysis of overall business regulation and also the three combined indices are considered.

237

Figure A4.2: Quality of regulations index based on Doing Business indicators, 2012

Source: World Bank staff calculations, based on Doing Business.

	Doing Business All	Start-ups	Operations	Institutions
Denmark	91	98	97	75
United Kingdom	90	91	92	92
Ireland	89	92	90	91
Sweden	83	95	88	73
Finland	82	97	84	74
Norway	83	99	83	76
Iceland	79	96	78	80
Switzerland	77	86	86	67
Belgium	81	88	83	79
Austria	77	87	83	76
Netherlands	77	92	81	71
Germany	74	83	81	76
France	74	81	82	74
Luxembourg	64	77	75	63
Portugal	71	92	76	64
Spain	66	84	73	63
Italy	64	83	75	48
Greece	56	71	69	50
Latvia	75	87	77	84
Estonia	75	86	83	71
Lithuania	74	89	78	74
Czech Rep.	70	82	79	69
Hungary	69	84	75	66
Poland	68	77	75	71
Slovak Rep.	67	86	72	69
Slovenia	66	88	70	59
Cyprus	69	83	78	58
Bulgaria	69	80	74	71
Romania	62	78	64	77
Macedonia, FYR	77	87	81	76
Montenegro	71	81	79	65
Serbia	61	77	68	67
Turkey	61	78	70	64
Albania	58	79	59	74
Croatia	57	78	65	61
Bosnia & Herzegovina	55	72	66	59
Georgia	82	90	87	79
Armenia	67	90	70	59
Belarus	58	83	60	68
Moldova	57	82	58	71
Azerbaijan	55	84	51	72
Ukraine	45	63	49	72

Annex 4.3: Transition matrices for EU countries

Table A4.5: Transition matrix of survival firms, by subregion (percent)

EU15 North and Continental **Size in 2008**						
Size in 2003	0–9	10–49	50–249	250–499	500–999	1,000+
10–49	12.4	82.9	4.6	0.0	0.0	0.0
50–249	0.8	12.2	81.9	4.4	0.6	0.0
250–499	0.4	0.0	23.7	57.6	16.8	1.5
500–999	0.7	0.7	3.5	13.2	61.8	20.1
1,000+	0.0	0.0	2.0	2.0	10.2	85.7
EU15 South **Size in 2008**						
Size in 2003	0–9	10–49	50–249	250–499	500–999	1,000+
10–49	18.5	76.9	4.5	0.1	0.0	0.0
50–249	1.7	19.6	73.9	4.0	0.8	0.1
250–499	0.0	1.9	25.0	57.2	13.6	2.3
500–999	0.9	0.0	3.7	21.1	53.2	21.1
1,000+	0.0	0.0	2.1	0.0	14.9	83.0
EU12 **Size in 2008**						
Size in 2003	0–9	10–49	50–249	250–499	500–999	1,000+
10–49	19.3	68.0	12.7	0.1	0.0	0.0
50–249	3.1	11.7	77.5	6.6	1.0	0.1
250–499	1.2	2.7	25.0	55.1	14.5	1.6
500–999	1.0	2.0	5.0	19.0	58.0	15.0
1,000+	0.0	0.0	0.0	2.3	18.2	79.6

Note: Consider all sectors
Source: World Bank staff calculations, based on Amadeus.

Notes

1 The European Working Time Directive requires member states to limit the maximum length of a work week, including overtime, to 48 hours in seven days. In the United States, employers can ask workers to work more than the standard 40 hours a week with appropriate compensation; the law sets no limit.

2 The average total corporate tax rate in Western Europe is 48 percent, compared with an average of about 40 percent in other OECD countries. This is the total tax rate, including local taxes and mandatory social contributions paid by enterprises as calculated according to the "Paying Taxes" indicator in 2010 (Source: Doing Business database, www.doingbusiness.org). Data exclude Luxembourg.

3 According to Eurostat "Economy and Finance" Statistics (2007), the remaining 28.9 percent of jobs are in public administration, health, education, other services, and households.

4 "Value added" is defined as sales revenues minus the value of intermediate outputs. It includes the contribution to sales from both labor and capital. Value-added growth can be decomposed in the growth of employment and in the growth of value added per employee—that is, labor productivity.

5 See annex 2 for a detailed presentation of the Quality of Regulations Index, method of construction, and components: Start-up Index, Business Operations Index, and Institutional Quality Index.

6 Source: Access to credit measured by private sector credit over GDP (WDI); quality of infrastructure measured by a survey to business leaders (WEF); skills of the workforce measured as percent of workforce with tertiary education (WDI); and FDI inward and outward stock measured as stock over GDP on six sectors that this chapter focuses on (Eurostat).

7 Due to data availability, years covered vary for some countries. See table 4.1 note for details.

8 Given data availability, productivity is calculated as value added per worker employed in manufacturing and services, including the government and financial sectors. In the rest of the chapter, productivity considers the six sectors (see endnote 12).

9 Given limited data coverage and size of the economies, Cyprus and Malta are excluded from the analysis (as well as Luxembourg in the EU15).

10 Data are taken from the Italian National Institute of Statistics.

11 Marin (2010, p. 4).

12 Analysis based on Eurostat Structural Business Statistics database. Using the Eurostat microeconomic data, we consider private and public enterprises operating in six main sectors (manufacturing, construction, hotels and restaurants, retail and wholesale trade, transport and telecommunications, and real estate and other services) according to NACE 1.1 classification. We exclude social services, which are mainly provided by the government, extractive industries, utilities, agriculture, and the financial sector. These data cover EU countries plus Norway. Cyprus, Ireland, Luxembourg, and Malta are not included in the analysis due to limited data coverage. The analysis measures the gross effect of changes in labor and value added within the six selected sectors. As such, the impact of a new job created in one sector does not distinguish whether the job results from the reallocation of labor from agriculture to industry or is a new one.

13 The analysis in this chapter focuses on the countries of the European Union, for which the best data are available. Wherever possible the analysis is extended to countries outside the European Union.

14 For example, labor could become scarcer, but the quality of other inputs could improve if foreign companies enter the market.

15 The analysis is for the gross job creation by the six industries considered, and does not distinguish which jobs are new ones for the economy and which ones are reallocated from other industries.

16 Includes construction, wholesale and retail trade, hotels, and transport.

17 This is shown by exit rates data from Eurostat Business Demographic Statistics. Exit rates for firms smaller than 10 employees are 10.6 percent in the south, and 8.9 percent in the rest of EU15. Equivalent numbers for larger firms are 2.2 percent in the south, and 1.7 percent in the rest. Note that entry/exit rate is not available from Eurostat for all countries. The south includes Italy, Portugal, and Spain, and the rest includes Austria, France, Germany, Luxembourg, the Netherlands, and the United Kingdom.

18 The productivity growth figures presented in this section are based on the Eurostat Structural Business Statistics database for contestable sectors (manufacturing, construction, transport and telecommunications, wholesale and retail trade, hotels and restaurants, and real estate services). As such, these data do not exactly mirror the aggregate ones presented in table 4.1, which rely on WDI/ILO data and include mining, energy utilities, financial intermediation, government, and other services such as education and health. In addition, the data reflect different time coverage (1995–2009 versus 2002–08, respectively). These data also differ from the Eurostat data for the same sectors, but based on national accounts. The gap between two data sources remains evident for a few countries, most evidently Greece. This discrepancy—acknowledged also by Eurostat—could be due to the fact that value-added figures relying on national accounts data include an estimate for the informal economy. In addition, value added in Eurostat is computed at factor cost while in national accounts value added is expressed in basic prices. Moreover, the statistical unit is different in the two data sources: national accounts normally use the kind-of-activity unit whereas in the Eurostat Structural Business Statistics the unit is the enterprise, so part of the value added for a certain activity in Eurostat can in fact be attributed to another activity in national accounts.

19 Bernard and Jensen (1995), Bernard and Wagner (1997), and Aw and others (2000) provide evidence that export-oriented firms are closer to the efficiency frontier than nonexporters.

20 See Volkswagen annual report.

21 Variation of FDI stock (UNCTAD 2010).

22 The data refer to a panel of surviving firms with 10 employees or more from the Amadeus database. Foreign-owned firms are defined as enterprises with more than a 50 percent stake held by a foreign owner. A detailed description of the panel data is presented in annex 4.1.

23 Figure 4.12 describes all FDI, including finance; figure 4.13 limits itself to the six sectors.

24 Except for Estonia and Romania, though in Romania, foreign firms depart from a higher level.

25 The countries included in the sample are the Czech Republic, Poland, Estonia, Romania, and Slovenia. A detailed description of the panel data is presented in annex 4.1.

26 The results refer to manufacturing and services separately. Given the cyclical nature of the construction sector, it is excluded from the analysis. Within manufacturing and services, the model distinguishes firms belonging to different NACE 1.1 codes.

27 See annex 4.1 table A4.2, columns 1 and 6.

28 Country data measured in 2005. See endnote 6 for a detailed explanation of the data sources.

29 Results also show that increasing supply of credit and of skilled workforce lead to productivity growth at firm level.

30 See results for Czech dummy, in table A4.2, columns 1 to 5.

31 Global headquarters based in one of the EU12 countries or their domestic affiliates.

32 FDI inflows are a measure of both the amount of FDI received—not possible at firm level—and positive spillovers toward firms that are not direct recipients of FDI.

33 Considering companies with 10 employees or more based on the Amadeus sample. Purely domestic companies are considered as independent companies or the ones belonging to a domestic group, foreign-owned companies and companies belonging to a group with international presence in Europe.

34 Excluding Luxembourg, where most FDI was in the financial sector.

35 The EU15 countries included in the sample are Belgium, France, Finland, Italy, Norway, Spain, and Sweden. A detailed description of the panel data uses is presented in annex 4.1.

36 For manufacturing, the 7 percentage points refer to the difference between the largest and smallest country dummy (respectively, –0.01 percent for Belgium, and –7.23 percent for Norway). See table A4.3, columns 1 and 6.

37 Within manufacturing and services, the model distinguishes firms belonging to different NACE 1.1 codes.

38 See results for Italian country dummy, table A4.3, columns 1 to 5.

39 In EU12 countries the correlation between the estimated country dummies and the measure of quality of education system is 0.63 for manufacturing and 0.65 for service companies. For EU15 correlations are 0.46 and 0.15 respectively.

40 Typical examples are a simplified filing system for taxes and more flexible employment regulations.

41 The enforcement mechanism of business regulations in developed countries is usually based on risk-based systems, and larger businesses are subject to higher scrutiny than microenterprises. Several country-specific studies refer to the relationship between the size of the enterprise and compliance, for example, with tax regulations.

42 Share of informal economy over GDP calculated by Schneider, Buehn, and Montenegro (2010).

43 The probabilities are estimated using a multinomial logit model.

44 All of the explanatory variables are lagged to 2003. Region dummies (EU15 North/Continental, EU15 South, and EU12) are included as well as sector dummies. Standard errors are clustered to allow for possible correlations in the related probability across firms within the same country.

45 Parmalat's accounts were forged for a number of years and—upon discovery—the company went bankrupt, leaving a hole in its account of €14 billion, eight times the sum originally stated in the audited accounts.

46 For Bosnia and Herzegovina, Croatia, Serbia, and Ukraine the population weights were computed using the World Bank's Business Environment and Enterprise Performance Survey database for 2007.

47 Value added is defined in the Amadeus dataset as profit for period plus depreciation plus taxation plus interest paid plus cost of employees. The value-added figures (originally in local currency) were deflated by an appropriate 2005 output deflator obtained from the United Nations Economic Commission for Europe and then converted to 2005 US$ using the annual exchange rate obtained from WDI dataset.

48 The reported number of employees includes all part-time and full-time employees on the company payroll, both temporary and permanent.

49 $\Delta\ln(\text{Prod})_{i\,03\text{-}08}$ is calculated as

$$[\ln(\text{Prod}_{i08}) - \ln(\text{Prod}_{i03})] / (2008 - 2003)$$

50 We classify foreign-owned firms as those with a global ultimate owner (outside the country of firm's registration), as defined by Bureau van Dijk. We can identify the specific ownership share for 66 percent of those firms, and in this case, firms have at least 51 percent of foreign stake. For the remaining 34 percent of firms that are classified as foreign-affiliated by Bureau van Dijk, we cannot identify the exact ownership stake. However, as they are mostly small firms, we assume they are not publicly traded firms for which parent's ownership can be diluted, and we then assume they are managerially fully in control of the foreign parent.

51 We use the latest ownership status (based on the mapping of firm ownership available in the 2010 Amadeus version) to create these ownership dummies for 2003. As our sample excludes all firms that were involved in merger and acquisitions operations, we assume that the ownership structure of a firm observed in 2009 is the same in 2003. But note that we could not control for cases where the firm ownership structure has changed due to a joint venture in 2003–08.

52 Given the cyclical nature of the construction sector, it is excluded from the analysis. Within manufacturing and services, the model distinguishes firms belonging to different NACE 1.1 codes.

53 Since Doing Business already provides a summary index for projecting investors, this index is used directly in the analysis (reverse-coded, as mentioned earlier). It is also included in the construction of the comprehensive principal components analysis index of all indicators.

54 Data related to this indicator are still being calculated and reported, though the indicator is no longer included in the Doing Business overall ranking.

55 This is one of the main differences between the index and the ranking provided by the Doing Business report. The latter creates a yearly (relative) ranking of the different countries. As a result of the relative ranking, one country might reduce its position simply because other countries have improved their environment. The Doing Business principal components analysis is modified only when an objective change is realized in the country.

56 At individual indicator level, the lowest correlation among the calculated Doing Business principal components analysis indices and Doing Business ranks occurs for the paying taxes principal components analysis index and the paying taxes Doing Business rank: –0.85.

57 For a comprehensive review of the Doing Business methodology, see www.doingbusiness.org.

58 Product Market Regulation indicators are only available for 2003 and 2008 during the time period analyzed in this study and their country coverage is more limited.

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Chapter 5

Innovation

Google did not exist in 1995. Today, its market value is about $150 billion. Google's story epitomizes the success of the American "innovation machine." In 1999, roughly a third of the world's 1,000 largest firms by market capitalization were based in the United States, and of these, 35 percent were founded after 1950. Europe had only 181 firms among the 1,000 largest, and of these, only 14 percent were founded after 1950 (Cohen and Lorenzi 2000). Europe is a "convergence machine" but not an innovation machine. Over the past 15 years, with a few exceptions in the north, Europe has started falling behind the United States in productivity growth (see spotlight one).

Europe's most successful companies seem to grow by doing what they are already doing—but better. Following the slogan of the German car manufacturer Audi— Vorsprung durch Technik (Leading through Technology)—they have developed ever-more efficient versions of traditional technology hits. But European companies have not shifted to radically new technologies, especially information and communications technologies (ICT).

As the Google success story unfolded, another was in the making in tiny Estonia. In 2003, four Estonian programmers, along with a Swedish and a Danish entrepreneur, founded Skype.[1] A U.S. venture capital firm, Draper and Company, provided seed capital and further investments before eBay took over the company in 2005. Despite ups and downs and disputes among the founders and subsequent owners, the company was sold for $8.5 billion to Microsoft in 2011. Skype's success demonstrates that Europe can produce young, innovative companies.

But the average productivity gap between Europe and the United States will likely persist until Europe's larger continental economies emulate their intrepid northern neighbors in innovative enterprises. Europe's most successful new entrepreneurs are small: while Europe does produce internationally competitive innovators in niche markets, the United States dominates among the world's leading innovators, and this has Europe-wide effects.

> How much does Europe's innovation deficit matter?

> Why does Europe do less R&D than the United States, Japan, and the Republic of Korea?

> What are the special attributes of a successful European innovation system?

> What should European governments do to increase innovation?

245

This chapter asks whether Europe has fundamental flaws in its economic environment that make its innovation deficit a fact of life. It looks at both the degree of innovative activities and the way innovative firms grow. In dimensions important for innovation, such as the availability of venture capital funding for European innovators, the business orientation of scientific research, and the share of people with tertiary education, Europe lags the United States. Denmark, Finland, Germany, Sweden, and Switzerland have been building strong national innovation systems that go toe-to-toe with the best in North America and East Asia, suggesting that there are other factors holding Europe's leading innovators back from growing to a global scale. One big obstacle is Europe's fragmented internal market for services. Until Europe realizes the gains from market integration and continentwide competition, it is unlikely that enterprises in innovation-intensive sectors such as ICT will match the growth of U.S. enterprises like Amazon, Apple, Facebook, Google, and Microsoft.

In analyzing Europe's innovation performance and comparing it with Europe's peers in America and Asia, this chapter answers four questions:

- **How much does Europe's innovation deficit matter?** The innovation deficit explains why Europe has lagged the United States in productivity growth since the mid-1990s—but it is not the only factor. Using various measures of innovation, such as research and development (R&D), patent registration, and the introduction of new products and processes, this chapter shows that these measures correlate with the rate of productivity growth across both countries and firms. But the relationship is complex. Productivity growth depends on firms' performance at the frontier as well as below it. Having leading innovators in fast-developing sectors, as the United States does, is important to push out the technological frontier. For companies below the frontier and for Europe's lagging economies, lifting barriers to general investment and human capital formation may be as important as reducing barriers specific to innovation.

- **Why does Europe as a whole do less R&D than the United States, Japan, and the Republic of Korea?** The short answer is that Europe has fewer innovators in sectors that require a lot of investment in R&D. Otherwise identical enterprises are as likely to engage in R&D in Europe as they are in other advanced countries, but in Europe leading innovators are less likely to engage in R&D-intensive sectors like biotech and the Internet. So, what keeps entrepreneurs from venturing into new activities? While this chapter offers no definite answer, it suggests that one reason may be the lack of an integrated market for digital services, which leads Europe's entrepreneurs to benefit less from clustering together than their peers in Silicon Valley or Tokyo.

- **What are the special attributes of a successful European innovation system?** Successful European economies—Denmark, Finland, Germany, Sweden, and Switzerland—have essentially downloaded the "killer apps" that have made the United States a powerhouse for innovation. The apps include incentives for enterprise-based private R&D, an abundant supply of workers with tertiary education, and public funding mechanisms and intellectual property regimes that foster links between universities and firms. But Europe's leaders are constrained by their market's small size and incomplete integration.

246

Box 5.1: Google—a uniquely American innovation

Europe wonders what it takes to raise fast growers. The story of Google's birth and growth is instructive.

Google began as part of a project at Stanford University on investigating the technological requirements for a single, universal digital library. The project was funded by U.S. federal government agencies, including the National Science Foundation. A Stanford Ph.D. student, Larry Page, had the insight that a better search engine—using the analogy of academic citations—would rank web pages by the number of times they were linked to other web pages, rather than how many times the searched word or phrase appears on a web page. He was encouraged to follow this line of inquiry by his supervisor, Terry Winograd, and was joined by another graduate student, Sergey Brin.

By 1998, with a $100,000 contribution from Andy Bechtolsheim of nearby Sun Microsystems, Google Inc. was operating out of a Menlo Park garage. The next year, it got $25 million in equity funding from venture capital firms who, by 2001, forced it to hire a CEO. Three years later, in August 2004, with help from Morgan Stanley and Credit Suisse

First Boston, Google went public, raising $1.67 billion in its initial public offering. In 2005, Google was valued at more than $50 billion, making it one of the world's largest media companies, allowing Google to raise $3.5 billion in the stock market to acquire complementary businesses and technologies. In 2006, Google became one of Standard and Poor's 500 Index. The same year, Merriam-Webster and Oxford dictionaries officially added "google" as a verb.

Besides the ideas and technical expertise of its two founders, Google's success is the result of an unparalleled environment for innovation in information technology. Its four main attributes are these:

- First, universities that—through close links to firms—start and nurture the agglomeration of expertise and enterprise. In this case, the university is Stanford, and the agglomeration is Silicon Valley in the San Francisco peninsula, which radiates outward from the university. The university itself, founded privately in 1891, helped create Silicon Valley by leasing land to entrepreneurs, and then by providing human capital. Close to half of Silicon Valley firms are started by Stanford alumni.

- Second, financial support from the U.S. government for such projects as the Stanford Digital Library Project. The National Science Foundation is a major supporter of innovation in U.S. universities, as are other federal agencies such as the departments of Commerce, Defense, Energy, and Transportation.

- Third, proximity to investors who specialize in information technology ventures—who take a chance on new ideas and enterprises and provide management oversight. A culture of risk-taking and a tolerance for failure provides a conducive climate for such long shots as Google.

- Fourth, the ability to attract global talent. Bechtolsheim grew up in Germany before coming to the United States on a Fulbright scholarship, and he stayed on after his studies. Had he returned, he might not have been worth $2 billion, and Page and Brin might not have received a big check to get started.

Source: Google.

- **What can European governments do to increase innovation where it is most needed?** The answer is a two-pronged approach. First, reform the innovation ecosystem—regulations, finance, science, and incentives—to ease entry and reward risk-taking. Second, increase the size of the market for European innovators by strengthening the single market for digital and other modern services, which would allow agglomeration.

Google's success provides some clues about priorities and payoffs (box 5.1). The most important may be that to compete with the United States, Japan, and soon China, Europe has to bring together academic intellect, public funding, and private finance on a European scale.

Europe's innovation deficits matter—but not equally for everyone

In 1950–73, the Golden Age of European growth, productivity in Western and Eastern Europe converged rapidly toward that in the United States, the world's leading industrial economy. Growth and income convergence slowed over 1973–95, but for productivity it continued, as European working hours fell to less than those of the United States. During this period, the cohesion countries of Southern Europe and Ireland caught up rapidly with the European Union's founding members. Since 1995, the "old" EU members (EU15) have recorded slower productivity growth than the United States and have essentially stopped converging, while the new member

Figure 5.1: Mind the gap: convergence followed by slowdown in Europe's productivity relative to the United States

(GDP per hours worked in Geary/Khamis $, United States = 100)
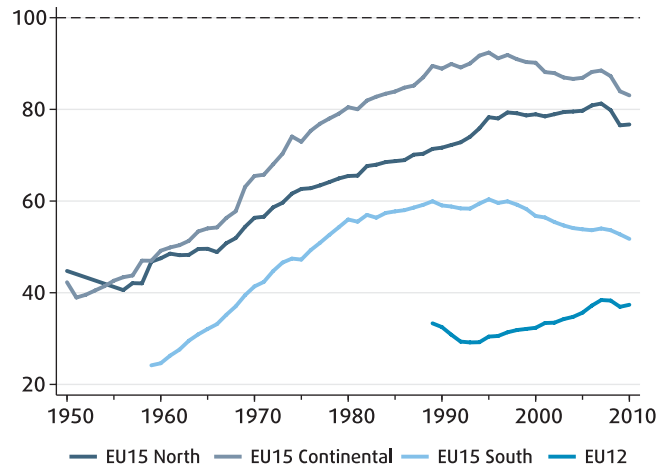
Note: EU15 North = Denmark, Finland, Sweden, and the United Kingdom; EU15 Continental = Austria, Belgium, France, Germany, and the Netherlands; EU15 South = Greece, Italy, Portugal, and Spain.
Source: World Bank staff calculations, based on Conference Board 2011.

states in Eastern Europe have started to catch up rapidly. As chapter 4 shows, productivity growth in Europe's south has been especially disappointing since 1995, while the north kept pace with the United States until the crisis (spotlight one; figure 5.1).[2]

Innovation as a source of long-term growth differentials

Innovation as a driver of long-term productivity growth has contributed to the EU15's failure to close its productivity gap with the United States. Economists have long linked long-term growth to technological improvements (for example, Solow 1956), but how technology improved remained a black box. More recently, Romer (1990) and Aghion and Howitt (1992 and 1998) proposed theories that link an economy's growth rate to its innovation rate. Aghion and Howitt's theory is of particular interest, because it accounts for empirical phenomena that characterize economic growth and convergence in Europe (Aghion and Howitt 2006):

- Productivity growth results from improvements in product quality, as firms that innovate substitute old, obsolete production with new, better-quality production. This "creative destruction," described first by Joseph Schumpeter, has led to accelerated structural change and productivity catch-up in Eastern Europe (Alam and others 2008).

- Firms innovate both by pushing out the technological frontier and by adapting technologies from the stock of global knowledge. As the stock grows, so too do the returns to innovation for all technological followers. Innovation has positive spillovers that can account for long-term growth differentials among economies. The European Union has targeted an increase in R&D investments as a key policy variable for improving long-term growth prospects.

- The forces driving innovation at or below the frontier differ. Competition spurs firms at the frontier to innovate to "escape" competitors, but for firms

248

well below the frontier, competition may discourage technological adaptation, because it reduces the rents available from adapting better technologies.[3] As a result, policies to promote productivity growth through innovation depend on whether a country's firms are below or at the technological frontier. For instance, comprehensive secondary education may be critical during catch-up, but tertiary education acquires greater weight once a country has reached the frontier; bank-led relationship-based financing may be optimal during catch-up, but for innovation at the frontier, equity (or venture capital) financing is likely better suited. Europe moved from below the frontier in the period of rapid convergence to close to it by the mid-1990s, and therefore the same policies that were good for growth before may not be optimal now (Abramovitz 1986; Eichengreen and Vazquez 2000; Aghion and Howitt 2006).

Considerable empirical literature supports the importance of structural change and innovation for productivity growth. Van Ark, O'Mahony, and Timmer (2008) decomposed economic growth in the United States and Europe into the contribution of several inputs to understand the productivity gap between the United States and the EU15 since 1995. The authors find that the key factor is the different rate of multifactor productivity growth in market services, such as retail trade, finance, and business.[4] Jorgenson and Timmer (2011) further show that the United States has benefited from much faster total factor productivity (TFP) growth in distribution and personal services than has the European Union. While the different rate of investment in ICT made a small contribution, organizational changes and product and process innovation in services—rather than capital deepening as a result of the introduction of ICT—lie behind the divergence in performance between the United States and Europe. In short, the United States gets a bigger productivity kick out of ICT than does Europe.

In addition, vast empirical literature investigates innovation's role in productivity and growth across enterprises or sectors of an economy. Hall, Mairesse, and Mohnen (2009) and Hall (2011) estimate the return on investments in R&D from those that link innovation to productivity growth through qualitative measures of product and process innovation (see box 5.2 for definitions of the various forms of innovation). The distinction is important because measures of investment in innovation, such as R&D spending, might not fully capture the nature of innovation in service industries such as retail or finance, which have been important in driving productivity growth differences between Europe and the United States. The conclusion from the empirical literature confirms the intuition behind recent

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Box 5.2: Defining innovation

- **Innovation:** The development and commercialization of products and processes that are new to the firm, the market, or the world. Activities involved range from identifying problems and generating new ideas and solutions to implementing those solutions and diffusing new technologies.

- **Product innovation:** The development of new products representing discrete improvements over existing ones.

- **Process innovation:** The implementation of a new or greatly improved production or delivery method, or of a new organizational method in firms' business practices, workplace organization, or external relations. This includes "soft innovation,"

such as layout reorganization, transport modes, management, and human resources.

- **Incremental innovation:** Innovation that builds closely on technological antecedents and does not involve much technological improvement upon them.

Source: Goldberg and others (2011), based on the Organisation for Economic Co-operation and Development.

249

Figure 5.2: Europe has a large innovation deficit relative to both the United States and East Asia's high-income economies

(R&D expenditures as share of economic output of selected countries, 2000–08)
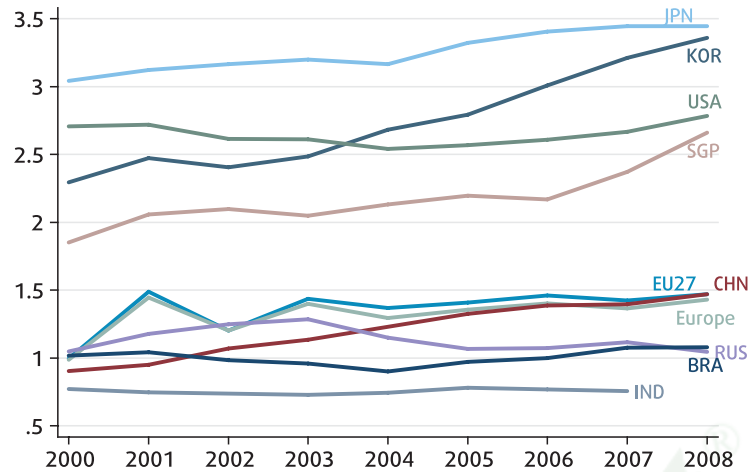
Note: Europe includes the EU27, EFTA, and EU candidate countries.
Source: UNESCO.

endogenous growth literature: innovation is positively associated with higher firm productivity and growth, and the social rate of return on innovation exceeds the private rate of return because of positive spillovers from growth in the available stock of knowledge.[5]

How large is Europe's innovation deficit?

Given the role of innovation in productivity growth, how does Europe measure up? Comparing the share of R&D investment in GDP in Europe with that in the United States and East Asia's high-income economies, Europe as a whole does less R&D (figure 5.2). Moreover, China has increased its R&D investment rapidly over the past decade, closing the gap with the EU15 and exceeding the new member states (EU12), EU candidate countries, and European partnership states. As chapter 1 shows, Europe's gap in R&D investments is due entirely to the lower R&D investments of Europe's business sector.

Aggregate comparisons, however, may be misleading. Innovative activity varies across European countries, and a wider range of indicators depicts a more varied landscape than a simple comparison of aggregate investment rates in R&D. One recent comparative data collection effort is the Innovation Union Scoreboard (IUS) prepared by the European Commission (European Commission 2011b), which compares innovation efforts across countries in Europe and is benchmarked against the United States and Japan.[6]

R&D investments and patent counts are the measures of innovation used most in enterprise-level studies linking innovation with productivity (Hall, Mairesse, and Mohnen 2009; figure 5.3). The leading countries in business investment in R&D are also the leading countries in patent counts.[7] Europe's leaders in both fields perform as well as or better than the United States and Japan.[8] The data on public R&D investments and international revenues from patents and licenses present a less clear pattern. Austria, France, the Netherlands, and
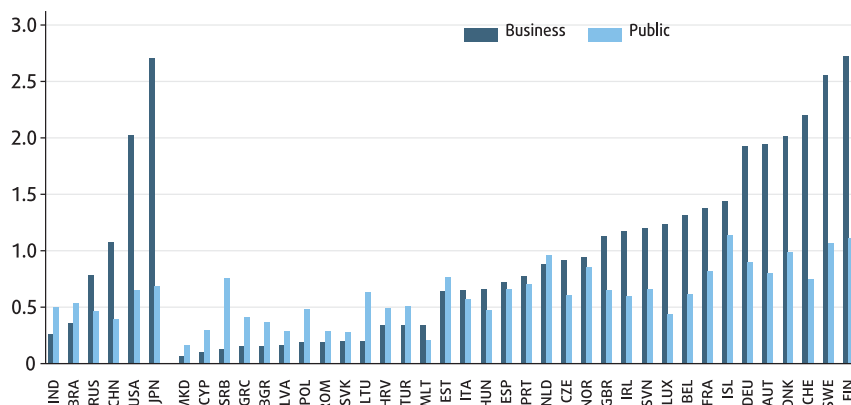
Figure 5.3: Europe's leaders invest as much in innovation as the United States and Japan

(business and public R&D expenditure, percentage of GDP)
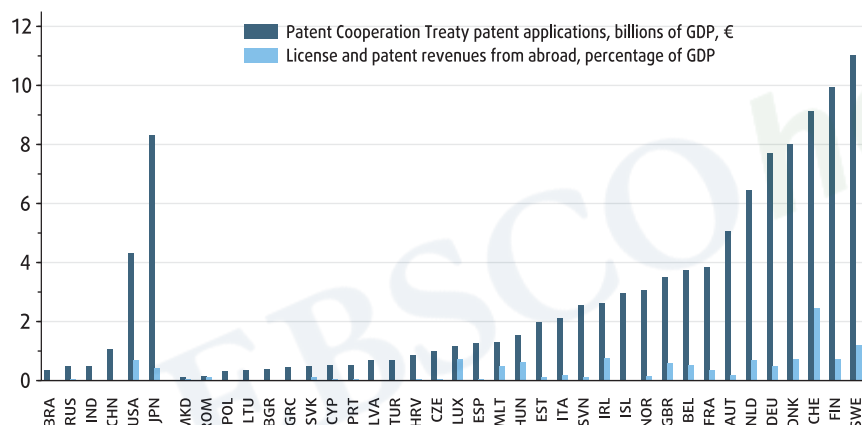
(patent counts and revenues from international licenses and patents)

Note: Data refer to different years by country.
Source: European Commission 2011b; UNESCO; and IMF BOPS.

Norway are among Europe's leaders and have higher spending on public R&D than do the United States or Japan. License and patent revenues from abroad show a diverse pattern, with the Benelux, Hungary, Ireland, Malta, and the United Kingdom performing well alongside Japan, Switzerland, Scandinavia, and the United States. Overall, these four measures are highly correlated: the correlation coefficient between a country's business and public R&D investment is 0.71, between a country's business R&D investment and its international patent count is 0.91, and between business R&D investment and international license and patent revenues is still 0.63.

The European Commission also collects data for non-R&D innovation spending, as well as the share of companies undertaking product, process, and organizational innovation. These data are collected only for European countries. Non-R&D innovation spending is high in Europe's emerging economies, such as Bulgaria, Croatia, Estonia, Poland, and Romania (figure 5.4).[9] Interpretations are speculative, but one possibility is that firms in emerging economies, particularly in the

251

Figure 5.4: In Europe's catching-up economies innovation is not always R&D

(non-R&D innovation expenditure, percentage of turnover of all enterprises)
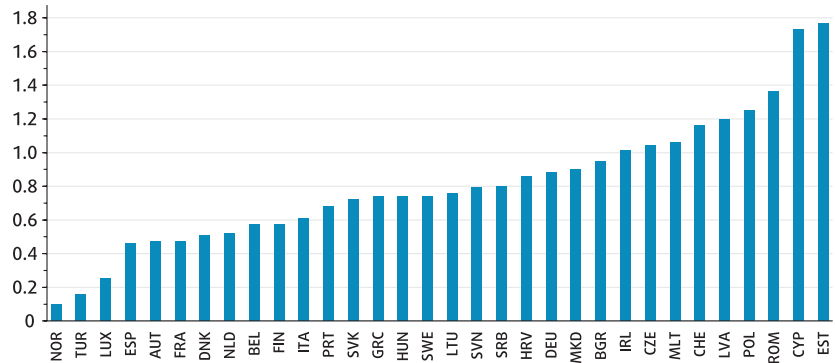
Note: Data refer to different years by country.
Source: European Commission 2011b.

transition economies of the former Soviet bloc, now are trying harder to adapt advanced technologies to local circumstances.

The Community Innovation Survey collects data on the share of companies undertaking innovative activities, measuring countries' share of all companies undertaking some kind of innovation, collaborating with partners outside Europe (China, India, and the United States), and collaborating with other companies or research institutions as opposed to doing it in-house (table 5.1). The survey measures collaboration with other companies to gauge the extent of innovation spillovers within and outside Europe. Several observations follow from looking at this survey alongside parallel data on small and medium enterprises (SMEs) (from the IUS but also based on Community Innovation Survey data).

There is a high correlation between the overall share of companies innovating and the share of SMEs innovating (0.85). The country with the largest share of companies innovating overall is Germany (close to 80 percent). The lowest proportion of innovating companies, as well as innovating SMEs, is in the transition economies of Eastern Europe: Latvia, Poland, Hungary, Lithuania, Bulgaria, and Romania.

There is also a close correlation between the share of companies undergoing process and product innovation and the share undertaking marketing and organizational innovation (0.79). As Hall (2011) summarizes, at the firm level, distinguishing the type of innovation is important, because firms may have different effects on productivity. At the country level, the data suggest countries that have innovative firms tend to have more of innovation overall.

The share of companies collaborating with others is also consistent across all firms and the subpopulation of SMEs (correlation of 0.81). Top performers are the United Kingdom, Denmark, Belgium, Estonia, and Slovenia. The least cooperation takes place in Romania, Latvia, and Bulgaria.[10] German and Italian companies are far less likely to cooperate and consequently appear to be doing most of their innovation in-house. When looking at where companies' partners are located, a distinct group of countries emerges that cooperate more internationally than others. This group includes Finland and Sweden as

Table 5.1: A large share of companies in Europe innovate, less so in the east

	SMEs innovating in-house	Innovative SMEs collaborating with others	Total innovating SMEs	SMEs introducing product or process innovation	SMEs introducing marketing/ organizational innovation	Total share of innovating enterprises	All types of cooperation	Cooperation with United States	Cooperation with China and India
	IUS	IUS	IUS	IUS	IUS	CIS	CIS	CIS	CIS
Denmark	40.8	22.7	63.5	37.6	40.0	51.9	56.8		
Finland	38.6	15.3	53.9	41.8	31.5	52.2	36.9	11.1	6.7
Ireland	38.8	9.8	48.6	27.3	41.6	56.5	24.1	2.5	2.8
Sweden	37.0	16.5	53.5	40.6	36.7	53.7	39.9	11.2	7.3
United Kingdom		25.0		25.1	31.1	45.6			
EU15 North	**38.8**	**17.9**	**54.9**	**34.5**	**36.2**	**52.0**	**39.4**	**8.3**	**5.6**
Austria	34.4	14.7	49.1	39.6	42.8	56.2	38.8	3.1	1.8
Belgium	40.2	22.2	62.5	44.0	44.1	58.1	48.8	9.4	5.8
France	30.0	13.5	43.5	32.1	38.5	50.2	42.4	5.2	2.4
Germany	46.0	9.0	55.0	53.6	68.2	79.9	20.7	2.4	1.3
Luxembourg	37.4	12.3	49.7	41.5	53.0	64.7	30.1	8.7	3.7
Netherlands	26.3	13.0	39.2	31.6	28.6	44.9	40.2	7.4	3.1
EU15 Continental	**35.7**	**14.1**	**49.8**	**40.4**	**45.9**	**59.0**	**36.8**	**6.0**	**3.0**
Greece	32.7	13.3	46.0	37.3	51.3				
Italy	34.1	6.0	40.1	36.9	40.6	53.2	16.2	1.3	0.8
Portugal	34.1	13.3	47.4	47.7	43.8	57.8	28.4	1.8	1.1
Spain	22.1	5.3	27.4	27.5	30.4	43.5	18.7	1.0	0.4
EU15 South	**30.8**	**9.5**	**40.2**	**37.4**	**41.5**	**51.5**	**21.1**	**1.4**	**0.8**
Bulgaria	17.1	3.5	20.6	20.7	17.4	30.8	16.6	1.1	0.5
Cyprus	41.6	21.3	62.9	42.2	47.3	56.1	51.4	3.6	3.2
Czech Republic	29.6	11.3	40.9	34.9	45.9	56.0	32.9	2.8	2.0
Estonia	34.0	22.3	56.3	43.9	34.1	56.4	48.6	2.7	1.4
Hungary	12.6	7.2	19.8	16.8	20.5	28.9	41.3	3.1	2.7
Latvia	14.4	3.3	17.7	17.2	14.0	24.3	16.6	1.2	0.1
Lithuania	19.4	8.0	27.4	21.9	21.4	30.3	38.7	4.5	2.6
Malta	21.6	5.2	26.8	25.9	25.6	37.4	19.8	3.1	2.0
Poland	13.8	6.4	20.2	17.6	18.7	27.9	39.3	4.2	2.0
Romania	16.7	2.3	18.9	18.0	25.8	33.3	13.8	1.4	0.8
Slovak Republic	15.0	5.8	20.7	19.0	28.3	36.1	32.2	4.0	3.5
Slovenia		14.2		31.0	39.4	50.3	48.0	6.6	4.1
EU12	**21.4**	**9.2**	**30.2**	**25.8**	**28.2**	**39.0**	**33.3**	**3.2**	**2.1**
Iceland		14.1							
Norway	25.4	13.1	38.5	28.9	30.8	49.2	35.1	4.3	2.2
Switzerland	28.2	9.4	37.6	57.0					
EFTA	**26.8**	**12.2**	**38.1**	**43.0**	**30.8**	**49.2**	**35.1**	**4.3**	**2.2**
Croatia	25.6	11.9	37.5	31.5	32.5	44.2	38.1	2.3	1.1
Macedonia, FYR	11.3	9.6	20.9	39.2	30.8				
Serbia	27.8	3.5	31.3	18.3	18.1				
Turkey	28.2	5.3	33.5	29.5	50.3				
EU candidates	**23.2**	**7.6**	**30.8**	**29.6**	**32.9**	**44.2**	**38.1**	**2.3**	**1.1**

Note: Data refer to different years by country and data source.
Source: European Commission 2011b; and sixth Community Innovation Survey (CIS).

leading international cooperators, but also the Benelux, Slovenia, and—to less extent—France. The United Kingdom does not report which countries its firms collaborate with, but likely belongs with this group.

In sum, there appears to be a group of leading innovators in Europe, distinguished by sizable investments in business R&D, a strong record in international patent registrations, and a substantial proportion of companies that undertake one type of innovation or another. This group does not have an innovation deficit relative to the United States or Japan, though it still lags behind the United States in productivity, particularly in services. Many other European countries do, however, have an innovation gap. Among the top performers in Europe, there is a distinct difference between the pattern in Germany—with many firms innovating mostly in-house—and the pattern in Scandinavia or the Benelux, where there is a stronger propensity for firms to innovate through collaboration with other companies or research institutes. Europe's emerging economies in the east are lagging behind on most indicators of innovation (with some notable exceptions such as Slovenia and Estonia) except for investments in non-R&D-related innovation.

The North innovates more than others; in the East investment matters more

Do these patterns help to explain the strong economic performance of Europe's northern economies relative to the less impressive performance in the south, as demonstrated in chapter 4? And how can we account for strong productivity growth in Eastern Europe, given that most transition economies do not seem to invest a lot in innovation or have a large share of innovative firms? The answer to the first question is to some extent. The answer to the second is that innovation is only one input into the productivity of firms, and the rate of return on innovation investments varies not only across companies but also across countries.

Figure 5.5: Innovation: another north-south gap in Europe
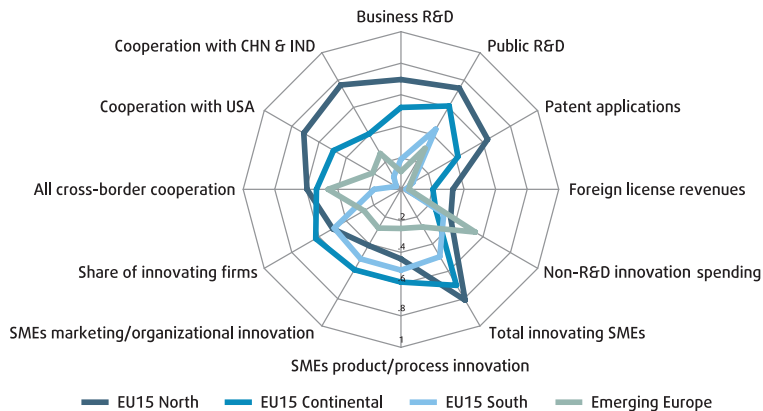
Note: Data are normalized to lie between zero (worst) and one (best) and refer to different years by country.
Source: European Commission 2011b; sixth Community Innovation Survey (CIS); UNESCO; IMF BOPS.

A word of caution: this chapter makes no attempt at a robust growth-accounting exercise that would allow the contribution of country-level innovation to be disentangled from other factors such as investments in physical and human capital. We undertake two simple exercises. The first shows the average scores by geographical country groups across all indicators used to measure innovation in figures 5.2 and 5.3 and table 5.1 (figure 5.5). The country groups are the same as used in chapter 4: the EU15 split into a northern group (Ireland, Scandinavia, and the United Kingdom), a continental group (Austria, Benelux, France, and Germany), and a southern group (Greece, Italy, Portugal, and Spain), and all of the new EU member or candidate countries in the sample (not distinguished here between subgroups among the emerging European countries). These scores tell a clear story: across most innovation measures the southern group lags the northern and the continental (figure 5.5). The only exception is the share of SMEs that introduce product and process innovation or marketing and organizational innovation.

The emerging economies in Eastern Europe score poorly on most dimensions of innovation, despite their strong productivity growth record, though they outperform the south in the share of enterprises cooperating with others inside and outside Europe and in non-R&D spending.

The second simple exercise correlates the measures of innovation introduced above with a measure of TFP, drawn on the ECFIN-AMECO database for TFP calculations available annually for 1998–2008 (figure 5.6).[11] In the EU15, there is a clear positive correlation between TFP growth and two of the three measures of innovation in figure 5.6: business R&D and registered international patents. The total share of firms innovating is not correlated with TFP growth in the EU15. In the EU12, the correlation between innovation and TFP growth is slightly negative. In other words, while innovation matters, it matters much more in "old" Europe than in "new" Europe to explain differences in productivity growth.[12]

In sum, there is no single innovation and productivity gap between Europe and the United States. Europe's leading innovators in the north (and to less extent, the continental countries) have kept pace with U.S. productivity growth and seem
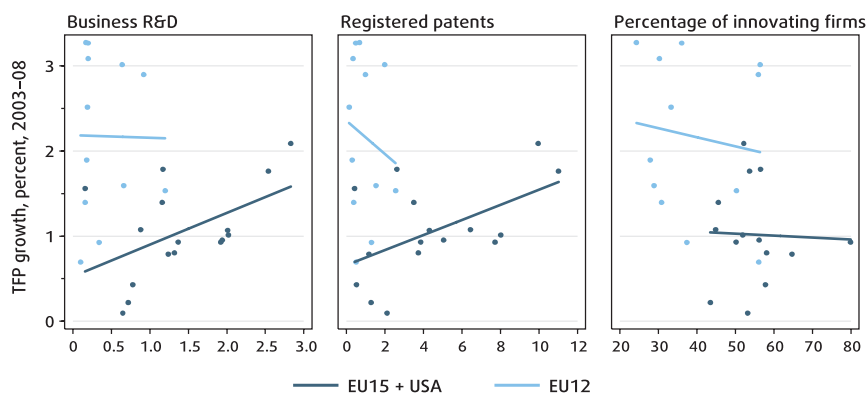
Figure 5.6: Innovation matters much more in "old" Europe than in "new" Europe in explaining differences in productivity growth

(innovation and TFP growth—different patterns in east and west)

Note: Business R&D is expressed as percentage of GDP and registered patents refer to patent applications per billions of GDP in euro. Data refer to different years by country and indicator.
Source: World Bank staff calculations, based on European Commission 2011b; and European Commission's annual macro-economic database (AMECO).

to be matching U.S. innovative investment and activity. For these countries, the question is how to become global productivity leaders. Europe's south innovates less and has fallen behind in productivity. These countries have an innovation and productivity gap to close with their Northern and Continental European peers and with the United States. Europe's east is catching up in productivity, but remains far behind in innovation. For these countries, sustaining productivity growth is what matters, but the innovation gap so far has not been a binding constraint.

Evidence from other emerging markets confirms that returns on innovation vary in relation to both the stock of complementary investments in physical and human capital (box 5.3) and a country's position relative to the global technological frontier (box 5.4). Chapter 4 analyzed the variation in enterprise performance in relation to a wider range of factors, including the business climate, the availability of skills, the quality of a country's infrastructure, and

Box 5.3: Is R&D/GDP a good measure of innovation performance?

It is common to rank innovation performance by the share of R&D investment in GDP. But intuitively it cannot be true that, given huge differences in the sophistication of the private sector, the optimal level of investment in R&D should be the same in Albania and Germany. Generally, the question is whether countries face a barrier to accumulating knowledge capital, or to all factors of production. To approach the question of whether Latin America showed innovation shortfalls, Maloney and Rodríguez-Clare (2007) used a model developed and calibrated by Klenow and Rodríguez-Clare (2005) that allows for both types of barriers and captures

interactions in accumulating different types of capital, including "knowledge capital." To extend this to additional countries, we compare the conventional measure of R&D investment (box figure 1, vertical axis) with the degree to which, controlling for other factors of production, it appears that innovation is inhibited (taxed) or, if to the left of the origin, subsidized (box figure 1, horizontal axis).

Although the analysis depends on notoriously fickle measures of relative TFP, it suggests several interesting findings. For instance, even though China is far above Colombia in R&D spending, the analysis suggests that it could

invest more given the accumulation of human and physical capital. But Hong Kong SAR, China—below China in R&D spending—appears to be innovating more than expected given the other factors accumulated; it may not be efficient to push toward a higher share of R&D.

The analysis is only suggestive, but it makes an important point: innovation does not exist independent of other factors of production. When barriers to accumulation are high and binding, additional R&D spending may yield few benefits.

Source: World Bank staff, based on Maloney and Rodríguez-Clare 2007.

Box figure 1: R&D level may not show innovation problem
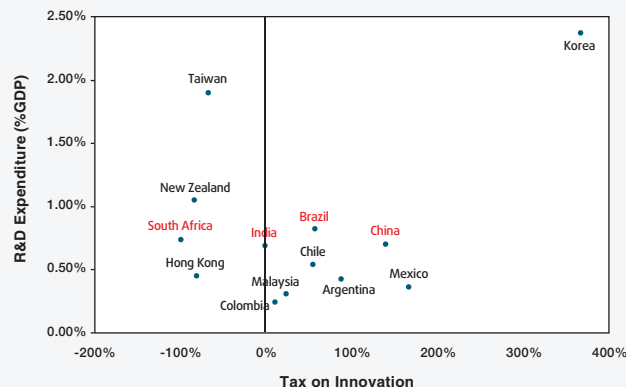
Note: R&D expenditure (percentage of GDP) is average for 1995–99. Tax on innovation is the calibration of the model by Maloney and Rodríguez-Clare (2007), adjusting for natural resources activities. The calibration is done using data for the 1990s, except for Hong Kong SAR, China (1980s).
Source: World Bank staff calculations, based on WDI; statistical yearbook (Taiwan, China); and UNESCO (South Africa).

others. When these factors are binding, innovation may matter less. Comparing Europe's leading innovating companies with those in the United States and Japan, how does Europe perform "at the frontier"?

Why European enterprises do less R&D—not enough Yollies

If Europe's most innovative countries invest as heavily in R&D as the United States and Japan, comparing favorably with these peers on innovation indicators, why don't we find Googles and Apples in Sweden and Finland? One answer is that Europe's leading innovators are mostly older companies operating in less innovation-intensive sectors. Europe struggles to nurture young, innovative companies in sectors characteristic of the "new" economy, such as ICT, biotechnologies, or medical services, which would grow into global leaders. Europe's leading innovators are more

Box 5.4: Why don't lagging countries do more R&D?

Although R&D spending is associated with inventions at the frontier, Cohen and Levinthal (1989) stress the "second face" of R&D, which facilitates the adoption of existing technologies from abroad. Griffith, Redding, and Van Reenen (2004) test this using sectoral time series data from 11 OECD countries. They find that countries further from the frontier had rates of return almost twice those at the frontier. For instance, the United States had a total rate of return of 57 percent while Finland and Norway had rates of return close to 100 percent, with 50 percent due to enhanced learning. These numbers are extraordinarily high, but not necessarily out of line with those found in other studies (see Jones and Williams 1998, and Hall, Mairesse, and Mohnen 2009). Jones and Williams (1998) calculate that at these returns, the United States should be investing roughly four times what it does

presently. The question arises, if returns increase as we get further from the frontier, why would lagging countries invest in anything besides R&D? Shouldn't the southern and eastern countries of Europe invest more than those at the frontier?

Using a country-level panel, Goñi, Lederman, and Maloney (2011) confirm previous findings that, up to a point, returns rise with distance from the frontier (box figure 1). Each point corresponds to a distance from the frontier represented by a particular country in a particular five-year period, though the estimates, based on a rolling window, do not correspond to that particular country-time combination per se. To the right, we see rich countries with returns consistent with the literature, and then as we move left and away from the frontier to countries such as the Republic of Korea and Greece in 1996–2000,

the returns rise. Beyond the distance corresponding to Mexico, Chile, and Hungary in 1996–2000, returns begin to fall. At Romania's distance from the frontier, countries actually experience negative returns to R&D. Perhaps the finance minister of Romania is reasonable not to see a 3-percent-of-GDP target as a good use of his resources.

Why is this the case? As we get further from the frontier, the business climate is likely to worsen and the private sector become less sophisticated, such that even the best of ideas will yield limited fruit. Moreover, progressively weaker human capital in both the public and private sector could imply few good ideas that actually result from R&D investments. To the degree that they displace more feasible investments in education or infrastructure, the overall return on R&D could be negative.

Box figure 1: Rate of return on R&D versus distance from the frontier
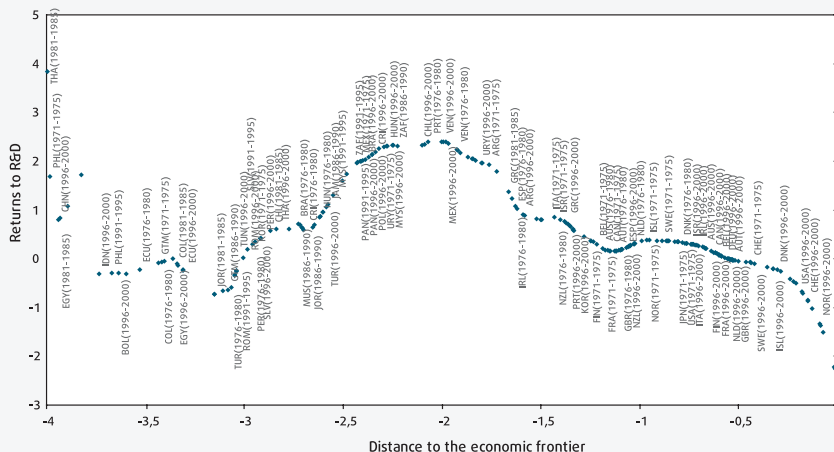
Source: Goñi, Lederman, and Maloney 2011.

likely to push out the technological frontier in established sectors by developing better-quality versions of the same basic product. But they are less likely than their American counterparts to push into new fields.

A word of caution: this section does not directly examine the link between the presence of young, leading innovators and economywide productivity growth. However, the basic argument linking productivity and innovation to the age, size, and sectoral structure of an economy has received significant empirical support (O'Sullivan 2007; Aghion and others 2008). Bartelsman, Haltiwanger, and Scarpetta (2004) found, for instance, that postentry performance differs markedly between Europe and the United States, suggesting barriers to firm growth as opposed to barriers to entry. New European firms' inability to grow large manifests in the high-tech, high-growth sectors, most notably the ICT sector (Cohen and Lorenzi 2000).[13] This correlates with a lower specialization of the European economy in R&D-intensive, high-growth sectors, most notably the ICT sectors (O'Mahony and van Ark 2003; Denis and others 2005; Moncada-Paternó-Castello and others 2010).

The global expenditures of leading innovators by age cohort and sector, taken from the JRC-EC-IPTS Industrial R&D Scoreboard (Hernández Guevara and others 2008), demonstrates Europe's lower rate of investment in R&D compared with the United States. Comparing the innovative profile of young, leading innovators (which we will call "Yollies") with that of old, leading innovators ("Ollies") shows how the lower share of Yollies contributes to Europe's lagging business innovation performance.[14]

Europe has fewer Yollies than the United States, and its Yollies invest less in R&D

Among the United States' leading innovators in the Industrial R&D Scoreboard, more than half are "young" (born after 1975; figure 5.7). U.S. Yollies include Microsoft, Cisco, Amgen, Oracle, Google, Sun, Qualcomm, Apple, Genzyme, and eBay. By contrast, only one in five leading innovators in Europe is "young." In the United States, Yollies account for 35 percent of total R&D of leading innovators; in Europe, a mere 7 percent! Notably, Japan has almost no young firms among its leading innovators. The remaining firms in the sample of leading innovators (mostly from emerging Asia) have a high share of young firms, to be expected given the recent economic take-off of these countries.

Of the 74 European Yollies in the Scoreboard, 20 are based in the United Kingdom. France, Germany, and Switzerland each hold nine, the Netherlands has eight.[15] In relative terms, when looking at the share of Yollies in a country's total R&D of leading innovators, Italy does poorest with only 3 percent, but Germany and Sweden have surprisingly low shares at 4 percent, way below the European average. The Netherlands, with 15 percent, is above average. Switzerland scores highest in Europe with 24 percent. But even this share is far below the United States' 35 percent. European Yollies include U.K.-based Vodafone in telecom services, UK Shire in specialty biopharma, Swedish Hexagon in measuring technologies, Dutch ASML in semiconductors, and French Ubisoft in entertainment software.

Table 5.2: Europe specializes in sectors with medium R&D intensity, the United States in high intensity

(relative technological advantage (RTA) indices by sector, ratio, 2007)

	Europe	United States
Aerospace and defense	1.50	1.13
Automobiles and parts	1.26	0.58
Biotechnology	0.32	2.20
Chemicals	1.31	0.64
Commercial vehicles and trucks	1.30	1.06
Computer hardware and services	0.08	1.39
Electrical components and equipment	1.56	0.18
Electronic equipment and electronic office equipment	0.18	0.37
Fixed and mobile telecommunications	1.53	0.20
Food, beverages, and tobacco	0.92	0.74
General industrials	0.61	1.49
Health care equipment and services	0.70	1.86
Household goods	0.84	1.60
Industrial machinery	1.84	0.24
Industrial metals	1.00	0.30
Internet	0.00	2.54
Oil	1.00	0.85
Personal goods	1.44	0.69
Pharmaceuticals	1.27	1.16
Semiconductors	0.50	1.72
Software	0.51	2.05
Support services	0.78	1.19
Telecommunications equipment	1.38	1.09

Note: Relative technological advantage is calculated as the region's share in total sectoral R&D relative to the region's share in overall R&D. A value in relative technological advantage that is higher than 1 means that the region is technology-specialized in this sector. Japan and the rest of the world are not reported because of too few observations when disaggregating to individual sectors. Innovation-based growth sectors are bold and in italics.
Source: Bruegel and World Bank staff calculations, based on European Commission's IPTS R&D Scoreboard.

Because the difference in R&D intensity between Europe and the United States is small for Ollies, the explanation falls to the Yollies. Not only does Europe have fewer Yollies, but those that Europe has are less R&D-intensive.[16]

Europe's Yollies are in less innovative sectors so they invest less in R&D

Why do Europe's Yollies have lower R&D intensity than those in the United States? Europe specializes in less innovative sectors. Comparing Yollies within the same sectors shows that Europe's Yollies are just as R&D-intensive as their U.S. competitors, as expected given the global markets for many of their inputs and outputs.

Figure 5.9: Innovation-based growth sectors

(percentage of total sales, 2007, and annual percent growth, 2004-07)
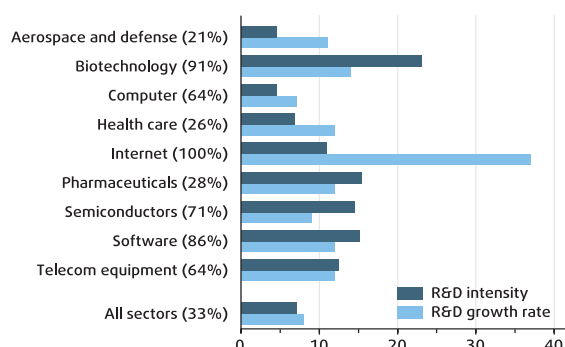

Note: R&D intensity is expressed as percentage of total sales. R&D growth is average annual growth over 2004–07. The percentages of Yollies among all firms in a sector are in parentheses.
Source: Bruegel and World Bank staff calculations, based on European Commission's IPTS R&D Scoreboard.

Figure 5.10: Only the United States focuses its R&D efforts in innovation-based growth sectors

(average relative technological advantage in innovation-based growth sectors, ratio, 2007)
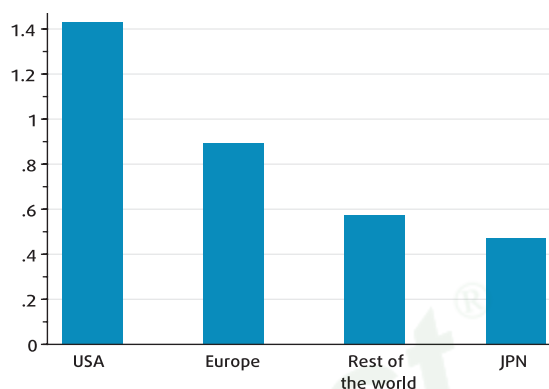
Source: Bruegel and World Bank staff calculations, based on European Commission's IPTS R&D Scoreboard.

Disaggregating the R&D Scoreboard by sector—listing all that have above-average R&D intensity, above-average R&D growth, or an above-average share of young companies among its leading innovators—can show whether or not Europe specializes in innovation-intensive sectors (figure 5.9).[17] The innovation-based growth sector includes aerospace, biotech, computer hardware and services, health care equipment and services, Internet, pharmaceuticals, semiconductors, software, and telecom equipment—all in the ICT and the health nexus (innovation-based growth sectors).
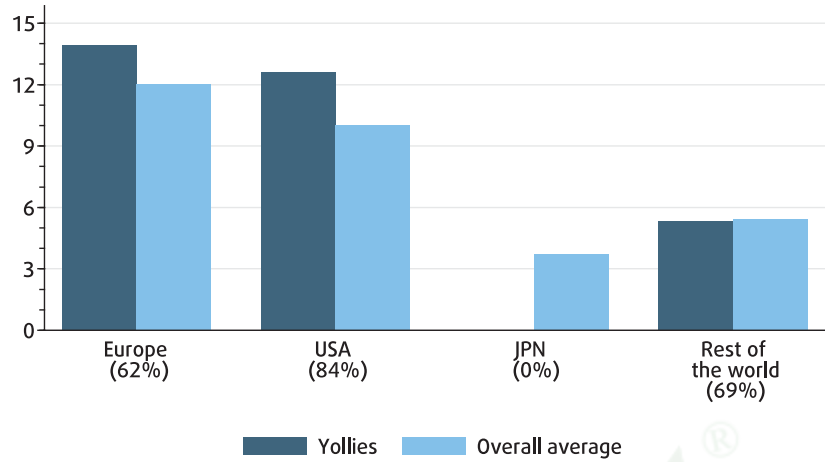
With the innovation-based growth (IBG) sectors identified, where are Europe's R&D efforts concentrated? Europe spends a larger share of its R&D investments in sectors characterized as medium-R&D-intensive, as found by Moncada-Paternò-Castello and others (2010; table 5.2). These include automobiles, chemicals, electrics, industrial machinery, and telecom services. None of these sectors is young or has a high R&D intensity; all are older with medium R&D intensity. Further, automobiles, chemicals, and electrics have below-average R&D growth.

When looking at individual IBG sectors, it can be seen that Europe has a technological advantage (as indicated by an RTA>1) in aerospace, pharmaceuticals, and telecom equipment. Of these three, only telecom equipment is a "young" sector. The United States, by contrast, specializes in all IBG sectors (figure 5.10).

The final step in this decomposition analysis is comparing the relative importance and R&D intensity of Yollies in the IBG sectors across regions. Europe has significantly less of its Yollies in sectors with the highest opportunities for innovation-based growth (figure 5.11, top panel). But the ones it has in these

Figure 5.11: Europe has fewer Yollies in innovation-based growth sectors, but they are as R&D-intensive as in the United States

(R&D intensity in innovation-based growth sectors, percent, 2007)

Note: The shares of Yollies in innovation-based growth sectors are in parentheses.

(relative weight of innovation-based growth sectors in the overall population of Yollies, 2007)
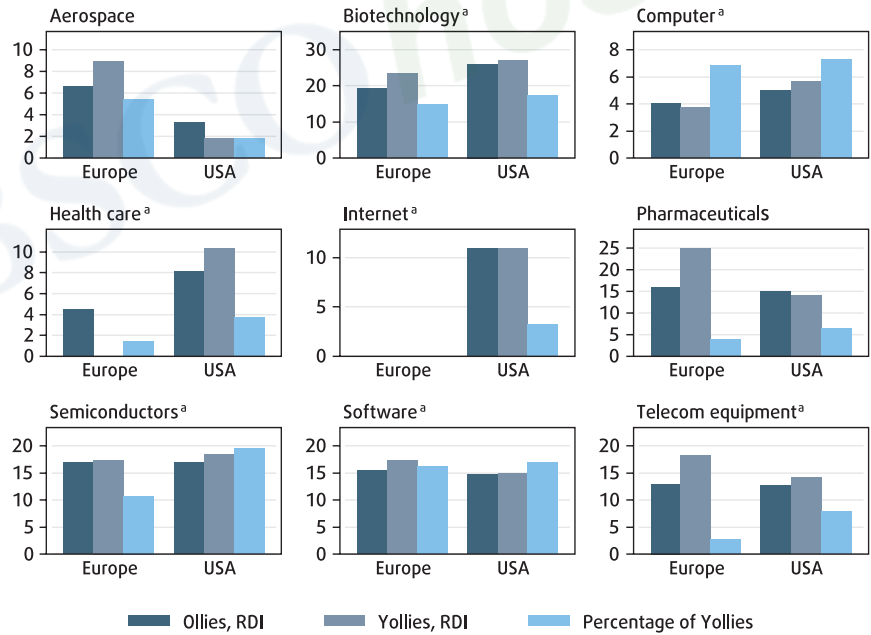
a. Cells with fewer than five observations.

Note: In the top panel, the shares of Yollies in innovation-based growth sectors are in parentheses. In the bottom panel, disaggregating the data into sectors, geographic areas, and age groups leaves few observations for analysis, calling for caution when interpreting results. Shaded cells are the young sectors. RDI refers to R&D intensity, which is, as defined above, R&D as percentage of total sales.

Source: Bruegel and World Bank staff calculations, based on European Commission's IPTS R&D Scoreboard.

sectors are as R&D intensive as their United States counterparts, if not more. In other words, European Yollies are less R&D-intensive than their United States counterparts because they operate in less R&D-intensive sectors.

Across most IBG sectors, Europe's Yollies are just as R&D-intensive as their U.S. counterparts, with a notable advantage in aerospace (figure 5.11, bottom panel). But Europe has a much smaller share of Yollies in the most conspicuous representatives of the knowledge-based economy, such as the Internet (where not one European company makes the list of leading innovators), telecom equipment, biotechnology, and health care.[18] Europe's comparable innovation deficit is due to a structural composition effect, not an intrinsically lower propensity to innovate among its firms (Veugelers and Cincera 2010b).

Japan demonstrates an alternative strategy to achieve productivity growth in traditional industries and to maintain global leadership. Germany might be following a similar route. But for Europe as a whole, greater success in innovation-intensive sectors such as ICT, biotech, and health care will be needed to catch up with the technological frontier represented by the United States.

European innovation systems need updating

What makes the United States better at generating new technological, organizational, or scientific ideas and applying them successfully in business? Many factors influence the innovation process. We call the interaction of these factors a country's National Innovation System. The fundamentals include the actors—managers and firms—and the main inputs: capital, skills, and ideas. A review of these fundamentals shows that Europe has several economies that do as well as the United States at creating the basis for innovation—if not better.

National innovation systems

Firms decide whether to innovate using existing technologies. In deciding, a firm will typically start by examining its competitive position. Firms facing limited competitive pressure are less likely to innovate, since innovation needs both effort and money (Aghion and Howitt 1998 and 2006).[19] The firm will want to know whether it faces a reasonably stable or highly uncertain outlook in its major markets, since innovation is a long-term business. The firm will consider its access to markets with the necessary income level and density of potential customers and suppliers to allow economies of scale inherent in many innovative technologies to be used to their potential. The firm may also respond to opportunities presented by public sector contracts. And last but not least, company managers decide whether to innovate. Quality of management differs, influencing these decisions and whether innovations succeed (Bloom and Van Reenen 2010).

A potential innovator will also examine the availability of new ideas that may present a business opportunity, though it is often a scientific discovery or intuition that generates a business idea. An innovator has to assess whether it has the necessary skilled workers to realize this opportunity. The innovator may also be spurred by upward shifts in an industry's quality standards or by the

Box 5.5: Where does entrepreneurship flourish?

A hundred years ago, the Austrian economist Joseph Schumpeter published his first major work, *The Theory of Economic Development,* laying the foundation for a large literature examining the role of the entrepreneur in economic development. For most economists, entrepreneurship is an activity responsive to material incentives such as competition, income taxes, or bankruptcy laws, and their influence on risk (Aghion and Howitt 2006). Some economists offer cultural theories of entrepreneurship, which emphasize how value systems encourage people to invest their talents in economic activities (rather than achieving cultural excellence, for instance; for a useful summary, see Shiller 2005).

To explain why some regions develop economic clusters and others do not, Glaeser, Kerr, and Ponzetto (2010) examine the supply of entrepreneurship versus the relative role of economic incentives stimulating demand for entrepreneurial activity, using an established empirical correlation between average company size and employment growth across locations in the United States. Their findings indicate that the supply of entrepreneurship matters. Some regions have a higher density of enterprises to start, reducing costs for others, and allowing clusters to grow (see also Delgado, Porter, and Stern 2010). But some regions are simply lucky to have more entrepreneurial people who, at the right juncture, were able to exploit new economic opportunities. This insight seems confirmed by evidence that attitudes toward values associated with entrepreneurship—such as risk-taking, thrift, and preference for work over leisure—vary across not only countries but also regions within a country (Shiller 2005).

It is likely that a combination of cultural, structural, and economic factors foments entrepreneurial clusters such as Silicon Valley or route 128. In the United States, such clusters have grown to international significance because labor is more mobile, venture capital more developed, and the home market large enough to nurture domestic companies to a global scale. Whether Europeans as a whole are less entrepreneurial than Americans is not clear. The challenge for Europe is to create a network of smaller innovation clusters that achieves the global reach of Silicon Valley. If Europe integrates its services markets, the livability of its historic cities and the quality of its transport network may enable it to compete with California (Crescenzi, Rodríguez-Pose, and Storper 2007).

example of other innovators operating in similar markets. These are factors that influence the supply of ideas that innovators can use.

Intermediating between supply and demand are a host of other factors, some specific to innovation, some affecting any investment. Key among these are: the availability of credit, venture capital and "angel" investors (for innovators specifically), and direct public support; intellectual property rights (IPR); regulatory barriers that may discourage innovation (for example, the costs of licensing new technologies, starting up or closing a business, and changed complementary inputs such as hiring and firing labor); and other factors such as the structure and efficiency of the tax or legal system, which influence the probability that an innovator will retain profits. Another factor influencing both supply and demand—and recently receiving considerable attention—is the existence of an "entrepreneurial culture." There is strong evidence suggesting that attitudes to entrepreneurship vary across countries and regions (box 5.5). Moreover, the presence of other entrepreneurs may stimulate innovators to start a new venture. This explains the interest of policymakers in creating innovation clusters (Lerner 2009; Delgado, Porter, and Stern 2010).

Below are three additional observations on the National Innovation System framework (figure 5.12):

- Discussions of National Innovation Systems often overemphasize supply-side factors and inputs into the innovation process, neglecting the fact that the best test for any innovation is its success with customers. Understanding and reinforcing incentives for firms to innovate and for entrepreneurs to enter new markets is key to a successful innovation system. Without "market pull," resources can be wasted. The painful transformation of public R&D institutes