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**Europe 2020 Poland**

**Fueling Growth and Competitiveness in Poland  
Through Employment, Skills, and Innovation**

**Overview**

**World Bank Human Development and Private and Financial Sector Development Departments**

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## Currency Equivalents

(Exchange Rate Effective March, 2011)

Currency Unit = Zloty (PLN)

US \$ 1.00 = 2.87 PLN

## Abbreviations

EU	European Union
FDI	foreign direct investment
GDP	gross domestic product
HEI	higher education institution
KRASP	Conference of Rectors of Academic Schools <i>Konferencja Rektorów Akademickich Szkół Polskich</i>
OECD	Organisation for Economic Co-operation and Development
PISA	Programme for International Student Assessment
R&D	research and development
RDIs	research and development institutes
SME	small and medium enterprise
TFP	total factor productivity

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## Executive Summary

Growth and competitiveness through employment, skills, and innovation and technology absorption are key issues to enable the European Union (EU) to meet the targets set out in the Europe 2020 Strategy for Smart, Sustainable, and Inclusive Growth. Poland has undertaken important reforms in the first two areas, but it needs to go further to sustain its impressive pre-crisis growth rates and meet the new targets on which Poland still lags behind (see table ES1).

Table 1. ES Europe 2020 Strategy Targets

Targets under the Europe 2020 Strategy	Poland
75% of the population aged 20-64 should be employed	64.9%
3% of the EU's GDP should be invested in R&D	0.59%
The share of early school leavers should be under 10%	5.3%
At least 40% of 30-34 years old should have completed a tertiary education	32.8%
Reducing the number of people at risk of poverty or exclusion by 20 million in the EU	10.4 million <sup>1</sup>

*Sources:* European Commission 2010a; World Bank staff estimates.

*Note:* All data for 2009. In the EU27, 113.7 million people were at risk of poverty or social exclusion as of 2009.

The remaining target of the Europe 2020 Strategy is the “20/20/20” climate/energy target (including an increase to a 30 percent emissions reduction if the conditions are right).

This Report, “Europe 2020 Poland,” aims to analyze how Poland can reach the Europe 2020 targets and to provide policy recommendations in the three specific areas. It also aims to complement and help operationalize the “Poland 2030. Development Challenges” report, which was developed by the Chancellery of the Prime Minister and focuses on similar areas.

The report “Europe 2020 Poland” concludes that raising employment, improving skills, and enhancing technology absorption and innovation could help offset a projected decline in potential growth (largely due to a slower growth in private investment), and put Poland back on track for even higher growth rates and so as to help Poland meet the Europe 2020 targets.

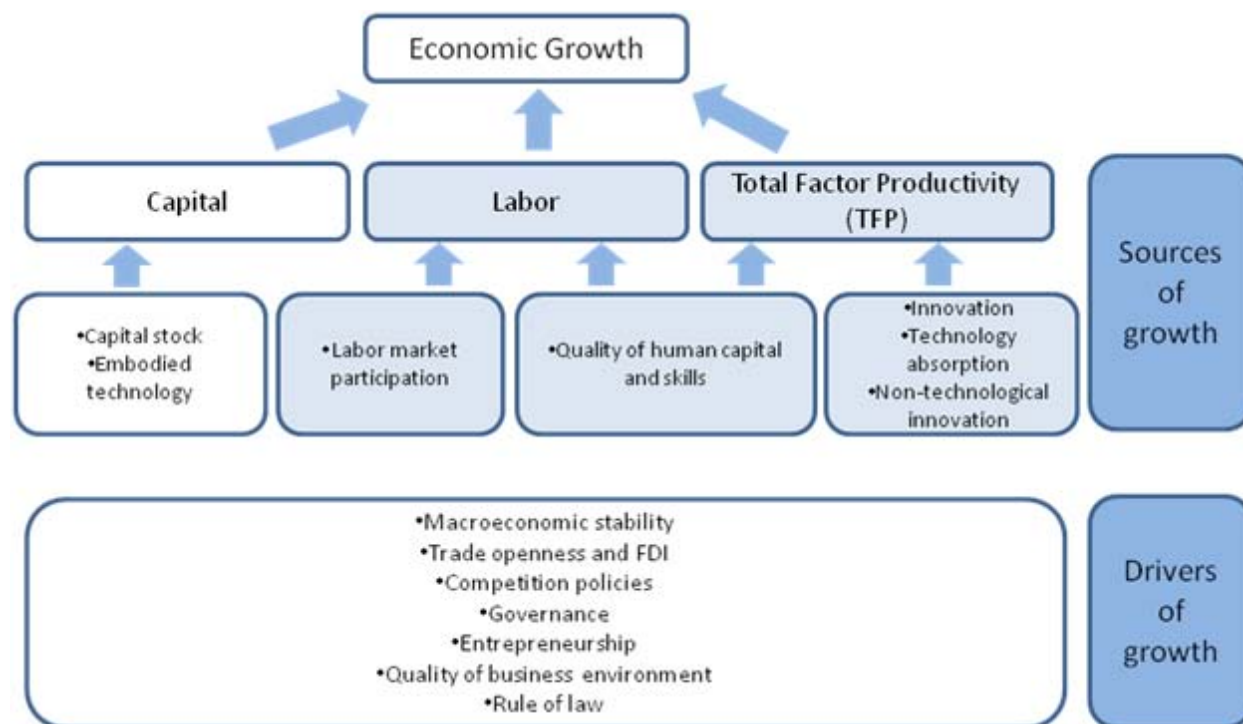
There are essentially three major sources of growth in any economy: capital, labor, and changes in total factor productivity (TFP) (figure ES1). This study will focus on labor and TFP only and will not discuss the contribution of capital, since it is analyzed in other World Bank publications. Nor will it discuss all drivers of growth, a selection of which is listed in figure ES1. Rather, it will focus on the public policies most relevant to employment, skills, and innovation and technology absorption.

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<sup>1</sup> Target for Poland is 1.5 million.



**Figure 1 ES Conceptual Framework of Drivers of Growth**



Source: World Bank staff.

This overview provides a summary of the World Bank “Europe 2020 Poland” report. The technical report provides a more in-depth analysis, including detailed background chapters on the macroeconomic setting; labor’s contribution to growth; the demand for skills; supply of skills and education; and innovation and technology absorption. The rest of this Executive Summary outlines the issues and recommendations in each area.

## Macroeconomic Setting

Poland has done remarkably well economically since the beginning of the transition to democracy in 1989. It also performed relatively well during the 2007–09 global financial crisis and was the only economy in the European Union to avoid recession in 2009. Prospects are improving, and economic growth is likely to accelerate from 3.8 percent in 2010 to above 4 percent in 2011.

However, there is uncertainty about whether Poland will be able to return to the high growth rates exceeding 5 percent per year achieved before the crisis or to develop at a similar speed as a number of other high-achieving upper middle-income countries such as Brazil, Chile, Korea, or Malaysia. Official estimates point to a decline in the potential growth rate by up to 1 percentage point a year by 2012. There are reasons to believe that potential growth going forward might be lower than before the crisis, mostly owing to smaller external financial inflows, a higher cost of debt, and a declining labor contribution from a smaller working age population. In particular, private investment is likely to grow more slowly as inflows of external funding diminish, costs rise, and corporate profitability declines. Moreover, private investment may suffer from weaker investment opportunities, higher risk aversion among companies, more constrained supply of credit, and crowding out by the growing public debt. Labor’s contribution to growth is likely to

stagnate without further reforms, owing to a shrinking labor force population and an increase in unemployment, albeit more limited in Poland than in most EU countries. Finally, the TFP growth rate may not recover to the high pre-crisis growth rates as private productivity-enhancing investment decreases, companies undertake only less risky and less innovative investment projects, and innovative, young, and more skill-intensive companies struggle with a more constrained access to financing.

In the environment of higher cost of capital and lower private investment, focusing on labor and TFP as key drivers of growth will be critical. Higher contributions of labor and TFP to growth can be achieved by raising employment, improving human skills, and enhancing technology absorption and innovation. Importantly, improved human capital and stronger skills are a necessary condition for raising employment and enhancing technology: the two have to go hand-in-hand to ensure that new labor market entrants have the necessary skills to meet market demand and companies are able to identify, absorb, and productively use technologies developed abroad. Partial, uncoordinated reforms can fail to raise employment and improve technology absorption.

Through a coordinated set of policies Poland can meet its quest for dynamic growth also in the post-crisis period. Our assessment is that the proposed coordinated labor market, human capital, and innovation-oriented reforms could raise gross domestic product (GDP) growth by up to one percentage point; thereby offsetting several factors that limits the country's quest for growth in the years to come.

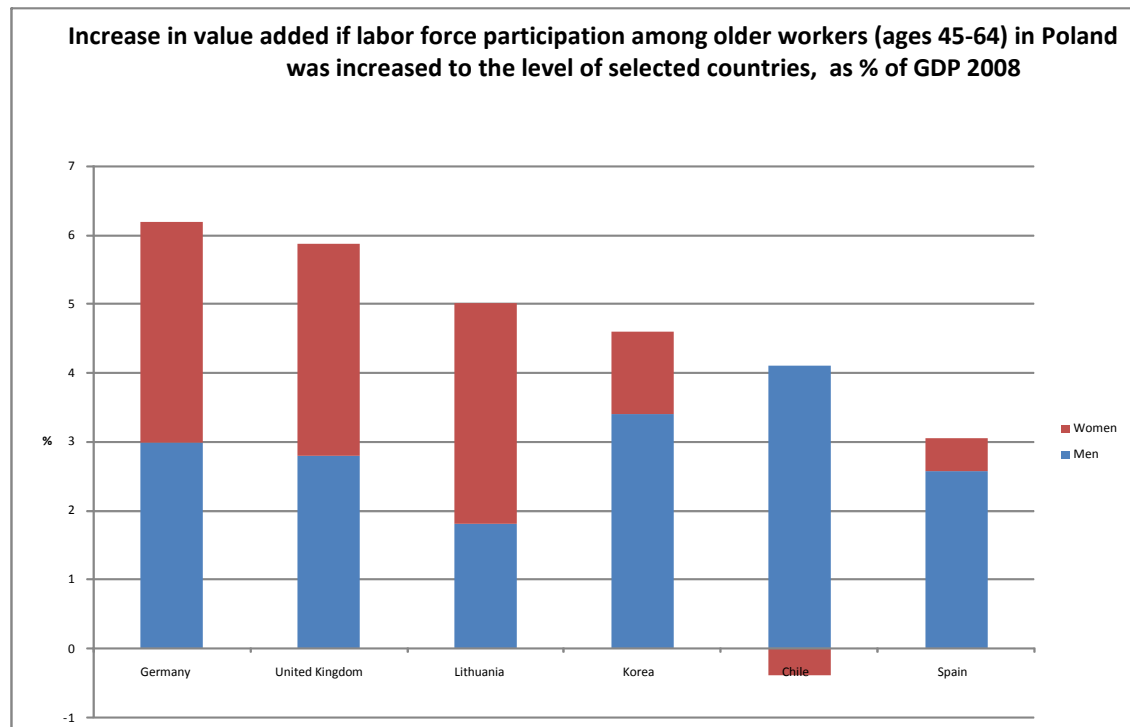
## **Raising Employment**

Although labor market conditions have substantially improved in Poland in recent years, the employment rate is still less than the EU average and well below the Europe 2020 target of 75 percent for the population aged 20–64. Currently, only 65 percent of the working-age population in Poland is employed. A lower employment rate translates into lower output and incomes. Raising the employment/population ratio is thus one of the key challenges that Poland faces on the road to convergence to the income level of the EU-15.

The main potential for increasing labor force participation is among older workers and women. Reducing labor market inactivity of older workers would yield substantial economic benefits: if older workers in Poland were as active as they are in Germany, then the Polish GDP would be up to 6 percent higher; if they were as active as in Spain, the level of GDP would be 3 percent higher (figure ES2). Achieving a higher employment rate is also critical given population aging and the growing life expectancy. The demographic dependency ratio—the ratio of the population 65 and older to the number of people between 16 and 64—in Poland will double in the next 25 years from about 30 percent to 60 percent.

The government is aware of the high costs of inactivity among older workers and of the fact that it is largely due to the design of the social security system. There is still room to promote longer working lives by adjusting the functioning of disability and early retirement pensions. Looking to the future, Poland can also first equalize the retirement age for both men and women and consequently adjust these with increases in the life expectancy.

**Figure 2 ES The Polish GDP Would Be 3 to 6 Percent Higher if Older Workers Were as Economically Active as in Comparator Countries**



*Source:* World Bank staff calculations based on Eurostat, Labor Force Survey 2008; Structure of Salaries and Wages by Occupation in October 2008, Central Statistical Office.

## Skills Demand

There are two labor market-related obstacles to the competitiveness and growth of Polish firms: workforce skills and labor regulations. Surveys indicate that Polish employers see inadequate workforce skills as one of the main constraints to the activity of their firms, with innovative firms tending to be more affected by skill shortages than traditional firms. However, compared with skills, labor regulations are less of an obstacle.

Higher educational attainment leads to better employment outcomes—in Poland as in other countries. Better education is associated with higher labor force participation and lower risk of unemployment. As a result, well-educated workers are much more likely to be unemployed than less educated ones. The employment rate is the highest among workers with tertiary education, which reflects both high labor force participation and low unemployment.

Job reallocation and the associated change in the occupational structure of employment have given rise to a skills mismatch in Poland. The skill content of the newly-created jobs differs from that of the jobs that were destroyed. The job reallocation process in 2009, as in earlier years, produced a surplus of skilled blue collar workers (craftsmen and machine operators) and a shortage of highly-skilled white collar workers, especially professionals. The manual workers' share in the wage bill fell from 43 percent in 1996 to only 30 percent in 2008. During the same period, the highly skilled white collar workers' share in the wage bill (professionals and managers) increased by as much as 16 percentage points and reached 44 percent. The wage bill

share of workers with medium-level skills (technicians, clerks) fell, although the fall was modest. As can be seen, the economic transformation in Poland, as elsewhere, is strongly biased toward high professional skills. Employers highlight the need for enhanced generic (“soft”) skills, job attitudes, and behavioral skills, such as responsibility, reliability, motivation, commitment, communication skills, and the ability to work in a team. Over 20 percent of Polish employers complain that job applicants do not have the expected advanced technical or vocational skills, and about 15 percent claim that young workers do not demonstrate the desired job attitudes: responsibility, reliability, motivation, and commitment. Other important skills that young workers lack include the ability to work independently, problem-solving skills, and planning and organizational skills. Addressing the skills mismatch requires actions in three areas: the educational system, including lifelong learning; labor market information; and job matching services, with the reform of the education system being by far the most important way.

### **Education and Skills Supply**

Poland compares favorably with other EU countries against the Europe 2020 benchmarks for the indicators that relate directly to education. The key challenges are to continue to increase the supply of tertiary students, while ensuring that they are able to acquire the key skills that employers want, and to give greater access to adult learning opportunities for those already in the labor market so that those in employment can respond to changing needs of their employers and those who are unemployed can shift to different jobs which require different skills.

Poland already has only a small proportion of its young people leaving school early (around 5 percent) and this number has stayed more or less constant for the past five years. The 1999 education reforms have led to impressive learning gains for students in secondary education, and Poland ranked highest of the covered Central and Eastern Europe countries in the last three PISA reading tests. However, these reforms have highlighted the need for changes at upper secondary education, where performance seems to have gotten worse.

Poland also appears to be on track to meet the Europe 2020 target related to tertiary education attainment, but the next stage of reforms is to pay attention to the type of education offered. Increasing returns to tertiary education signals that Polish firms still value - and de facto demand more - of graduates, despite some perceptions that there are too many graduates or that the Bachelor's degree is not valued. This Report finds that the supply of university graduates can very well continue to rise. The Polish labor market rewards Bachelor's degrees; those with such a degree earn about one-third more than those with only an upper secondary education, and this return is very close to that for a Master's degree (40 percent). These figures undermine the argument from the Polish academic community that the tertiary sector has expanded to its limits over the last 20 years. Key public stakeholders in Poland need to rethink the value of the Bachelor's degree and the steps needed to make it a success. Moreover, the composition of students at the tertiary level seems to be different from the emerging new structure in Europe and beyond, in which the majority of students are studying for a shorter period than in Poland.

More important than the number of higher education institutions that reportedly have implemented the three-cycle (Bachelor's - Master's - Doctorate) structure is the extent to which the system is accepted by the labor market and by the wider public. Interestingly, Finland, Norway, and Sweden, which have high proportions of their graduates in three-year Bachelor's programs, have elaborate lifelong learning systems. This might indicate that the Bachelor's degree has a distinct function in preparing citizens for a “lifelong learning career” in countries

with firmly established lifelong learning systems. This report recommends keeping Bachelor's degree enrollment levels stable and possibly even increasing them, as an appropriate foundation for continued learning in adulthood.

As Polish higher education continues to expand, it will need to offer the new skills that employers seek, which requires stronger links to employers, and policy attention will be needed to supporting such strong linkages. There appears to be strong interest (also compared to EU-27 peers) in the service-related professions, in education, and in social science, in particular. Student preference for science and technological subjects is comparable to their EU-27 peers but the overall low enrollment rates in these subjects would need to be monitored closely given the overall direction of the countries' growth strategy.

Another policy challenge is to ensure that there are institutions which offer good quality vocational courses at the tertiary level, in part to ensure that adults in the labor force have access to further learning opportunities. Poland thus needs to make a concerted effort to open up further education and training to those most in need, that is, those with low levels of skills and most likely to suffer from job destruction in the nearer future. Short-term benefits of a lifelong learning system could include improved access to the labor market for everyone, not only for older workers, and a more elaborate system of second chances for those who were not able to take full advantage of the formal education system. Fees charged by public institutions for part-time students tend to disadvantage students from lower socioeconomic segments of society.

### **Enhancing Technology Absorption and Innovation**

Growth in Poland in recent decades has been based on capital accumulation. In the longer term, however, growth is dependent on technological change in addition to factor accumulation. Endogenous growth theory shows how innovation, knowledge spillovers, human capital, and R&D are key factors driving self-sustained, long-term economic growth. Growth in countries below the notional technological frontier is mainly driven by diffusion and absorption of technologies that are new to the firm or new to the country but not new to the world.

A country's absorptive capacity is a key driver of economic growth and industrial productivity. Trade flows, foreign direct investment, and labor mobility and training are important channels for firms to access technology. But technology absorption is not automatic. It also requires a favorable investment climate, an educated workforce, and some R&D on the part of absorbing firms. High quality of human capital and strong skills are particularly critical for technology absorption: they need to go hand-in-hand to ensure sufficient returns on technological investments.

Poland has scope to increase the efficiency of public expenditures on R&D before increasing its, albeit low, levels of spending. Poland ranks poorly among EU countries with regard to the efficiency of public expenditures, measured as a ratio of innovation and technology absorption indicators (for example, patents) to R&D. Currently, Poland classifies as a low spender with roughly 0.6 percent of GDP spent on R&D, significantly below the European Commission's 3 percent target, with the majority of it dedicated to basic science. Key observations on innovation and technology absorption in Poland include the following:

- Polish firms compare reasonably well on technology absorption to firms in neighboring Central and Eastern European countries but report little interest in innovation.

- The share of co-patenting compared to indigenous patenting is rising in Poland, but not fast enough relative to European comparators, let alone to global leaders. That patent counts reflect innovation is obvious. That they may reflect certain kinds of knowledge absorption is less evident. Furthermore, co-patents play a role in promoting higher-quality knowledge spillovers due to the more competitive, thoroughly reviewed, and cited nature of international co-patents. Poland may be better off promoting international collaboration through provision of specific financial incentives for co-patents.
- Restructuring of research and development institutes (RDIs) remains unfinished. RDIs have diversified their competitive R&D income portfolio, through increased revenues from private firms, to a greater extent than other research sector entities. However, they are still heavily reliant on budgetary funds. The most important policy lesson from the RDI sector reform process in countries of Central and Eastern Europe is the insufficient reorientation of the RDIs to collaboration with the enterprise sector. This remains a pressing priority for Poland.

## **Main Findings and Policy Options**

Raising employment, improving skills, and enhancing technology absorption and innovation could help offset the projected decline in potential growth and put Poland back on track for even higher growth rates. To achieve these goals, the report offers the following findings and policy options.

### **Raising employment:**

- Increase economic activity among older workers (and older female workers in particular) as key to achieving the Europe 2020 employment target.
- Make further revisions regarding the access to social security benefits so that they do not present a disincentive for labor market participation;
- Increase ability for workers to enter into part-time employment which would increase economic activity especially among older workers;
- Enhance skill levels of the working age population as these are crucial for labor force participation.
- Adjust the retirement age of women to that of men (age 65).

### **Closing the skills gap and reforming education:**

- Focus on lifelong learning, involving all subsectors, and on equity of access and access to early childhood education, in any overall reform of the education system.
- Develop a learning outcomes approach for all levels of learning, with more emphasis placed on generic skills as a basis for labor mobility.
- Broaden the mission of tertiary education institutions and make them more efficient through performance-based financing.
- Make the Bachelor's degree an important part of the future lifelong learning system.
- Place more emphasis on data collection and monitoring and evaluation of the system, including tracer studies for graduates.
- Strengthen the links between the education system and the economy through, for example, sector councils involving employers that establish learning outcomes for certain professions, employers' involvement in university governance, and so forth.

**Refocusing technology absorption and innovation:**

- Improve the investment climate, including by enhancing the quality of the business environment, to spur firm investments in R&D.
- Channel public funding to support co-inventions in addition to domestic inventions, to promote international collaboration and knowledge spillovers.
- Establish a system of employee-led privatization, that is, transfer of ownership to RDI managers and researchers (excluding the real estate), to complete the restructuring of commercialized RDIs and those volunteering for privatization.
- Reform the RDI financing system to strengthen applied research and links with the needs of Polish small and medium enterprises and industry.
- Continue to improve the quality of human capital and availability of skills, which have to go hand-in-hand with innovation and technology absorption to bring the largest benefits.

# I. Introduction

1. **Poland has done remarkably well economically since the beginning of the transition to democracy in 1989.** It also performed relatively well during the 2007–09 global financial crisis and was the only economy in the European Union (EU) to avoid a recession in 2009. Prospects are improving, and economic growth is likely to accelerate from 3.8 percent in 2010 to above 4 percent in 2011. However, there is uncertainty about whether Poland will be able to return to high growth rates exceeding 5 percent a year experienced before the crisis and whether Poland will be able to develop at a similar speed as a number of other high achieving upper middle-income countries such as Korea, Chile, Malaysia or Brazil. There are reasons to believe that potential growth going forward might be lower, mostly due to smaller external financial inflows, the higher cost of debt, and a declining labor contribution. To return to pre-crisis potential growth rates, Poland will need to raise employment, improve human skills, and enhance technology absorption and innovation.

2. **This report takes the Europe 2020 Strategy (box 1), currently under discussion by the EU Member States, as a starting point to discuss how these targets can be achieved in Poland.** The latest figures for Poland are in table 1.

## Box 1. Europe 2020 Strategy for Smart, Sustainable, and Inclusive Growth

The Europe 2020 Strategy is the successor of the EU's Lisbon Agenda (2000–2010), which focused on growth, jobs, and social cohesion. The European Commission Communiqué on Europe 2020 was published in March 2010. At the time of writing, country-specific targets were under discussion.

Europe 2020 puts forward three mutually reinforcing priorities:

- Smart growth: developing an economy based on knowledge and innovation
- Sustainable growth: promoting a more resource-efficient, greener, and competitive economy
- Inclusive growth: fostering a high-employment economy resulting in social and territorial cohesion.

The Commission proposed the following EU targets:

- 75 percent of the population aged 20–64 should be employed
- 3 percent of the EU's gross domestic product should be invested in research and development
- The “20/20/20” climate/energy targets should be met (including an increase to 30 percent of emissions reduction if the conditions are right)
- The share of early school leavers should be under 10 percent and at least 40 percent of the younger generation should have a tertiary degree
- 20 million fewer people should be at risk of poverty.

As EU President José Manuel Barroso stated in the Preface to the Europe 2020 Strategy, “To achieve a sustainable future, we must already look beyond the short term. Europe needs to get back on track. Then it must stay on track. That is the purpose of Europe 2020. It's about more jobs and better lives. It shows how Europe has the capability to deliver smart, sustainable and inclusive growth, to find the path to create new jobs and to offer a sense of direction to our societies.”

*Source:* European Commission 2010a, World Bank staff.



Table 1 Europe 2020 Strategy Targets

Targets under the Europe 2020 Strategy	Poland
75% of the population aged 20-64 should be employed	64.9%
3% of the EU's GDP should be invested in R&D	0.59%
The share of early school leavers should be under 10%	5.3%
At least 40% of 30-34 years old should have completed a tertiary education	32.8%
Reducing the number of people at risk of poverty or exclusion by 20 million in the EU	10.4 million <sup>2</sup>

Sources: European Commission 2010a; World Bank staff estimates.

Note: All data for 2009. In the EU27, 113.7 million people were at risk of poverty or social exclusion as of 2009.

The remaining target of the Europe 2020 Strategy is the “20/20/20” climate/energy target (including an increase to a 30 percent emissions reduction if the conditions are right).

## II. The Macroeconomic Setting

3. **Poland is one of the most successful transition economies.** From the beginning of the transition in 1989 until 2008, Poland’s gross domestic product (GDP) increased more than that of any other transition economy in Central and Eastern Europe. Poland’s remarkable performance during the global crisis, when it was the only country in the European Union to record positive GDP growth, further increased the country’s lead. In 2011, Poland’s GDP per capita is projected to reach around 56 percent of the EU-15 level of income, up from only 33 percent in 1991. This will also be one of the highest ratios of income relative to Western Europe since around the year 1500, helping offset 500 years of relative economic decline (Piatkowski 2009).

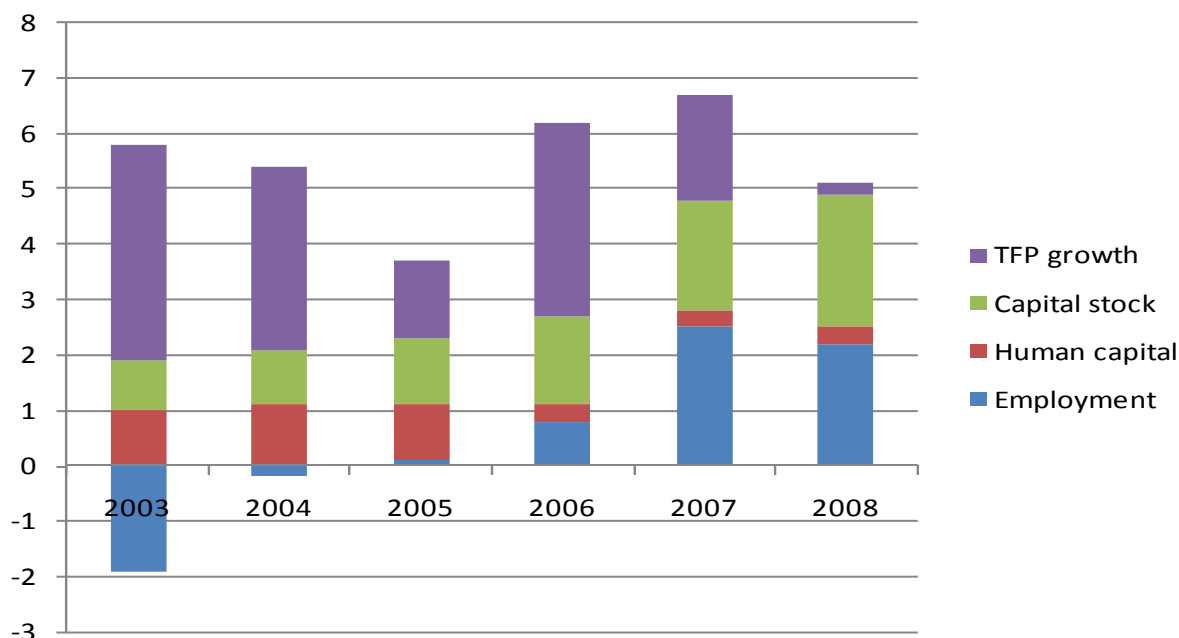
4. **In the past decade, growth has been mostly driven by investment and improvement in total factor productivity (TFP),** with investment playing the predominant role just before the onset of the global financial crisis in 2007, with the additional help of rising employment. TFP growth was high during 2003–08 but decelerated substantially just before the onset of the crisis (figure 1), suggesting—together with rising inflation and worsening resource constraints—that the growth rate might have risen above its potential. Such fast growth was thus ultimately unsustainable and the crisis seems to have only amplified what was already a slowing economy (Epstein and Macchiarelli 2010; Richter and Krzak 2011).

5. **Poland weathered the global financial crisis with flying colors.** It was the only EU country to expand during the global financial crisis, growing by 1.8 percent in 2009 compared to a decline of 4.3 percent in the EU-15 countries and of 3.6 percent in the EU-10 region.

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<sup>2</sup> Target for Poland is 1.5 million.

**Figure 1. Poland: Sources of GDP Growth, 2003–08**



Source: Richter and Krzak 2011.

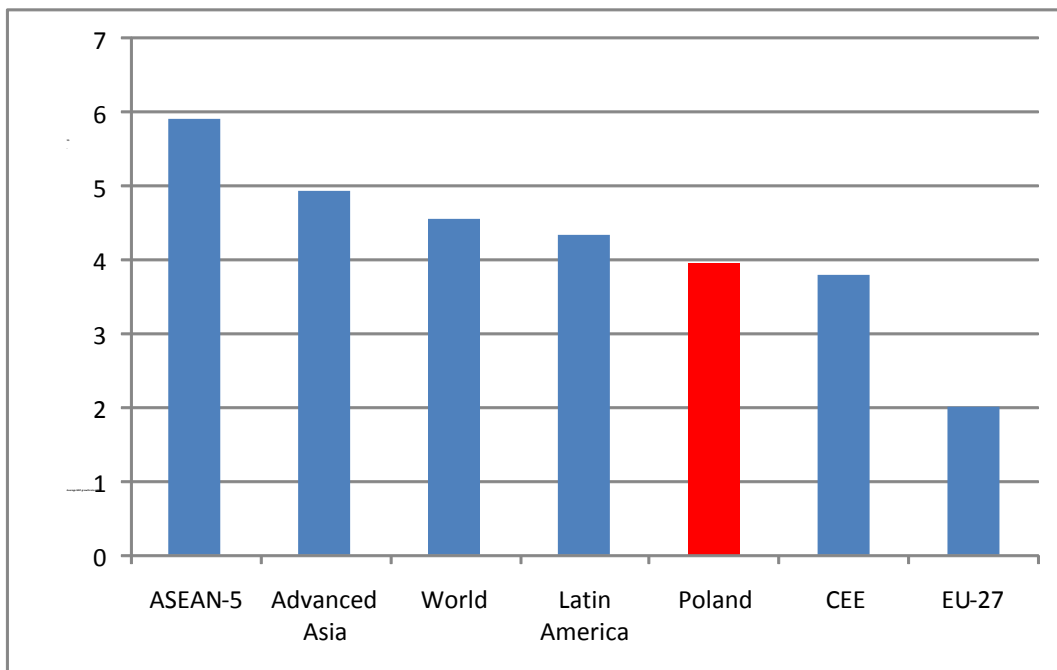
**6. However, there is a risk that the potential growth going forward may not return to pre-crisis rates.** This could happen for several reasons:

- Private investment is likely to grow more slowly as inflows of external funding diminish, costs rise, and corporate profitability declines. Private investment may also be affected by weaker investment opportunities, low capacity utilization, higher risk aversion among companies, and more constrained supply of credit. Foreign direct investment (FDI) inflows may also stagnate relative to the pre-crisis period as global equity flows decrease. Finally, private investment is likely to be crowded out by the need to service growing public debt, which is estimated to have increased from 49.9 percent of GDP in 2009 to close to 55 percent of GDP in 2010 and onwards. If interest rates rise to fund the public debt, this would discourage private borrowing.
- Labor's contribution to growth is likely to stagnate without further reforms. Increasing employment occurs with a substantial lag behind the economic cycle and part of the increase in unemployment, albeit more limited in Poland than in most EU countries, could persist, contributing to the underutilization of labor. A shrinking labor force population will also be a factor in reducing labor's contribution to growth.
- The TFP growth rate may not recover to the high pre-crisis growth rates. First, TFP growth is likely to decline as private productivity-enhancing investment decreases. In particular, given the macroeconomic uncertainty, companies are likely to undertake only less risky and less innovative investment projects. Second, research and development (R&D) investment may be undermined by lower corporate profitability, weak demand prospects, and continued low efficiency of public R&D spending (see technical report, chapter 5 on absorption and innovation in Poland). Third, productivity gains from reallocation of resources may diminish. Economic recessions associated with financial

crises tend to entrench the current industrial structure and distort allocation of factors across firms within an industry, mostly owing to increases in the cost of funds (Estevao and Severo 2010). In fact, there is evidence that the current crisis seems to have affected innovative, young, and more skill-intensive companies in the EU-10 more negatively than traditional enterprises, mostly due to more constrained access to financing (Correa and Iooty 2010). In addition, companies in low-productivity sectors, mostly domestic services, seem to have done better throughout the crisis than the manufacturing and export-oriented sectors, where productivity growth tends to be higher. Finally, the pace of technology improvement in the global economy is likely to moderate in the future (Jorgenson and Vu 2010), lowering TFP growth driven by technology absorption from abroad. The most recent projection of the National Bank of Poland (2010) suggests that TFP growth in Poland may decelerate from 2.0 percent on average during 2004–08 to 1.8 percent during 2009–11.

7. **Official estimates point to a decline in the potential growth rate by up to 1 percentage point a year by 2012.** This would suggest that following the global financial crisis Poland is likely to experience a permanent loss in output. Such a scenario is expected to unfold for all EU-10 countries, at least until 2012. In addition, growth projections suggest that until 2015 Poland is likely to grow at a slightly lower rate than other emerging markets on a similar level of development (figure 2).

**Figure 2. Projected Average GDP Growth Rates for Poland and selected regions, 2010-15.**



*Source:* IMF World Economic Outlook database October 2010.

*Note:* Advanced Asia: Korea, Hong Kong, Taiwan, Singapore. Other definitions as in the IMF's World Economic Outlook.

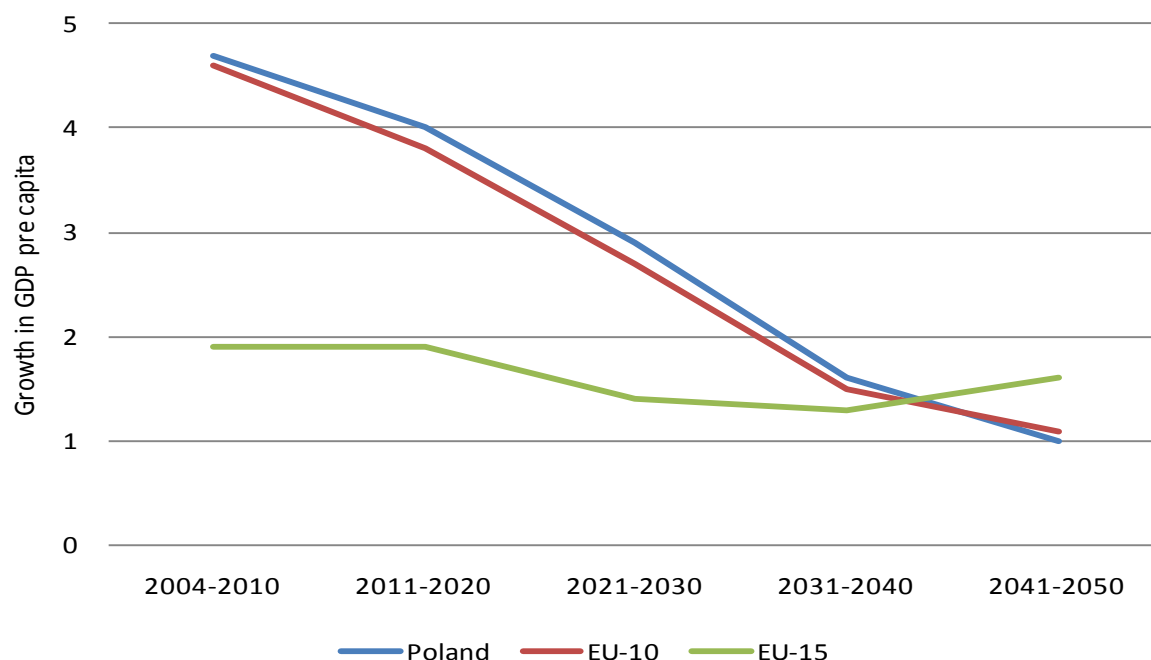
**A number of factors may, however, mitigate the projected decline in Poland's potential growth rate as a result of the crisis. They are:**

- **Public investment is likely to increase due to the growing absorption of EU funds, averaging 4 percent of GDP a year until 2013**, adding as much as 0.4 to 0.6 percent to GDP growth until 2015 (depending on the model used in growth impact estimations). In all models, faster GDP growth would result from additional public and private capital accumulation, increasing labor productivity, and higher employment. Given the poor state of infrastructure in Poland, particularly roads, EU funds used for financing infrastructure are expected to be especially productive.
- **Unlike in most EU countries, private investment in Poland may recover sooner than expected** given that the banking sector has been largely unaffected by the crisis, and lending policy is again becoming more accommodative. FDI inflows might not decline much either owing to Poland's remarkable performance during the crisis, which has enhanced its investment attractiveness relative to regional peers. In 2009, FDI inflows reached 8.4 billion euro, only 16 percent less than in 2008, while FDI inflows in the Czech Republic, Hungary, and Romania declined by more than 40 percent. In 2010, FDI inflows in Poland are estimated to have reached levels close to those before the crisis.
- **Poland may continue to increase productivity at a high rate.** As Poland is still relatively far from the global technological frontier, comparing the difference in productivity levels between Poland and the United States, the global technological leader, **it is easier to increase productivity**, mostly through technology absorption. This is likely if R&D, employee skills, and the investment climate are in place to allow technology-absorbing Polish firms to narrow the gap with the global technological frontier.

8. **However, in the longer term, potential growth is set to decline, owing mostly to an aging population.** The European Commission (2009) projects that due to population aging, potential growth in EU-27 countries is likely to decline from 2 percent per year from 2010 to 2019 to just over 1 percent from 2020 onward. Carone and others (2006) project that Poland's growth in GDP per capita will slow from 4.7 percent a year during 2004–10 to 4.0 percent during 2011–20 and then to below 3 percent after 2021 (figure 3). Moreover, these projections were made before the crisis and they are likely to overestimate post-crisis growth rates for Poland and for the EU-27.

9. **A new set of reforms will need to be implemented to minimize the risk of a decline in the potential growth rate and achieve targets under the Europe 2020 Strategy.** The reform agenda is comprehensive and includes strengthening fiscal sustainability, increasing labor force participation, improving education and skills, enhancing technology absorption and innovation, cutting red tape, and reducing regulatory costs for doing business. The crisis has reemphasized the importance of these reforms, as envisioned in the EU's new Europe 2020 Strategy for smart, sustainable, and inclusive growth. The Polish Government is aware of most of these challenges, as evinced in "Poland 2030. Development Challenges," but its recommendations have yet to be implemented.

**Figure 3. Projected Long-Term Growth Rates for Poland, EU-10, and EU-15, 2004–50**

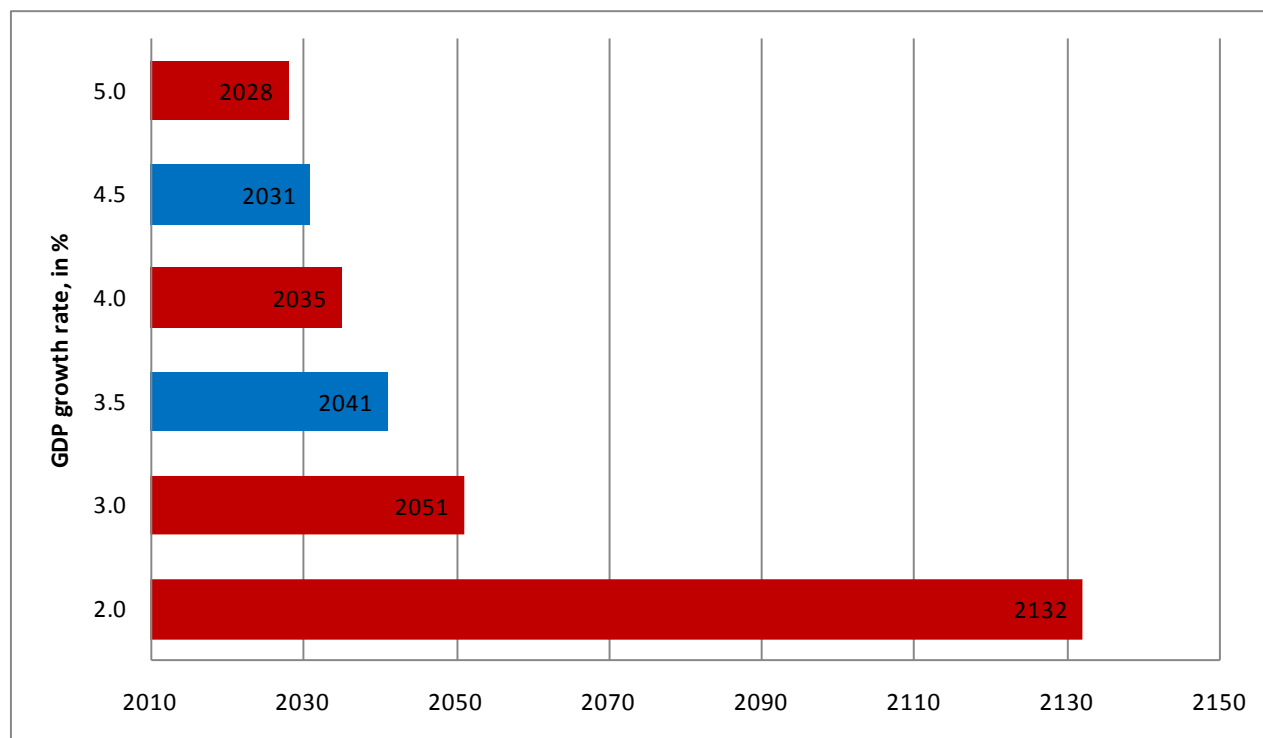


*Source:* Carone and others 2006.

10. **This report discusses how Poland could sustain fast growth in the years after the crisis.** Two broad economic policy strategies are presented: (a) increasing the contribution of labor by raising labor participation and reducing skills mismatches in the labor market; and (b) raising total factor productivity (efficiency) by enhancing human skills, increasing technology absorption, and fostering innovation. While there are many ways to achieve both goals, covered by a wide literature, this report will focus specifically on education and skills as a key factor affecting employment outcomes and on increasing technology absorption.

11. **Returning to pre-crisis growth rates would significantly shorten the time needed for convergence with the EU-15.** If Poland were able to increase the potential growth rate by 1 percentage point—back to the pre-crisis growth rates of 4.5 percent a year—a simple linear extrapolation suggests that it would reach the then-EU-15 level of income by 2031, 10 years earlier than at the currently projected growth rate of around 3.5 percent. In a pessimistic scenario, if growth slowed to 2 to 3 percent a year on average, full convergence would be delayed into the second half of the century (figure 4).

**Figure 4. When Could Poland Catch Up with the EU-15?**



*Source:* Author's calculations.

*Note:* EU-15 GDP growth rate projected at 1.5 percent a year based on European Commission (2009b). The projections are for illustrative purposes only since they do not take into account likely changes in population, real exchange rates, and productivity growth rates.

12. **While demographic trends will limit expansion of employment, particularly in the longer term, there is a large potential to increase employment through higher participation rates in the medium term.** The size of the population in Poland is already declining, decreasing from 38.6 million in 1995 to 38 million in 2010, owing to low birth rates and net migration outflows. The decline in population is expected to be gradual until 2020, with the population estimated at 37.5 million in 2020, but then to accelerate, with population projected to be only 32 million by 2050. As in other countries in the region, birth rates in Poland are low, with a fertility rate of only 1.3, and the population is aging quickly. Extrapolation of current trends indicates that the median age in Poland is set to increase from 38.2 in 2010 to 41.7 in 2020 and to 51.0 in 2050, one of the highest median ages in the region. There is scope for an increase in employment from immigration, from an increase in the employment rate, or from both. To date, immigration inflows have been minimal. Moreover, although employment has increased substantially in recent years, thanks to the economic expansion, a lower tax wedge, and a tightening of pre-retirement benefits, it nonetheless amounted to only 65 percent in 2009, significantly below the Europe 2020 target of 75 percent.

13. **Raising employment, especially of older workers, to the level of the best performers in the EU could substantially boost growth.** As documented in the technical report, chapter 2, raising the employment ratio of older workers in Poland to that of Germany, one of the best performers in the EU in terms of employment ratios for both older workers and total population, would increase the level of Poland's GDP by up to 6 percent. If this were achieved within the next eight years, higher employment would contribute an additional 0.8 percentage points to the

annual GDP growth, making up for the large part of the projected decrease in the potential growth rate in the medium term. However, the contribution of higher employment rates to growth could be lower if the working-age population declines, as projected.

14. **Reducing skill mismatches will be essential to increasing employment.** The labor participation rate (that is, the level of employment) can be raised through a variety of measures, including raising the effective retirement age, increasing domestic mobility, and enhancing the supply of affordable housing in large cities (OECD 2010a). However, improving skills to reduce skill mismatches is also critical to improve employability of the non-employed and thus to raise employment, as will be further elaborated.

15. **Raising the value and efficiency of R&D spending would also support growth.** Poland's spending on R&D is one of the lowest and most inefficient in the EU, with Poland considered to be a low spender with poor results. There is clearly a large potential for improving the efficiency of public R&D spending, including by stimulating private sector contributions and engagement in R&D. However, the positive impact on growth at this stage would probably be modest. Research studies show a large divergence in the rates of return on R&D and, therefore, its impact on growth. On the whole, however, the contribution of R&D spending to growth is clearly positive. The emphasis in the case of Poland, therefore, lies on improving the efficiency and efficacy of R&D spending.

16. **The longer-term impact of R&D can be much higher, particularly if combined with improved skills.** Given current demographic trends (an aging population with low birth rates and decreasing working-age cohorts), unless immigration inflows start to increase substantially, labor contribution to growth will diminish over the long term or even become negative, especially after 2020. R&D-driven technology absorption and innovation will then have to play an increasingly important role in supporting growth. The amount and efficiency of R&D spending will also have to increase as Poland closes the gap to the global technological frontier and moves from an investment-based model of growth to an innovation-based model. However, to affect growth, increased R&D spending will have to be accompanied by improved human skills, which are crucial to facilitate convergence to the technological frontier.

17. **Raising employment, improving skills, and enhancing technology absorption and innovation could help offset the projected decline in potential growth and put Poland back on track for even higher growth rates.** A back-of the envelope calculation (based largely on a literature review) shows that the combined contribution of a higher employment rate and more efficient R&D spending, a key ingredient of both enhanced technology absorption and innovation, could amount to almost 1 percentage point a year. This would support the country in its quest for sustained and rapid growth.

### III. Labor's Contribution to Growth<sup>3</sup>

#### *Main labor market trends and patterns*

18. **Although labor market conditions have substantially improved in Poland in recent years, the employment rate is still less than the EU average, and well below the Europe 2020 target of 75 percent for the population aged 20–64.** Using the Europe 2020 benchmark, labor is still significantly underutilized in Poland. Currently, only 65 percent of the working-age (20–64) population in Poland is employed, which is 10 percent less than the EU target. This employment gap translates into lower output and incomes. Raising the employment/population ratio is thus one of the key challenges that Poland faces on the road to convergence to the EU income level.

19. **Labor market outcomes have substantially improved in Poland in recent years.** Although the current employment level is still unsatisfactory, Poland has made great headway in reducing unemployment and to some extent also in increasing labor force participation. The unemployment rate was reduced from the very high levels prevailing in the early to mid-2000s to 7.1 percent in 2008. The impact of the 2007–08 global financial crisis on unemployment in Poland has been modest so far—less than in most EU countries. Despite the crisis, there was in 2009 some increase in the labor force participation rate, which can be attributed to the 2009 pension system reform, which dramatically restricted early retirement. As a result, the employment/working-age population ratio increased by 5 percentage points within just two years and was not affected by the crisis. This trend is expected to continue as the full effects of the reform are still to materialize.

20. **The most remarkable development has been the sharp drop in the incidence of long-term unemployment.** Long-term unemployment is a symptom of labor market exclusion and as such carries with it substantial social costs. Thus, the large reduction in the incidence of long-term unemployment from 50 percent of those unemployed in 2006 to the current level of 25 percent signals both the reduction in the scope of labor market exclusion and the development of a more dynamic labor market in Poland. Still, the long-term unemployed are a large group. This indicates that they are deficient in some essential employability skills and thus need substantial assistance (such as counseling, training, and activation measures) to be re-integrated into the labor market.

21. **The main challenge is to further increase labor force participation, especially among older workers and women.** It is no longer unemployment that accounts for the relatively low employment level in Poland, but the low labor force participation rate (in other words, many are not even seeking work). Labor force participation is particularly low among three groups: older workers, women, and youth. The difference between Poland and other EU countries is greatest in the case of older workers, which reflects in large part the, until recently, very generous rules governing early retirement. Specifically, only 35 percent of persons aged 55–64 are

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<sup>3</sup> “Poland 2030. Development Challenges” has identified high economic activity and labor force adaptability as one key development challenges for Poland in the medium-term (KPRM 2009). Policy options considered in this section are consistent with main recommendations of this document. Specifically, both this report and “Poland 2030” emphasize the need to improve the labor supply incentives embedded in the social security system, the need to develop flexible forms of employment, and finally the need to invest in workers skills, including through lifelong learning.



economically active in Poland (table 2) compared with the EU average of 51 percent, 58 percent in Chile and 62 percent in Korea (2009 data). This is a significant gap. Closing it is particularly important because the Polish population is aging, and if the gap is not closed, the pension system will be fiscally unsustainable (as will be further elaborated). In addition, low labor force participation of older workers also carries substantial social costs in terms of forgone output and thus lower wages and pensions. Indeed, the employment rate among older women at 23 percent is extremely low—as much as 20 percentage points lower than in the EU-15. Thus, the challenge is to encourage older women to stay in the labor force longer (which would go hand in hand with raising the retirement age for women, which is currently 60, five years lower than for men), but at the same time to create appropriate employment opportunities for them.

Table 2. Labor Force Participation and Employment by Sex and Age: Poland Compared with Other EU Countries, 2009

*Panel A Labor force participation rate, %*

	Poland			EU15			EU10 – Poland		
	Total	Women	Men	Total	Women	Men	Total	Women	Men
15–64	65	58	72	73	66	79	69	62	76
15–24	34	29	38	47	45	50	37	33	41
25–49	86	80	92	86	79	93	86	79	93
50–54	73	68	78	81	73	90	81	75	86
55–64	35	23	48	51	43	60	49	39	59

*Panel B Unemployment rate, %*

	Poland			EU15			EU10 – Poland		
	Total	Women	Men	Total	Women	Men	Total	Women	Men
15–64	8.3	8.8	7.9	9.1	9.1	9.2	10.3	9.5	11.2
15–24	20.6	21.2	20.2	19.5	18.2	20.6	22.5	19.9	24.5
25–49	7.0	7.7	6.3	8.4	8.5	8.2	9.3	8.7	9.9
50–54	6.7	7.0	6.4	6.3	6.2	6.3	9.1	8.1	10.0
55–64	6.3	5.5	6.7	6.3	6.0	6.6	7.6	6.9	7.9

*Panel C Employment/population ratio, %*

	Poland			EU15			EU10 – Poland		
	Total	Women	Men	Total	Women	Men	Total	Women	Men
15–64	59	53	66	66	60	72	62	56	67
15–24	27	23	30	38	37	40	29	26	31
25–49	80	74	86	79	72	85	78	72	84
50–54	68	63	73	76	69	84	74	69	78
55–64	32	22	44	48	40	56	45	36	54

Source: World Bank staff calculations based on Eurostat data.

22. **The employment rate among youth is much lower in Poland than in the EU-15 countries.** This reflects both low labor force participation and high unemployment, especially among young women. To the extent low labor force participation is due to enrollment in education, it should not be of concern. However, the proportion of youth that is neither in school nor employed is relatively high. Why young Polish women fare worse in the labor market than young men needs further research.

23. **There is a considerable potential to increase labor's contribution to economic growth by activating the large numbers of inactive persons in pre-retirement age.** For example, as reported in the technical report, chapter 2, if the number of inactive women aged 55–59 fell by 10 percent the overall employment/population ratio would increase by nearly 0.5 percentage points. In contrast, a 10 percent fall in inactivity among women aged 20–24 would lead to a less than 0.1-percentage-point increase in the overall employment rate.

24. **If persons aged 45–64 were as active in Poland as they are in Germany, the employment rate would be about 8 percentage points higher.** That would mean that the gap between the Europe 2020 75 percent target rate and the current rate (65 percent) would be almost closed. Comparison with Germany and other countries where the official retirement age for women is 65 (to be successively increased over the coming years) suggests that raising the retirement age for women in Poland could bring an increase in the employment rate of 0.5 to 0.9 percentage points. The biggest gain would be achieved by activating men and women aged 55–59. This by itself would increase the employment rate by 3 to 4 percentage points.

#### *Inactivity among older workers*

25. **Labor force participation rates among older workers change little over time in Poland, and are not very responsive to changing labor market conditions,** as discussed in the technical report, chapter 2. This suggests that decisions by older workers regarding job search and employment are influenced by factors different from employment prospects.

26. **The change in the pre-retirement benefit seems to have increased the supply of older workers.** There have been increases in the labor force participation rate among men aged 55–59 and among women aged 50–54. In both cases, the increase in economic activity occurred among persons before the then-allowable early retirement age (60 for men and 55 for women). To some extent, this increase may reflect the improvement in labor market conditions that began around 2006. However, a more likely reason is a policy change that took place in 2004, which limited the eligibility for the so-called pre-retirement benefit. This suggests that economic inactivity in older age is associated with the availability of social benefits. But it also indicates that the labor supply of older workers is quite responsive to benefits policy and that benefit access is an important determinant of labor supply decisions. This implies that labor force participation of older workers can be effectively influenced by appropriate policy instruments.

27. **The two main reasons for inactivity among workers of pre-retirement age are disability and early retirement.** Older persons are inactive because of poor health status (disability), economic incentives (availability of benefits), and cultural factors (the role of women). Disability is the main reason for inactivity for men aged 45–59 and for women aged 45–54, that is, until they reach the early retirement age. Consequently, retirement is the dominant reason for inactivity among workers who reached the early retirement age. Caretaking and homemaking activities are the prevailing reason for inactivity only among women under 50 years

of age. Women over 50 years of age are inactive mainly due to disability and later on due to early retirement (Labor Force Survey 2008).

28. **Given the existing institutional arrangements, many older workers in Poland are provided with incentives to withdraw from the labor force.** The availability of disability pensions and early retirement options might make inactivity the preferred choice for many older workers. If that is the case, then attempts to activate those workers will probably be futile unless the relevant policies and incentives are changed. Increasing the economic activity among older workers would require revising access to disability pensions so that they reach those indeed in genuine need as well as limiting early retirement options. The government recognizes these as policy priorities.

29. **In addition, there is a group of older workers whose inactivity is involuntary.** They would prefer to work but failed to find jobs, and they do not believe that job opportunities exist for them. This category of “discouraged workers” accounts for some 10 percent of inactive men, and 12 to 15 percent of inactive women aged 45–54. These workers are part of the pool of the potential labor force and need job search assistance and counseling to be reintegrated into the labor market. For this group, well-designed activation policies may have a high payoff in terms of employment rates.

30. **Those who are inactive before reaching retirement age are mostly women with less than a secondary education living in villages and small towns.** The educational attainment aspect is important because it determines the “distance” to the labor market, and thus the potential effectiveness of activation policies. Skilled workers face better employment prospects than unskilled workers, and therefore it is easier to activate them. About one-quarter of the older inactive persons have only primary education and thus virtually no marketable skills. However, over one-third of the older inactive persons has completed vocational training and thus presumably possesses some marketable skills. In addition, close to one-fourth of the older inactive persons has secondary technical education. Employment prospects for workers with secondary technical education are relatively good in Poland, and hence in principle these persons could go back to the labor market if the incentives to work were strengthened.

31. **The differences in economic activity between older men and women vary by educational attainment.** Specifically, the difference in economic activity between older men and women with tertiary education is much smaller than between men and women with vocational training. In other words, highly educated women make similar decisions regarding economic activity in older age as men. In contrast, less educated women are more likely to adopt the traditional role of homemakers and caretakers. This indicates the important part played by educational attainment in explaining labor market behavior of older men and women.

32. **Education affects labor force participation decisions by influencing individuals preferences and job opportunities.** First, education affects *labor supply* decisions. Preferences regarding the choice between economic activity and inactivity vary by education. For example, more educated women are more likely to prefer a professional career than less educated women, who are more likely to prefer caretaking and homemaking activities. In this case, inactivity reflects voluntary choice. Second, education affects job opportunities. More educated workers face significantly *better* employment chances than less educated workers in Poland. In this case, inactivity may reflect the lack of employment opportunities and is thus involuntary. The relative

importance of both factors—supply and demand—in determining labor force participation decisions is an issue that merits further research, but the results of our analysis tend to suggest that supply-side factors prevail over demand-side factors.

*The economic costs of inactivity*

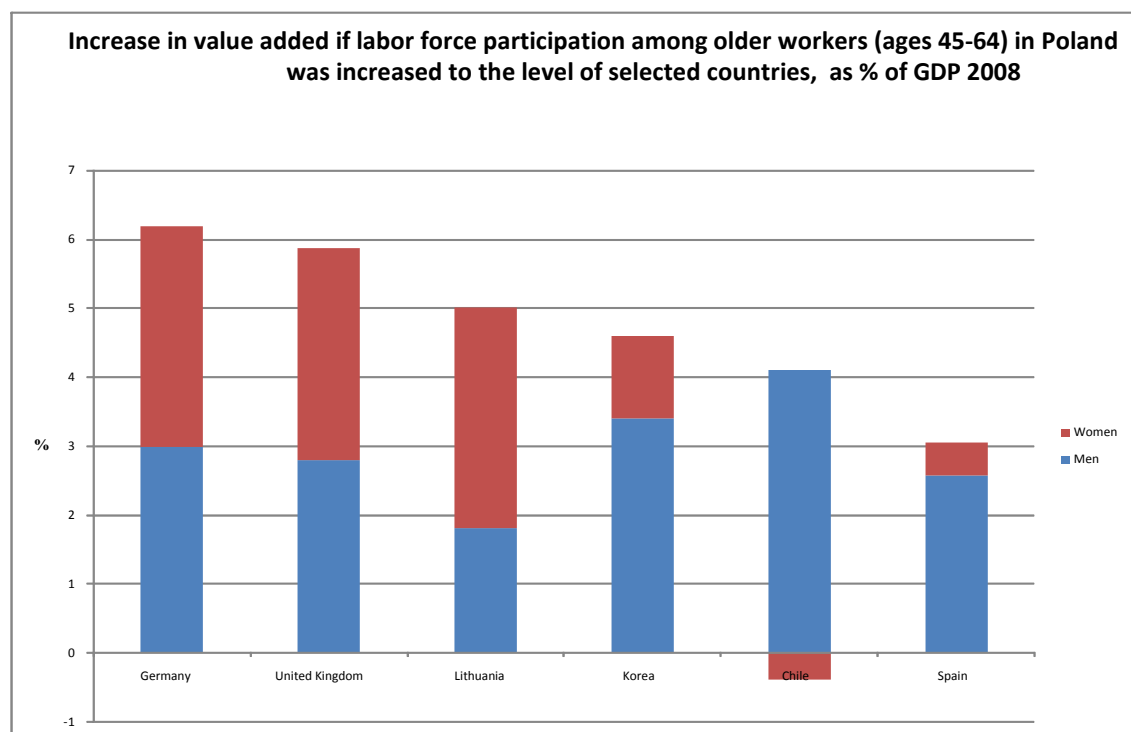
33. **If older workers in Poland were as active as in comparator countries, then Polish GDP would be up to 6 percent higher.** Figure 5 shows the (static) change in GDP following a hypothetical increase in the participation rate of older workers in line with the rate found in comparator countries.

34. **Achieving a higher employment rate is also critical given population aging and the growing life expectancy.** The demographic dependency ratio in Poland will double in the next 25 years (from about 30 percent to 60 percent), meaning there will be more dependent persons to be sustained by fewer working persons. Moreover, the dependent persons will live longer. These two factors will imply a growing redistribution of income from the working population to the dependent population, implying higher taxes and, accordingly, lower net wages. An increase in the employment rate is one key way to countervail these adverse economic consequences of the demographic trends. To prevent incomes from falling, more older persons need to work, and they need to work longer, in line with the longer life expectancy.<sup>4</sup>

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<sup>4</sup> Increasing immigration might lower the demographic pressure, but this issue was not analyzed for this report.

**Figure 5. Polish GDP Would Be Higher by 3 to 6 Percent if Older Workers Were as Economically Active as in Comparator Countries**



*Sources:* World Bank staff calculations based on Eurostat, Labor Force Survey 2008; Structure of Salaries and Wages by Occupation in October 2008, Central Statistical Office.

*Increasing labor's contribution to growth through promoting longer working lives*

35. **The government is aware of the high costs of inactivity among older workers, and of the fact that it is largely due to the design of the social security system.** Accordingly, a number of reforms have been undertaken in recent years to improve economic incentives and encourage higher labor force participation among older workers.

36. **There is, however, still room to promote longer working lives through further limiting access to disability and early retirement pensions to those with genuine need.** The 2009 reform marks significant progress in this area. The number of persons eligible for early retirement was considerably reduced. But the agenda is unfinished. A number of occupational groups are still eligible for early retirement, in particular, the police, the army, miners and steelworkers, railroad workers, and members of the judiciary. Such options would need to be carefully reviewed (as currently underway) with the challenge being to effectively implement these plans and to limit the number of persons eligible for early retirement on the basis of occupational health and safety grounds).

37. **Increasing the retirement age would mark a policy with significant impact.** The first priority would be to raise the official retirement age for women from 60 to 65, and thus equalizing it with that for men. Looking to the future, the retirement age for both men and women could then be gradually raised in line with the increase in life expectancy. Linking the official retirement age to life expectancy is being considered by a number of countries that face

the double challenge of population aging and increasing life expectancy, which presents a viable option also for Poland. The idea is that longer life implies a longer working life.

38. **The effectiveness of the above-mentioned reforms intended to increase economic activity among older workers would be enhanced if they are accompanied by measures to enhance the productivity and employability of older workers.** These include the development of a system of lifelong learning, and of active labor market policies (such as job search assistance, job counseling, training, and incentives for employers to hire older workers). Many of these measures are envisioned by the government program “Intergenerational Solidarity 50+” but still need to be implemented.

39. **Reforms that limit access to social security benefits are difficult.** Reforming early retirement will inflict important changes on groups that currently hold such rights. Policy makers thus face a difficult tradeoff between long-term gains from the social security reforms and short-term costs. The payoff of reforms aimed at increasing economic activity promises to be significant while the costs in terms of relative low labor force participation through a generous social security system are high and would be born by the society at large in terms of lower incomes, lower benefits, and higher taxes. Promoting higher economic activity and longer working lives is a good example of the need for inter-generational solidarity expressed in *Poland 2030* (KPRM 2009).

## IV. Skills Demand: The Employers’ Perspective

*Obstacles to productivity growth: Workforce skills and labor regulations*

40. **Surveys indicate that Polish employers see inadequate workforce skills as one of the main constraints to the activity of their firms, with innovative firms more affected by skill shortages than more traditional firms.** Even in 2007, a period of strong economic growth, Polish employers considered skill shortages their top problem (Rutkowski 2007). And Polish employers complain about inadequate workforce skills more often than their counterparts in other EU-10+Croatia countries. Firms that invest in R&D or that have introduced innovation and technology absorption are more likely to cite an inadequately educated workforce as a major or severe obstacle to firm operation. This implies that the skills gap may be an important factor hampering innovation and technology absorption and impeding the modernization of the Polish economy.

41. **Inadequate workforce skills are a more severe obstacle to firm growth than labor regulations.** The percentage of employers who view inadequate workforce skills as a major obstacle to firm operation (36 percent) is significantly higher than that of employers who view labor regulations as a major obstacle (27 percent). This has important ramifications for policy priorities. Policies aimed at improving workforce skills and closing the skills gap will yield a higher growth impact than policies to enhance labor market flexibility.

*Demand for skills*

42. **Higher educational attainment leads to better employment outcomes.** Better education is associated with higher labor force participation and lower risk of unemployment (see technical report, chapter 3 for the full discussion). As a result, well-educated workers are much more likely to be employed than less educated workers. The employment rate is the

highest among workers with tertiary education, which reflects both high labor force participation and low unemployment. The employment rate is by far the lowest among workers with primary education, but it is also low among workers with secondary general education. Workers with secondary technical education and with vocational training fare better in the labor market than graduates of secondary general schools but worse than university graduates. To illustrate, the employment rate among workers with tertiary education is 78 percent compared with 61 percent among workers with secondary technical education and 41 percent among workers with secondary general education. These are dramatic differences. They are accounted for primarily by differences in the labor force participation rates and to a lesser degree by differences in the unemployment rates. Thus, differences in labor market outcomes among educational groups reflect both the supply-side and demand-side factors. Workers with higher educational attainment are more likely to be economically active (which reflects labor supply decisions), but at the same time they face a lower probability of unemployment (which is indicative of strong labor demand).

43. **The increase in returns to education reflects structural changes in the Polish economy.** Enterprise restructuring in Poland has been associated with a pronounced shift of labor demand away from less skilled blue collar labor toward highly skilled white collar labor. This demand shift is manifested in the changing employment and wage structures. The number of blue collar jobs fell and that of professional jobs sharply increased in the recent years. Changes in the wage structure paralleled those in the employment structure. Professional workers have seen their relative wages grow, while blue collar workers and middle-skilled white collar workers have seen their relative wages fall. The share of skilled blue collar workers (such as craftsmen and machine operators) in total employment fell by over 8 percentage points from 1996 to 2008, and at the same time the share of professionals and managers increased by over 9 percentage points. These are substantial changes in the employment structure that occurred within a relatively short time.

44. **The changes in the skill structure of labor demand that have occurred in Poland are best reflected in changes in the wage bill shares of different occupational groups.** The manual workers' share in the wage bill fell from 43 percent in 1996 to only 30 percent in 2008. During the same period, the highly skilled (professionals and managers) white collar workers' share in the wage bill increased by as much as 16 percentage points and reached 44 percent. The wage bill of workers with medium-level skills (technicians, clerks) fell, although the fall was modest. Economic transformation in Poland, as elsewhere, is strongly biased toward high professional skills.

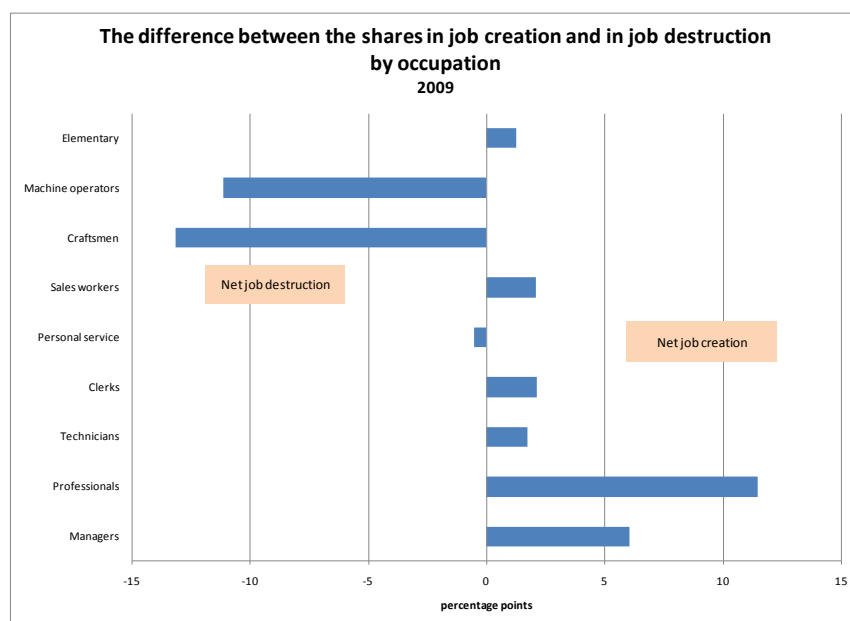
#### *Skills mismatch*

45. **Enterprise restructuring and associated job reallocation has taken place despite the 2007–08 global financial crisis.** The job turnover rate exceeded 9 percent, and over 3 percent of all jobs were reallocated away from contracting firms toward expanding firms in 2009. Expectedly, job turnover is higher among less skilled occupations and lower among highly skilled occupations. A large proportion of job movements take place within broad occupational groups, although there is also some movement among these groups.

46. **Job reallocation, the associated change in the occupational structure of employment, and the demand for new skills have given rise to a skills mismatch.** The skill content of the newly created jobs differs from that of the jobs that were destroyed. The job reallocation process

in 2009 produced a surplus of skilled blue collar workers (craftsmen and machine operators) and a shortage of highly skilled white collar workers, especially professionals (figure 6). About 25 percent of workers who lost their jobs in 2009 will not be able to find new jobs in their former skilled blue collar occupations (either as craftsmen or as machine operators). At the same time, 25 percent of newly created jobs will remain vacant if there is no additional (above that resulting from job reallocation within the occupation) supply of skilled white collar workers (largely professionals and managers). Even during the crisis, demand for highly skilled (professional) occupations remained high enough to yield net employment growth. Unfortunately, the demand for mid-level skills is rather weak, which constrains the scope for inter-occupational mobility and exacerbates the skills mismatch problem.

**Figure 6. Newly Created Jobs Differ in Skill Content from Old Jobs, Giving Rise to the Skills Mismatch**



*Source:* World Bank staff calculations based on Narodowy Bank Polski-World Bank Survey of Demand for Skills 2009.

*Note:* For details on calculation, see technical report.

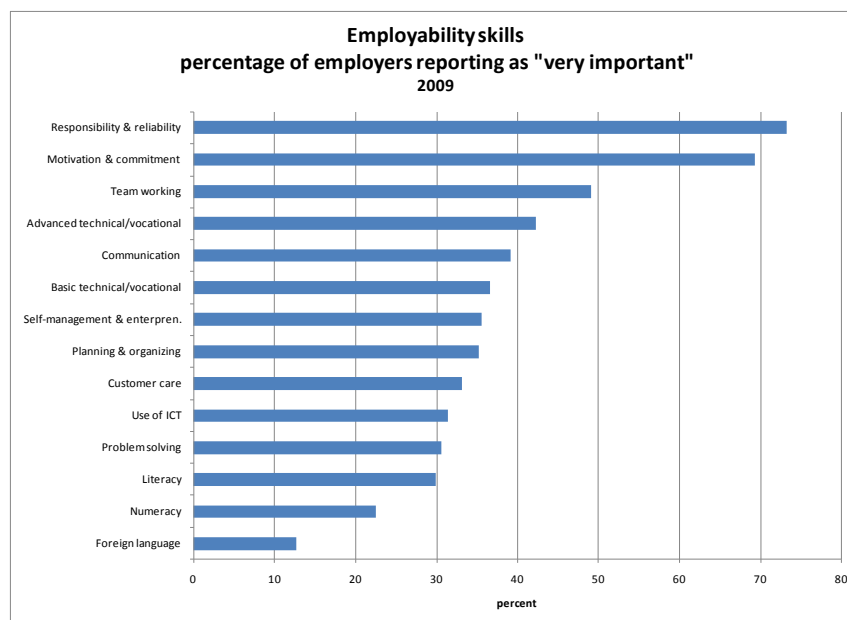
47. **The economic consequences of the skills mismatch can be severe. Importantly, it contributes to unemployment.** The transition between old jobs and new jobs is difficult for workers. As shown above, new jobs require skills that are different—as a rule higher—from those required in the old jobs. Consequently, many workers who lost their jobs in the declining sectors of the economy find it difficult to find new jobs in the expanding sectors. But the skills mismatch can also hamper the growth of firms. Skill shortages mean that some of the job openings remain unfilled and new jobs are not being created. This, in turn, may hinder output growth.

48. **Employers increasingly expect job applicants to have appropriate job attitudes and behavioral skills—the so-called “soft” skills.** These include responsibility, reliability, motivation, commitment, communication skills, and the ability to work in a team. Technical and



vocational qualifications—the so called “hard” skills—are important, too, but the soft skills are critical for employability. Responsibility and reliability are considered to be very important by almost 75 percent of employers. Advanced technical or vocational qualifications are viewed as very important by over 40 percent of employers, and basic technical qualifications are viewed as very important by over 35 percent. Thus, adequate job attitudes and behavioral skills are considered essential by more employers than advanced technical skills (figure 7). This is probably because the more advanced job-specific technical and vocational skills can be provided through on-the-job-training, while it is more difficult to influence job attitudes and behavioral skills. Also, when rating various skills, employers may take it for granted that job applicants possess the required core technical skills.

**Figure 7. Employers Value Job Attitudes, such as Responsibility and Motivation, the Most**



*Source:* World Bank staff calculations based on Narodowy Bank Polski-World Bank Survey of Demand for Skills 2009.

49. **Young workers most frequently lack those skills that employers view as the most important: the advanced technical skills and the desired job attitudes.** Over 20 percent of employers complain that job applicants do not have the expected advanced technical or vocational skills (see technical report, chapter 3 for details), and about 15 percent of employers claim that young workers do not demonstrate the desired job attitudes: responsibility, reliability, motivation, and commitment. Other important skills that young workers lack include the ability to work independently, problem-solving skills, and planning and organizational skills. Thus, the skills gap has two dimensions: the “hard” one and the “soft” one. It is the lack of adequate hard and soft skills that both prevent some graduates from finding a job and impede job creation and firms’ competitiveness in Poland.

50. **Innovative firms demand different skills than traditional firms.** Innovative firms put a premium on the ability to solve problems, to work independently and in teams, to communicate, and on planning and organizational skills. They are more often concerned that

young workers lack some of these critical skills. For example, innovative firms cite more frequently than traditional firms ability to work independently and planning, motivation, and problem-solving skills as lacking among young workers. But they also more often complain about the lack of advanced technical and vocational skills. Thus, compared with traditional firms, innovative firms demand better generic (soft) skills, *and* higher technical (hard) qualifications and competencies. The important implication of this is that skill deficiencies are likely to have a greater negative impact on the growth prospects of innovative firms than on the growth prospects of traditional firms. Thus, the skills gap—if not addressed—could constrain the ability of Polish firms to innovate, to improve their competitiveness and, eventually, to grow.

**51. Many firms, especially larger ones, address the skills gap by providing training to their workers.** The incidence of training provided by firms varies from around 50 percent in small firms to close to 90 percent in large firms. Innovative firms—which tend to demand higher skills—are somewhat more likely to train their workforce than traditional firms (there is an 8-percentage-point difference in the incidence of training).<sup>5</sup> More productive firms also provide training to their workforce more frequently than less productive firms. Causality is likely to run in both directions; firms that are more innovative and productive demand higher skills and are thus more likely to invest in the human capital of their workers by providing training; and, simultaneously, the provision of training is likely to contribute to innovation, technology absorption, and productivity growth.

#### *Closing the skills gap*

**52. To some degree the skills mismatch is unavoidable in every restructuring and growing economy because new jobs differ from old jobs.** The supply of skills adjusts to the changing demand with a significant time lag due to high adjustment costs (it takes time for new courses to be developed and for workers or the unemployed to take them to acquire new skills). The challenge is to minimize the inertia on the supply side to keep the skills mismatch in check. Otherwise, if the skills mismatch becomes excessive, it adversely affects the growth potential of the economy by both contributing to unemployment and hampering the creation of new jobs and productivity growth. Enhancing the responsiveness of the supply of skills to the changing demand is thus the challenge Poland faces.

**53. Addressing the skills mismatch requires action in three areas: labor market information, job matching services, and, the reforming of the education system.**

**54. Current and accessible information about the labor market is key for students and jobseekers and for education and training institutions. Information is key for those who want to make informed career choices.** Students, in particular, need information about the employment outlook for different educational and occupational groups. Every young person must decide what education to acquire before entering the job market and which occupation to choose. Ideally, this decision should be based on objective information. Labor market information is also critical to educational and training institutions. These institutions need to be familiar with the trends in occupational demand to be responsive to the needs of the labor

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<sup>5</sup> The data come from the Narodowy Bank Polski-World Bank Survey of Demand for Skills 2009. Given that the sample was not fully representative and biased toward large firms, they cannot be generalized for the whole economy.

market. They also need to know what specific skills employers require. Then they can use this information to shape their curricula and training offerings. It is also important for educational and training institutions to collect and publicize the job status of their graduates.

**55. Employment services can play an important role in matching workers with jobs.** Such services include job brokerage, job search assistance, vocational counseling, training referrals, and mobility grants. If well designed, these programs can enhance the skills and productivity of the unemployed and thus increase the likelihood of successful matches.

**56.** Reforming the education system is by far the most important way to address the skills mismatch in Poland. This issue is dealt with in the next section.

## **V. Education and Skills Supply**

**57.** Poland compares favorably with other EU countries against the Europe 2020 benchmarks for the indicators that relate directly to education. The key challenges are to continue to increase the supply of tertiary students, while ensuring that they are able to acquire the key skills that employers want, and to give greater access to adult learning opportunities for those already in the labor market so that those in employment can respond to changing needs of their employers and those who are unemployed can shift to different jobs which require different skills.

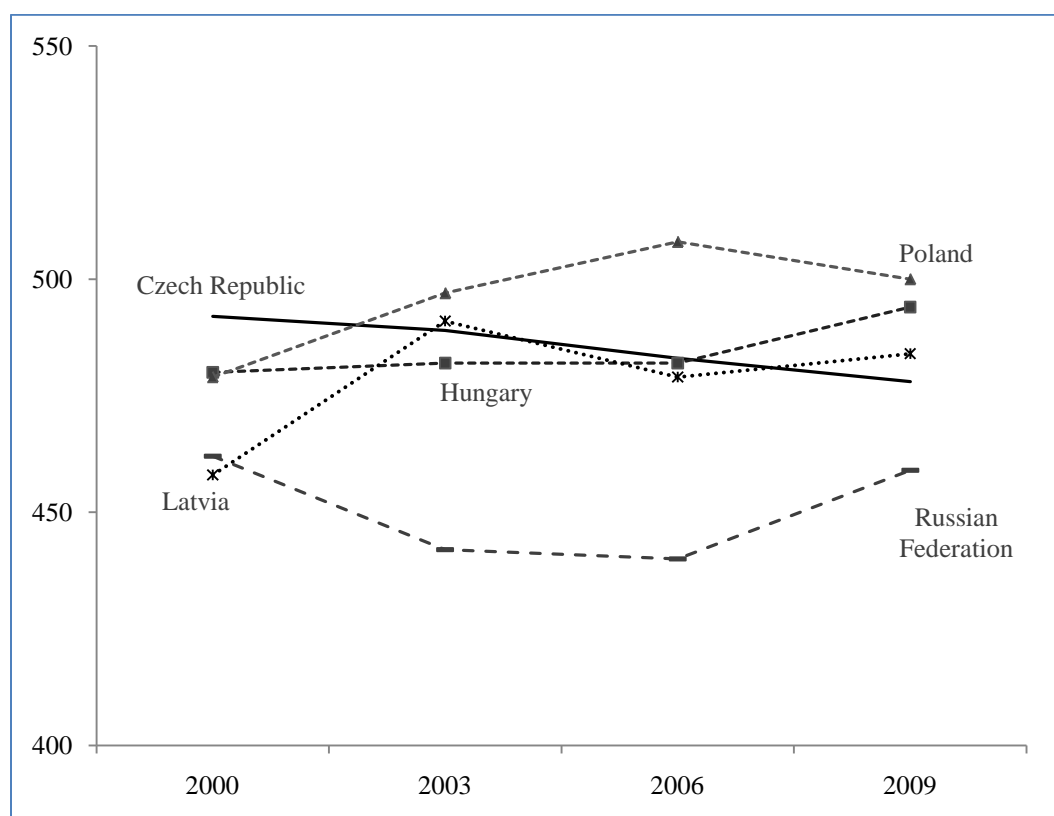
### *Polish progress towards Europe 2020 – secondary education*

**58. Poland already has only a small proportion of its young people leaving school early and this number can be expected to stay low.** Poland has already surpassed the Europe 2020 target of less than 10 percent of young people leaving school early—the latest figure is 5.3 percent and had remained more or less constant for the past five years. Poland is in advance of other Central European countries. And this figure can be expected to stay low given the latest reforms of secondary education.

**59. The 1999 education reforms have lead to impressive learning gains for students in secondary education, and Poland ranked highest of the covered Central and Eastern Europe countries in the last three PISA reading tests.** These reforms restructured schooling, deferred tracking in secondary education, engendered a profound curriculum reform, and gave more autonomy to schools. The new curriculum attempted to balance three dimensions of education—acquiring knowledge, developing skills, and shaping attitudes. As described by Jakubowski and others (2010:6), “The curricular reform was designed not only to bring about change in the contents of school education and to encourage the introduction of innovative teaching methods, but above all to change the teaching philosophy and culture of schools.” These reforms have resulted in an impressive improvement in Polish student scores on the Programme for International Student Assessment (PISA). Jakubowski and others (2010:26) close their analysis by cautioning “policymakers about the effectiveness of vocational schooling—when that schooling is not designed to improve math and reading skills...which have become the real vocational skills in the world of work today.” One factor in particular—the delayed division of secondary school students into vocational and general education tracks (after nine years of joint general schooling)—has led to an unprecedented success in terms of skills enhancement. This was reflected in Poland’s jump in PISA scores between 2000, 2003, and 2006 (figure 8).

60. **These reforms have highlighted the need for changes at upper secondary education.** While Jakubowski and others (2010) clearly attribute the remarkable improvement to “more” general education, they also show that performance stagnates or even deteriorates for International Standard Classification of Education<sup>6</sup> 3B and 3C (the non-academically oriented types of secondary education), that is, beyond age 17, when students are again taught in separate tracks. “Thus, the stratification of Polish students in the old secondary school system still exists under the new name of upper secondary schools. It seems that the reform helped to update the skills of the average students, but the negative effect of the tracking system was simply postponed by one year....**Intuitive claims that upper secondary education did not improve that much seems to be supported by the results presented....**Still, students in vocational tracks lack knowledge and skills needed to fully benefit from the modern society and economy and the reform did not change that” (Jakubowski and others 2010:23).

**Figure 8. PISA Reading Performance, Selected ECA Countries, 2000, 2003, 2006, 2009**



Sources: OECD PISA data; Jakubowski and others 2010:9, World Bank staff.

Note: Year of PISA assessment displayed on x-axis and PISA score on y-axis. The average score among OECD countries is 500 points and the standard deviation is 100 points.

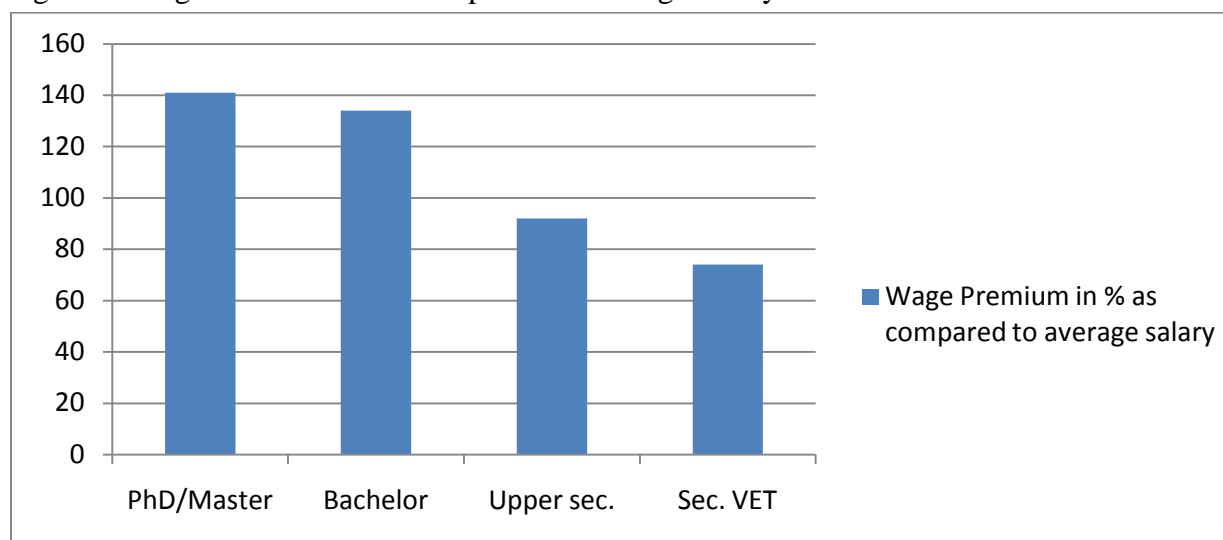
<sup>6</sup> The International Standard Classification of Education was designed by the United Nations Educational, Scientific and Cultural Organization in the early 1970s to serve “as an instrument suitable for assembling, compiling and presenting statistics of education both within individual countries and internationally” ([http://www.unesco.org/education/information/nfsunesco/doc/iscled\\_1997.htm](http://www.unesco.org/education/information/nfsunesco/doc/iscled_1997.htm)).

61. **Poland also appears to be on track to meet the Europe 2020 target as relates to tertiary education attainment, but the next stage of reforms<sup>7</sup> is to pay attention to the type and quality of education offered.** Currently, 32.8 percent of young people in Poland have obtained a tertiary degree, compared to the Europe 2020 target of 40 percent. However, there has been a significant increase in enrollments in tertiary education since the start of transition – a five-fold increase in the last 20 years – and it can be expected that this will continue to raise the overall attainment rate.

62. **Increasing returns to tertiary education suggests that the supply of graduates can continue to rise, despite some perceptions that there are too many graduates or that the Bachelor's degree is not valued.** Returns from tertiary education in all 31 European economies studied by Psacharopoulos (2009) exceed any “reasonable” (for example, 5 percent) opportunity cost of capital, and they are highest in new EU Member States. The highest earnings premium of tertiary over secondary education graduates in Europe has been detected for new EU Member States (in descending order they are Hungary, the Slovak Republic, Latvia, Slovenia, Estonia, Lithuania, the Czech Republic, and Poland).

63. **The Polish labor market rewards Bachelor's degrees.** In Poland, it is the academic community that has a negative perception of the Bachelor's degree.<sup>8</sup> The data, however, do not support this negative view. The labor market does reward tertiary education in general. Even more important, it rewards not only the Master's but also the Bachelor's, and by a significant margin compared to general secondary education (figure 9).<sup>9</sup>

Figure 9. Wage Premium in % Compared to Average Salary



Sources: GUS 2009; authors' calculations.

Note: The Bachelor's includes engineering degrees at that level.

<sup>7</sup> E.g. in the context of the Strategy for Human Capital Development which is currently under preparation.

<sup>8</sup> The negative view might have its origin in the way the Bachelor's degree was introduced in Poland. See technical report, chapter 4 for details.

<sup>9</sup> However, the data presented include engineering degrees at the Bachelor's level, so further research would be needed to support these findings.

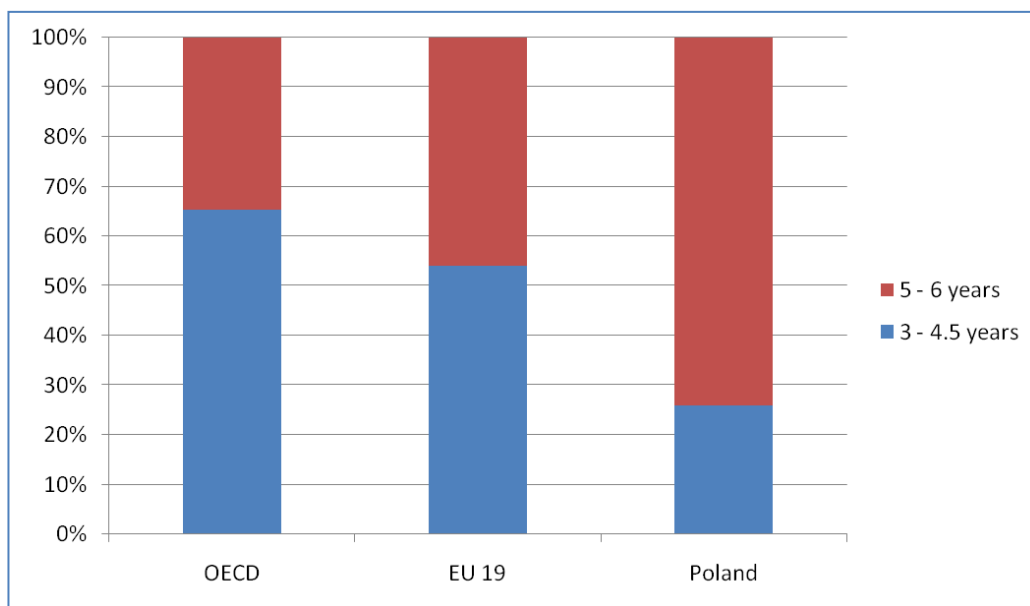
64. **These figures stand in contrast to the argument from the Polish academic community that the tertiary sector has expanded to its limits over the last 20 years.** For example, the Higher Education Strategy put forward by the Conference of Rectors of Academic Schools in Poland (Konferencja Rektorów Akademickich Szkół Polskich, KRASP), a major voice of the higher education sector, claims that the “supply of highly qualified people exceeds market demand,” and that the “labor market [is] saturated with highly qualified professionals.” However, there is little evidence of this. On the contrary, there is still high and often unmet demand for highly qualified staff. It is important to distinguish between flows (high in tertiary education) and the stock of people with a higher education degree (still relatively low in Poland at 26 percent of employed persons). It is also important for institutions to monitor what happens to their graduates when they enter the labor market.

65. **Key public stakeholders in Poland need to rethink the value of the Bachelor’s degree and the steps needed to make it a success.** The civil service and major employers must understand the value of a Bachelor’s degree and clearly communicate the status they attach to it and that they value employees who hold the degree. In addition, the experience of Scandinavian countries indicates that the promotion of the Bachelor’s degree is strongly correlated with the expansion of adult learning—something Polish policy makers need to encourage. (See technical report for two relevant case studies.)

#### *Tertiary education reform agenda*

66. **Moreover, the composition of students at the tertiary level seems to be different from the emerging new structure in Europe and beyond, in which the majority of students are studying for a shorter period than in Poland.** In Poland, 74 percent of graduates graduated from programs of five to six years’ duration. Only 26 percent graduated from programs of three to five years. The OECD and EU-19 averages are reversed. In the OECD, 64 percent graduated from programs of three to five years and 34 percent graduated from programs of five to six years. For the EU-19, the figures are 54 percent and 46 percent, respectively. The only two countries in Europe with a similar distribution to that of Poland by duration of studies, are Greece (100 percent graduate from programs that last five to six years) and the Slovak Republic (with almost exactly the same structure). All Anglo-Saxon countries show a different distribution. The vast majority of first-time graduates in Australia (95 percent) and the United Kingdom (97 percent) come from shorter (Bachelor’s-type) programs, as do the majority in the United States and Ireland (both 55 percent) (all data from OECD 2008) (figure 10).

**Figure 10. Percentage of (First-Time) Graduates, by Duration of Program**



*Sources:* OECD and Eurostat data; authors' calculations.

67. **This report recommends keeping Bachelor's degree enrollment levels stable and possibly even increasing them, as an appropriate foundation for continued learning in adulthood.** All young people can expect to have to engage in continuous learning over their lifetimes, and not just for their first degree. The current motivation in Poland to begin studying for a Master's degree – i.e. to opt for an overall longer study period - seems to be more fear based (fear of unemployment or of having a degree which is not recognized) than the desire to specialize and gain deeper knowledge of a subject. Higher education institutions will need to change in order to accommodate the ever changing needs of the public and the learner's life cycle. The savings to be gained from focusing more on the shorter Bachelor's (and a differentiated but comprehensive fee system) would free resources for overall quality-enhancement and equity-supporting measures.

68. **More important than the number of higher education institutions that reportedly have implemented the three-cycle (Bachelor's – Master's – Doctorate) structure** (see technical report, chapter 4) **is the degree to which the system is accepted by the labor market and by the wider public.** For example, the results of one survey taken in 31 European countries indicated that, in Poland, 75 percent of students wanted to continue studying for a second degree, 12 percent wanted to find work and continue studies later on a part-time basis, and 5 percent wanted to find work and never study again (EC 2007; EC 2009b). On one side of the spectrum there are students, mainly from transition countries and from France, Italy, and Germany, who prefer to continue studying for a Master's degree. On the other side of the spectrum there are students from all the Scandinavian countries, and from Belgium, Lithuania, Portugal, and Slovenia who evaluate their higher education at the Bachelor's level as useful and in which more than 50 percent of Bachelor's students prefer to find work upon graduation. In, Finland, Norway, and Sweden, 65 percent are in this category (EC 2009b).

69. **Interestingly, Finland, Norway, and Sweden have elaborate lifelong learning systems.** This might indicate that the Bachelor's degree has a distinct function in preparing citizens for a "lifelong learning career" in countries with firmly established lifelong learning systems.

70. **As Polish higher education continues to expand, it will need to offer the new skills that employers seek, which requires stronger links to employers, and policy attention will be needed to steer the courses which students choose.** There is significant emphasis among employers on generic (soft) skills that have a strong complimentary function vis-à-vis the "technical" skills related to a specific profession. Polish employers specifically value and seek generic skills such as creativity motivation, responsibility, and problem solving (as recognized in *Poland 2030* (KPRM 2009)). But these skills can only partially be taught in a classroom; they must also be acquired in real-life situations. The future role of employers, therefore, will not only be to get actively involved in the governance of tertiary education and other educational institutions and in the establishment of learning outcomes. They will also need to play an active part in providing work placements for students where they will have the opportunity to learn and internalized the specific rules and requirements of the work world. Without such an active involvement in the education system, employers will most likely not get the future employees they want and need.

71. **There appears to be strong interest (also compared to EU-27 peers) in the service-related professions, in education, and in social science, in particular.** These "preferences" are strongly connected to the education supply side. The remarkable expansion of the Polish tertiary education sector (1,928,000 students in 2009 compared to 404,000 students in 1990) was mainly achieved through privately-funded higher education at public institutions and, in particular, expansion of the private sector (from 6 institutions in 1990 to 195 institutions in 2000 to 325 institutions in 2009). Most private providers offer higher education in high-fee, low-cost subjects, such as social science. Moreover, it is also likely that public higher education institutions (HEIs) "fill up" their classrooms in subjects that do not require specific equipment and are, as a rule, "low cost."

72. **While student preference for science and technological subjects is comparable to their EU-27 peers, concern is nevertheless warranted.** The overall low enrollment rates in these subjects have been monitored and were a continuous source of concern under the Lisbon Agenda. (See technical report, chapter 4 for details on subject-related choices students make and the potential implications for the economy.)

#### *Adult Learning*

73. **Another policy challenge is to ensure that there are institutions which offer good quality vocational courses at the tertiary level, in part to ensure that adults in the labor force have access to further learning opportunities. Funding arrangements will need to be adjusted as part of this strategy.**

74. **Current Polish reform initiatives highlight the further need for skills enhancement and lifelong learning.** Participation in adult education is recognized in this Report as a fundamental factor enabling older employees to remain in the labor force. It concludes that low qualifications levels and the lack of the *ability* and of the *opportunity* to acquire new qualifications are the main reasons why Polish employees leave the labor market too early



(Jakubowski and others 2010). Relatively low levels—although increasing in the last few years—of participation in adult education make labor market mobility more difficult. The “Report on the Intellectual Capital of Poland” (2008) stresses the critical role of lifelong learning in bridging the competence gaps among labor force participants who are older than 45 years of age, that is, those who had finished their formal education prior to the transition. Competence gaps include gaps in language skills, information and communication technology skills, and general skills necessary to stay active and remain flexible in a changing labor market.

**75. Poland thus needs to make a concerted effort to open up further education and training to those most in need,** that is, those with low levels of skills and most likely to suffer from job destruction in the nearer future. The phenomenon that “the learning ‘rich’ get richer” (OECD 2004) can be clearly seen in Poland. Participation in adult education or further training is very low—at only 50 percent of the EU average. Among those who engage in adult education, higher education graduates are significantly more represented than other groups.

**76. Short-term benefits of a lifelong learning system could include improved access to the labor market for everyone, not only for older workers, and a more elaborate system of second chances for those who were not able to take full advantage of the formal education system.** The technical report presents an illustration of how such chances are provided in the United Kingdom through Further Education Colleges. However, most experience with successful lifelong learning systems has been in just a handful of European countries, including Ireland, and in the Scandinavian countries. Their experience can provide valuable information for policy makers considering policy reforms in Poland. The technical report (chapter 4) presents a summary of the Finnish and Irish approaches.

**77. Fees charged by public institutions for part-time students tend to disadvantage students from lower socioeconomic segments of society.** Those who obtain fee-free, state-subsidized places are disproportionately from privileged backgrounds in the Central and Eastern Europe region generally, while chances of obtaining higher education in Poland by a 20–35-year-old whose father had a professional occupation were four times higher than the chances of a child of a manual worker (the ratio in the United States is 2 and in Finland it is 1.5) (Canning, Godfrey, and Holzer-Zelazewska 2007).

**78. There is a lack of institutional, and therefore educational, diversity.** A 2007 OECD report on Polish higher education stated, there is a lack of “true diversity of mission and values” in the system, and there is a “pervasiveness of ‘academic drift.’” There is no encouragement for institutions “to take a vocational mission seriously,” which has far-reaching consequences in the context of skills and competences of graduates (Fulton and others 2007:47–48). It also means that there are few institutions who are able to offer shorter-duration, more flexible forms of education and training. (See technical report for a broader and deeper discussion of additional issues related to the Polish tertiary education system, including the issues of financing and quality assurance.)

**79. Poland is well-placed to move ahead with the next major reform, to orient the tertiary education system around outcomes.** Poland, as a signatory country of the 1999

Bologna Declaration,<sup>10</sup> began to implement the reforms soon after signing and reported success in implementation early on. However, some key dimensions related to lifelong learning (in particular, implementation of national qualification frameworks and recognition of prior learning) have not received sufficient attention. This has led to “low marks” in the Bologna Stocktaking.

### *The future of learning and working in Poland*

80. **Important changes in this direction include the move from teaching knowledge to acquiring skills, from teacher-centered to student-centered learning, and from a narrow focus on knowledge to a broader range of learning outcomes.** This shift is accompanied by a completely different toolset and policies that include European and National Qualifications Frameworks, recognition of prior learning, credits for smaller learning units, and modularization. The proper implementation of the Bologna toolset, in particular, when it comes to mobility tools like the European Credit Transfer and Accumulation System, might also help the promotion of lifelong learning in Poland. The move from input-oriented, time-based degrees toward learning-outcomes-based models of qualifications that Europe has seen in the past 10 years, particularly in tertiary education, marks a paradigmatic shift in this respect. Following the development of a European Qualifications Framework for Lifelong Learning, many European countries developed National Qualifications Frameworks to make learning and its outcomes transparent and to open up the possibility of more flexible, individual learning paths. The qualifications in these frameworks are mostly described through “learning outcomes” (what a learner knows and is able to do) and—for tertiary levels—quantitative measures as (European Credit Transfer and Accumulation System) credits. Long-standing experience with qualifications frameworks in Scotland and Ireland became guides for other European countries and might be helpful for Poland. Ideally, qualifications frameworks are learning-outcomes based, duration neutral, provide the basis for recognition of prior learning, allow for permeability, and have been developed involving key stakeholders, including employers.

81. **The foundation for successful “lifelong learning careers” for all needs to be laid down early on,** in particular, by addressing the inequitable preschool education received by children living in rural areas. (The net enrolment rate among children in rural communities is only 19 percent compared to 62 percent among urban children [World Bank 2010].) This is a way to pursue the concept of ‘territorial cohesion’ set out in *Poland 2030* (KPRM 2009).

### *Options for further reforms and future growth: A summary of recommendations*

82. **Poland has many reasons to be proud of its education system.** It has tackled some particularly difficult reform issues such as the strengthening of general schooling and the significant expansion of tertiary education. These reforms will provide a strong basis for the next phase of system enhancement geared toward competitiveness and growth. The education chapter recommendations, the details of which can be found in the technical report, chapter, 4, include the following:

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<sup>10</sup> The Bologna Declaration was adopted by the ministers of education of 29 European countries at a meeting in Bologna in 1999. Today the process includes 47 countries. The Declaration proposed a two-tier (later a three-tier) system of higher education. It also proposed a European Higher Education Area in which students and graduates can move among countries and have their education qualifications recognized more easily (<http://www.ond.vlaanderen.be/hogeronderwijs/bologna/>).

1. *Take equity seriously and address it from the beginning.* As many studies have shown, investment in early childhood development has high rates of return. Moreover, it provides a firm foundation for lifelong learning.
2. *Use the debate on the introduction of a National Qualifications Framework to reconsider system permeability*—that is, access to higher levels and different education tracks and offers—and *detect and remove “dead ends” for learners.*
3. *Carry forward the reforms of secondary education into upper secondary education courses.*
4. *Higher education institutions would best diversify their missions and become more open to different types of learners.* The future labor market will require people with more, not fewer, skills. Tertiary education degrees will be the rule, not the exception. Consequently, research would need to inform higher education and will have to include applied research strengthening both the role of higher education institutions in the regions and the productivity of small and medium enterprises. Equitable access and quality of provision at all levels need to be ensured. To achieve this, internal quality assurance systems at institutions of learning will need to be established.
5. *The government needs to take an active role in reconsidering the institutional setup of education.* The current demographic shift will give policy makers the fiscal and factual space to do this because, if access modalities do not change, there will not be enough students to justify the current institutional setup. This must be done to ensure that future challenges—for example, demand regarding graduates from specific fields—are adequately met and are not left to arbitrary developments, such as the current drift toward low-cost subjects described above.
6. *For the government, in general, and the Ministry of Science and Higher Education in particular, to fully assume this role, data collection and monitoring and evaluation at all levels, including the institutional level, will need to be strengthened,* for example, through tracer studies (Murthi and Sondergaard 2010). Beyond programmatic decisions at the system level triggered by significant demographic shifts, the Ministry is advised to steer the system through a performance-oriented financing system. This does not mean that institutions would need to spend their scarce time constantly writing tender applications (as one of the current higher education strategies seems to suggest). Rather, they could accomplish this through framework contracts in connection with performance-oriented funding systems that strengthen research and output at the institutional level that are innovation and technology-absorption oriented. Germany and Finland, for example, have positive experiences with such funding models.

## VI. Technology Absorption and Innovation

83. This section distills only four of the important findings and related policy recommendations of the technical report, chapter 5, on technology absorption and innovation. In line with the European Commission’s Europe 2020 Strategy, applied R&D generally, and its part in technology absorption and innovation more specifically, play a key role in promoting smart economic growth in Poland and maintaining the country’s competitiveness in the future.

84. **Growth in Poland in the last two decades has been based on capital accumulation and on improving productivity driven by technological change.** Endogenous growth theory shows how innovation, knowledge spillovers, and R&D are indeed key factors driving self-

sustained, long-term economic growth. Growth in countries below the notional technological frontier is mainly driven by diffusion and absorption of new technologies from countries on the frontier that are new-to-the-firm or new-to-the country below the frontier but not to the world.

**85. The learning activity that a firm engages in to integrate and commercialize knowledge and technology that is new to the firm, but not new to the world, is the process of absorption.** New-to-the-world innovation shifts a notional technological frontier outward, while absorption moves the firm closer to the frontier. Examples of absorption include adopting new products and manufacturing processes developed elsewhere, upgrading old products and processes, licensing technology, improving organizational efficiency, and achieving quality certification.

**86. A country's absorptive capacity is a key driver of economic growth and industrial productivity, but it requires a favorable investment climate, an educated workforce, and R&D on the part of absorbing firms.** Trade flows, foreign direct investment (FDI), and labor mobility and training are important channels for firms to access technology. But technology absorption is not automatic. While R&D investment oriented to new-to-the-world innovations is predominant in economies on the technological frontier, in countries below the frontier, such as Poland, R&D principally serves the need for firms to absorb new technologies and keep up with existing global technological trends. R&D is critical for the identification, acquisition, and assimilation of new technologies and for supporting implementation on the part of the firm. Firm-level R&D does not solely contribute to innovation. The “two faces of R&D,” as introduced by Cohen and Levinthal (1989), goes beyond the conventional role R&D plays in stimulating innovation. It is widely agreed today that systematically engaging in in-house R&D improves firms' ability to successfully transfer new technologies as firms become more proficient at learning about and using leading technological advances (that is, improves absorptive capacity). Griffith, Redding, and Van Reenen (2004) document that there has been convergence of TFP within a panel of industries across 13 OECD countries since 1970, and find evidence that both R&D and human capital appear statistically and economically important in this TFP catch-up process and in stimulating innovation directly.

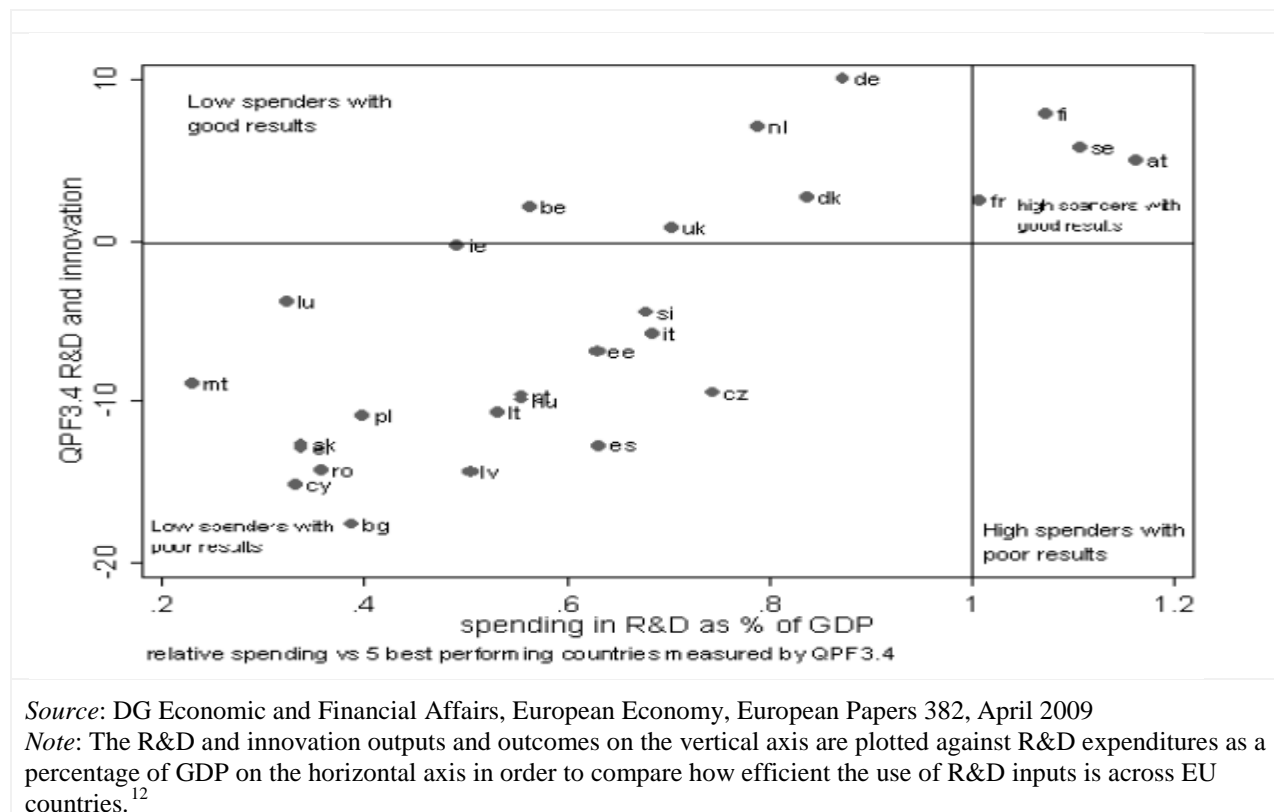
**87. The effect of business R&D on productivity is larger in countries where the share of universities (as opposed to government labs) is higher, in countries where the share of defense is lower, and in countries that are intensive in business R&D.** The effect of business R&D on productivity has been investigated in many empirical studies, performed at all aggregation levels—business units, firm, industry—and for many countries (especially the United States). According to Guellec and van Pottelsberghe de la Potterie (2006), these studies conclude that R&D matters, with the estimated output elasticity with respect to business R&D varying from 10 percent to 30 percent. They also report that an increase of 1 percent in business R&D generates 0.13 percent in productivity growth. The effect is larger in countries that are intensive in business R&D and in countries where the share of defense-related government funding is lower. A 1 percent increase in foreign R&D generates 0.44 percent in productivity growth, and the effect is even larger in countries intensive in business R&D; 1 percent more in public R&D generates 0.17 percent in productivity growth.

**88. In general, this literature finds the social rates of return to R&D to be substantially above private rates of return.** According to Griffith (2000), a large empirical literature has sought to estimate the rate of return to R&D at the firm and industry levels. These rates of return

both inform us of how important R&D is for growth and provide one of the main justifications for government subsidies to R&D, because firms' decisions to undertake R&D are based on their private return to R&D, leading to under-investment in R&D.

89. **For Poland to maximize benefits from any additional investments in R&D, and before attempting to meet the European Commission's 3 percent target, policy makers ought to take a hard look at the efficiency of the current public expenditures on R&D.** As figure 11 suggests, Poland classifies as a low spender with roughly 0.6 percent of GDP spent on R&D, with the majority of it dedicated to basic science. Also, Poland ranks poorly among EU countries with regard to the efficiency of public expenditures, measured as a ratio of innovation and technology absorption indicators (for example, patents) to R&D.<sup>11</sup> Thus, every effort must be made to improve the efficiency of public spending and leverage it to increase private sector expenditures on R&D, which in Poland are around 40 percent of total R&D compared to 60 percent in most OECD countries.

**Figure 11. Efficiency of Public R&D Spending as Reflected by Composite Outcome Indicators**



11 This observation on the low efficiency of public R&D expenditures is based on a comparison of classical output measures, for example, patents and publications. In contrast, Poland ranks high with regard to efficiency of public spending and quality of education, alongside Finland.

12 According to the EC, QPF3.4, the Quality of Public Finances, i.e. R&D and innovation outputs and outcomes is measured by the following: WEF index R&D (technological readiness, innovation, innovation & sophistication factors subindex; local availability of specialized research and training); Science and technology graduates (Eurostat); Patent applications by milliard EUR of total R&D expenditure (GERD) (Eurostat); Patent applications to the European Patent Office (per million inhabitants) (Eurostat); Patents granted to residents (World International Property Organization); Triadic patents (Eurostat); Basic research (IMD); Science in schools (IMD); and Youth interest in science (IMD).

90. **R&D is recognized as key for supporting both technology absorption and innovation.** In this context, the technical report, chapter 5 highlights three key objectives: (a) promoting R&D by firms for enhanced technology absorption and innovation; (b) promoting international **co-invention** as a channel for tapping into global knowledge and technology flows; and (c) restructuring, evaluating, and financing applied research and development institutes (RDIs) to facilitate their alignment with the needs of Polish industry.

91. **The policy environment for innovation and technology absorption is a subset of the investment climate for business in general.** Company registration and the bankruptcy regime, for example, determine the ease of entry and exit for low, mid or high technology companies. The key elements of the investment climate are presented below in table 3, comparisons of the perceptions of SMEs in Poland of the obstacles they are facing: the percentage of SMEs perceiving a given obstacle as major is reflected individually. Notably, Poland fares worse than Bulgaria, the Czech Republic, Slovakia and Hungary on business licensing and permits. Polish firms also perceive tax administration to be particularly burdensome when compared with the above mentioned NMS, but also with Turkey and Russia. to also cost of financing, macroeconomic instability and access to financing. Similarly, labor regulations, which can play a particularly critical role in an innovative start up's decisions to hire or fire skilled employees is reported by a quarter of Polish firms to be an obstacle. A detailed analysis of the investment climate is beyond the scope of this study and has been discussed separately with the Polish Government by the World Bank's Doing Business team. However, the obstacles highlighted below are cited as they create the environment in which firms must operate, and make decisions on risk and innovation.

Table 3. Firms Claiming major obstacles in .... [%]


Country	Poland	Bulgaria	Slovakia	Hungary	Czech	Turkey	Russia	Brazil
<b>Tax rates</b>	58.5	24.9	35.0	58.8	41.1	52.5	48.8	83.5
<b>Tax administration</b>	<b>26.5</b>	15.3	<b>11.8</b>	41.7	22.4	21.7	20.0	75.1
<b>Business licensing &amp; permits</b>	<b>21.5</b>	<b>8.9</b>	9.6	15.6	13.7	24.0	23.5	48.5
<b>Corruption</b>	24.1	33.5	31.1	20.4	25.1	42.3	50.0	69.9
<b>Crime, theft &amp; disorder</b>	22.9	24.5	24.7	3.9	16.8	13.2	38.1	57.0
<b>Access to finance</b>	22.0	17.2	17.7	11.7	23.7	14.3	35.0	55.5
<b>Customs &amp; trade regulation</b>	10.3	4.1	7.6	3.6	10.7	12.3	19.3	28.1
<b>Labor regulation</b>	<b>26.7</b>	12.5	8.6	<b>8.6</b>	12.2	8.2	10.8	57.4
<i>Source: World Bank Enterprise Surveys (2008 for Turkey, 2009 for other countries)</i>								

92. **Polish firms compare reasonably well on technology absorption to firms in neighboring Central and Eastern European countries but report little interest in innovation.** According to the World Bank Business Environment and Enterprise Surveys, Polish firms performed better on all traditional measures of technology absorption, such as new product launches and upgrading of existing products. This holds true even when firms in Poland are

compared with those firms in Eastern Germany that received extensive financial assistance from the West or with firms in the Czech Republic (table 3), which have long been among regional leaders in innovation. Interestingly, the percentage of firms that added a new product is higher in Poland than in Western Germany, indicating that either Polish firms are more innovative than German firms or that the domestic market in which they predominantly operate is still far from saturation, allowing for faster introduction of new products. This may be an indication that some Polish enterprises are still in the transition stage, and might be more inclined to add more new products and even upgrade existing ones compared to their stable counterparts in Western Germany. Regarding innovation, however, according to a September 2008 survey by the Confederation of Private Polish Employers (PKPP Lewiatan 2008), during 2004–08, only 34 percent of SMEs reported interest in innovation, of which only two-thirds actually invested in R&D. A 2010 Polish Ministry of Economy survey found that while 30 percent of SMEs introduced some kind of innovation in 2008, only 16 percent planned to innovate in 2009. Low interest in innovation was reportedly due to the difficult investment climate, low access to finance, high perceived risk of innovation, and lack of clients' interest in new products.

Table 4. Technology Absorption in Enterprises in Poland, Eastern Germany, Western Germany, and the Czech Republic

*Initiatives of companies over the past 36 months, %*

	% of firms that have undertaken the initiative in-country			
	Poland	Eastern Germany	Western Germany	Czech Rep.
<b>Added new product</b>	<b>34.7</b>	<b>11.0</b>	<b>18.2</b>	<b>18.0</b>
<b>Upgraded existing product</b>	<b>49.0</b>	<b>29.1</b>	<b>49.3</b>	<b>29.7</b>
Discontinued product line	11.5	5.4	14.6	9.8
Obtained ISO	12.4	8.2	3.3	9.5

*Source:* World Bank Enterprise Surveys, presented by Itzhak Goldberg at the Knowledge Economy Forum IX, Berlin, 2010.

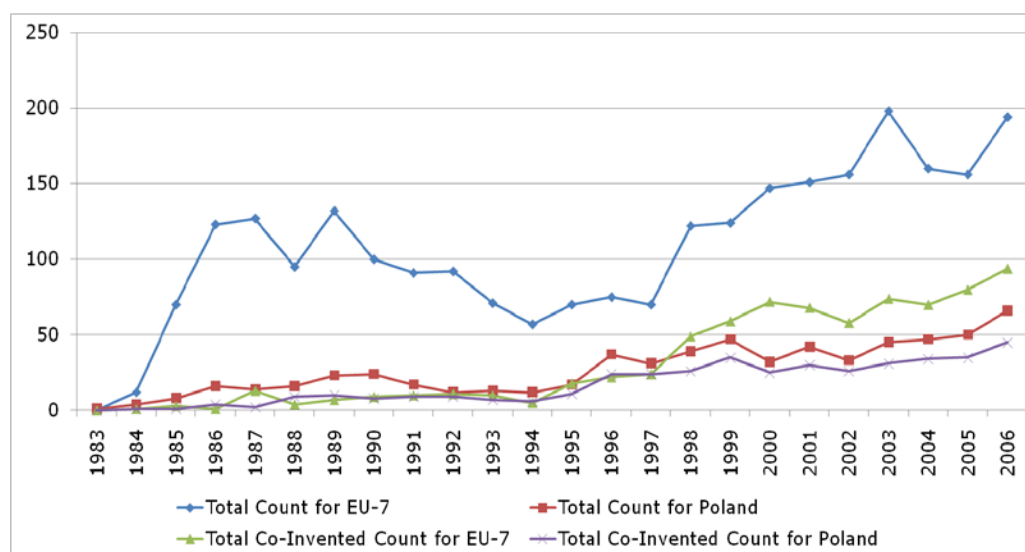
93. **Recommendations for improving Polish innovation and technology absorption** are discussed in the remaining part of this section. The following are discussed in turn: to improve the investment climate, promote international co-patents and co-inventions, complete the restructuring of RDIs, and establish a more efficient financing system for RDIs.

94. **Further improvements in the investment climate would encourage firms to invest in R&D.** Results of the World Bank Business Environment and Enterprise Surveys show that Poland does worse than the Czech Republic with regard to regulatory uncertainty, cost of

financing, macroeconomic instability, and access to financing.<sup>13</sup> However, Poland fares as well as or better than the Czech Republic in tax rates, functioning of the judiciary, and tax administration, but far behind Western Germany. The government is in the process of considering R&D tax breaks as a means of stimulating firm innovation. The feasibility of the tax system to reliably create incentives for SMEs to conduct and account for R&D expenditures will certainly be the subject of intense consultation and revisions.

95. **A public funding scheme to support co-inventions rather than domestic inventions could be established to promote international collaboration and knowledge spillovers.** The share of co-patenting compared to indigenous patenting is rising in Poland, but not fast enough relative to European comparators, let alone to global leaders. That patent counts reflect innovation is obvious. That they may reflect certain kinds of knowledge absorption is less evident, as discussed in the technical report. Furthermore, co-patents play a role in promoting higher-quality knowledge spillovers due to the more competitive, thoroughly reviewed, and cited nature of international co-patents. Co-patents are growing rapidly in the BRIC (Brazil, Russia, India, and China) economies, especially in China and India, and in several EU-7 countries (i.e. Czech Republic, Slovakia, Latvia, Lithuania, Estonia, Hungary, Poland), but not as fast in Poland (figure 12 and figure 13). Moreover, even though growth of Russian patenting is decelerating, a large fraction of Russian patents today are made up of multinational inventor teams (i.e., international co-inventions). Therefore, Poland may be better off promoting international collaboration through provision of specific financial incentives for co-patents. Interviews with inventors identified through the international patent office provide an exciting and unique review of the cases of co-patenting by Polish scientists.

**Figure 12. Invention and Co-Invention in Poland and the EU-7**

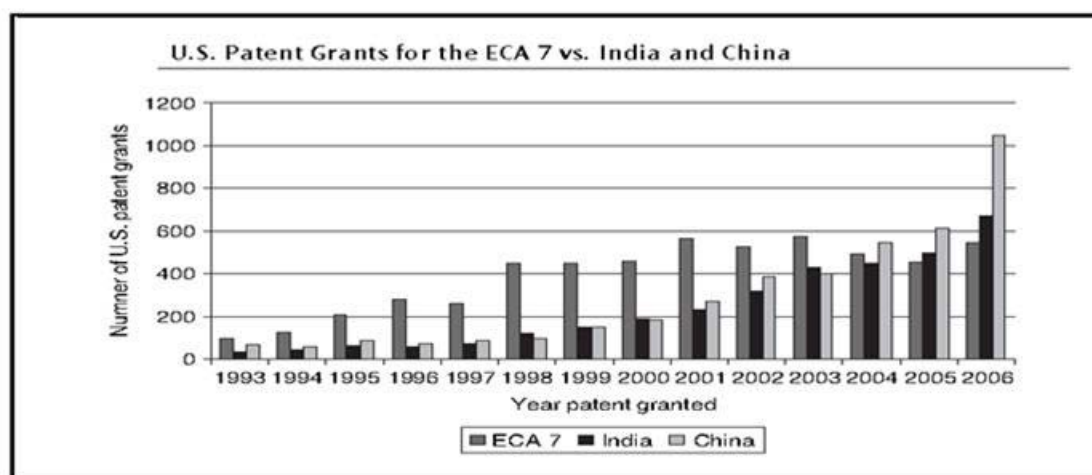


Source: U.S. Patent and Trademark Office data.

<sup>13</sup> In the World Bank's Doing Business 2010 report, the Czech Republic is ranked behind Poland in terms of the overall quality of business environment, which could be attributed to a different methodology.



**Figure 13. US Patent Grants for the ECA 7 vs. India and China**



*Notes:* The graph compares counts of patents in which at least one inventor is based in one of seven ECA countries, India, or China. The ECA-7 are Russia, Hungary, Poland, Slovenia, the Czech Republic, Bulgaria, and Ukraine.

*Source:* Authors' calculations based on the U.S. Patent and Trademark Office Cassis CD-ROM, December 2006 version.

96. **Restructuring of research and development institutes (RDIs) remains an incomplete agenda, undermining the government's objectives of effectively improving linkages between the Polish applied research and enterprise sectors.** The RDI sector in Poland has come a long way since the early transition years and has been restructured along various paths, the less favorable one being that of commercialization. Over time, commercialized RDIs become ineligible for public financial support but continue to be state owned, preventing them from functioning under the same incentives as private enterprises. In the long run, this ambiguous status leaves corporatized RDIs worse off than poorly ranked but subsidized RDIs.

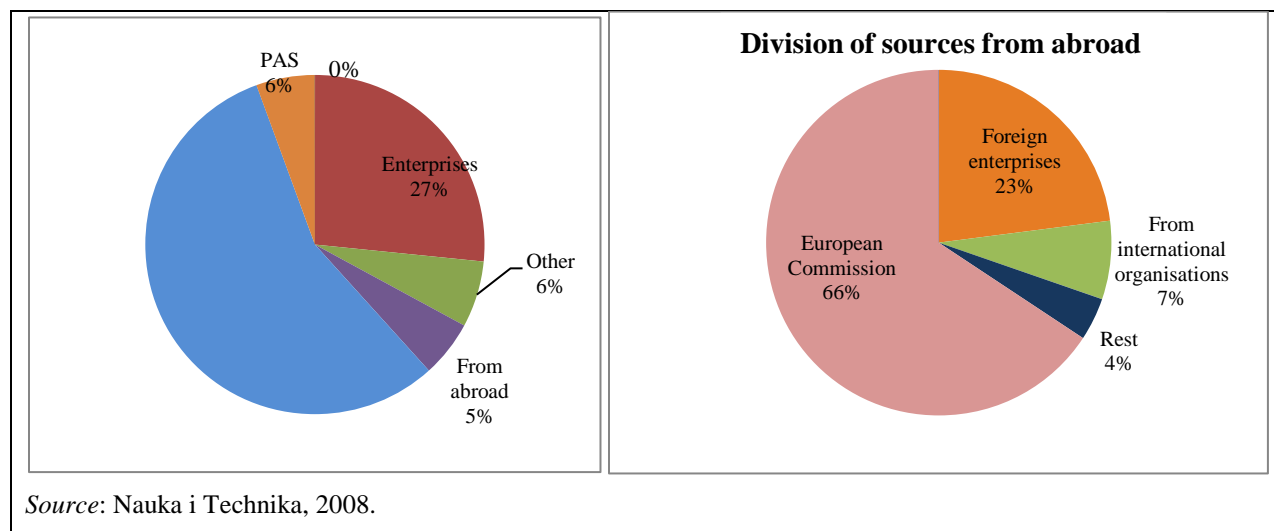
97. **There is a need to complete the restructuring of RDIs.** One option is insider privatization<sup>14</sup>, which is transfer of ownership to RDI managers and researchers could be initiated to complete the restructuring of commercialized RDIs and those volunteering for privatization. In these kinds of privatization, the transfer of ownership does not include the ownership of real estate, which will be subject to long-term land lease to avoid abuses.

98. **Establishing a more efficient financing system for RDIs catering to the needs of modern Polish industry is key.** Although still heavily reliant on budgetary funds, RDIs have diversified their competitive R&D income portfolio to a greater extent than other research sector entities. However, although RDIs have increased revenues from R&D services provided to firms, they have not done so sufficiently. Increasingly, they generate revenues from various external sources, including EU funding, which may be creating an undesirable dependence in the long

<sup>14</sup> We define *insider privatization* as a sale of the company's shares to its managers and workers; and *outsider privatization* as a sale to an investor who is an outsider, i.e. neither a manager nor a worker of the company. The 1990's privatization of RDIs in transition economies across ECA is considered to have had negative outcomes. In Russia, privatization that took place in the mid-90s led to acquisitions by investors interested in the valuable real estate possessed by the centrally located RDIs. The investors then typically disbanded the RDI and used the real estate to develop shopping malls and for other commercial urban uses. Another way to deal with the concern about assets is insider privatization: selling the shares of the enterprise to its researchers.

term (figure 14). Increasing the revenues generated from firm R&D collaboration remains a pressing priority for Poland. Other research entities, including Polish Academies of Science institutes and higher education institutions (HEIs), rely much more on public funding and cannot declare the same diversity in funding sources or partners.

**Figure 14. RDI Expenditures on R&D Activity by Source of Funds, 2008**



99. In the long run, the evaluation and financing indicators for RDIs, HEIs, and Polish Academies of Science institutes need to be aligned based on the differentiated institutional objectives and importantly varied outcomes tasked to these actors by the research system (for example, applied R&D, basic R&D, and teaching), and relevant differentiated indicators (patents, publications, international partnerships, sales of R&D and engineering services to firms, and so forth). The new law reforming the Polish science system entered into force on October 1, 2010. It introduced the parametric evaluation system for all research units. According to the new law, the Committee for Evaluation of Research Units (KEJN) was established to assess the quality of the work of individual research units. Given the variety of scientific research, special criteria and principles have been prepared to guide teams of experts involved in the assessment.<sup>15</sup> It will be important to closely follow the implementation of this new reform to ensure that differentiated evaluation is applied to universities, PAS institutes and applied RDIs, thus financing the best in each category based on tailored criteria for each type of entity.

100. R&D is crucial to promote both technology absorption and innovation to stimulate economic growth in Poland. National research reform priorities could hence include extensive efforts to:

<sup>15</sup> Based on the results of the parametric evaluation (ocena parametryczna), the Committee is to rank research units among one of three categories: A, B or C: where A stands for very good level (it is possible to award A + to indicate an outstanding level), B - satisfactory level (i.e. indicates recommendation to improve scientific performance or stimulate development of the economy), C - unsatisfactory level. The amount of subsidies granted to a unit will depend on the category. The priority will be to finance centers within category A. The Minister may grant additional financial support to those units. In turn, units which qualify as category C will receive funding for six months, with the longer term objective of incenting them to restructure and improve their performance.

- Improve the efficiency of public expenditures on R&D
- Improve the innovation climate for firms to invest in R&D
- Improve the availability of simple financial instruments promoting R&D in firms
- Employ public resources to support international co-patenting to promote global knowledge spillovers
- Complete the restructuring of RDIs
- Realign the balance between applied and basic research funding based on a modernized evaluation and categorization that will create incentives for the public sector to conduct applied R&D and to service the innovation and technology needs of both the large and, importantly, the small and medium-sized enterprises.

## **VII. Main Findings and Policy Options**

101. Raising employment, improving skills, and enhancing technology absorption and innovation could help offset the projected decline in potential growth and put Poland back on track for even higher growth rates. To achieve these goals, the report offers the following findings and recommendations.

### **Raising employment:**

- Increase economic activity among older workers (and older female workers in particular) as key to achieving the Europe 2020 employment target.
- Make further revisions regarding the access to social security benefits so that they do not present a disincentive for labor market participation;
- Increase ability for workers to enter into part-time employment which would increase economic activity especially among older workers;
- Enhance skill levels of the working age population as these are crucial for labor force participation.
- Adjust the retirement age of women to that of men (age 65).

### **Closing the skills gap and reforming education:**

- Focus on lifelong learning, involving all subsectors, and on equity of access and access to early childhood development education, in any overall reform of the education system.
- Develop a learning outcomes approach for all levels of learning, with more emphasis placed on generic skills as a basis for labor mobility.
- Broaden the mission of tertiary education institutions and make them more efficient through performance-based financing.
- Strengthen the Bachelor's degree as an important part of the future lifelong learning system.
- Place more emphasis on data collection and monitoring and evaluation of the system, including tracer studies for graduates.
- Strengthen the links between the education system and the economy through, for example, sector councils involving employers that establish learning outcomes for certain professions, employers' involvement in university governance, and so forth.

### **Refocusing technology absorption and innovation:**

- Improve the investment climate to spur firm investments in R&D.

- Channel public funding to support co-inventions in addition to domestic inventions, to promote international collaboration and knowledge spillovers.
- Establish a system of insider privatization, that is, transfer of ownership to RDI managers and researchers, (excluding the real estate), to complete the restructuring of commercialized RDIs and those volunteering for privatization.
- Reform the RDI financing system to strengthen applied research and links with the needs of Polish small and medium enterprises and industry.

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